MODERN TREND IN LIBRARIES: FOR BEGINNERS

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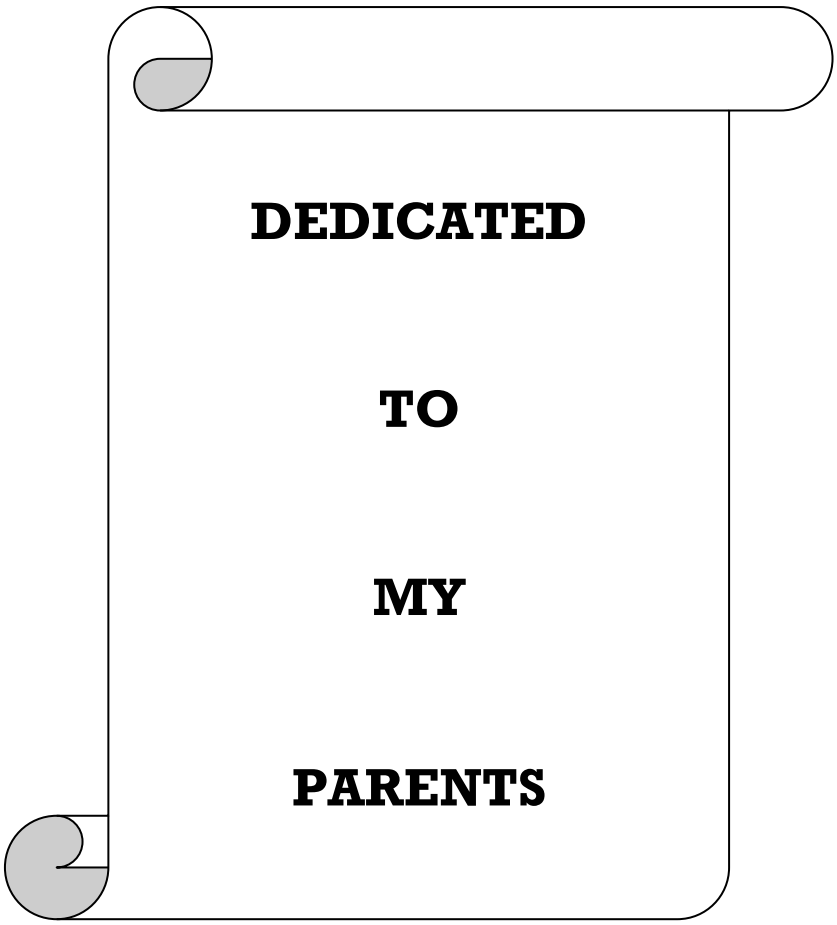
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TO
MY
PARENTS

Preface

Librarians and information professionals are confronted today by the rapidly changing environment. Automation of library activities and adoption of computers to both routine as well as non-routine activities has become almost a necessity and is being hotly discussed and debated in all professional gatherings. There are many reasons for this change. One of the major reasons to this change is the rapid developments that are taking place in information technology and the potential for new services which they bring. At the same time the demands for information by the library users are also changing. The readers are now coming with new expectations and insist for high quality service. On the other hand the range and variety of information sources that librarians handle are also changing. Apart from print material librarians now deal with online bibliographic databases, CD-ROMs, electronic journals, digital texts supplied from a number of vendors that are downloaded from Internet. Each of these format requires generic and highly specialized skills for searching, identifying, extracting and disseminating the right information to the right reader at the right time and in the right format.

Technological change is a major contributor to economic development. The rapid development of information and information technology has tremendously increased our capacity to process information and accelerated growth in the information intensive sector. The impact of information technology arises from its attributes such as enabling technology which can be applied in a wide range of different circumstances, the capacity of the technology increasing at an exponential rate; and the cost of the technology falling rapidly. These attributes of Information technology will trigger a new wave of economic growth stimulating the development of information society. It is indeed the avenues of information technology that should. beutilised to the possible extent in libraries and information centres to make

use of the information speedily, effectively, efficiently and with precision. The application of Information technology in libraries especially in developing countries like India is imperative in the present day information environment for sustainable development in the socio-economic, political, cultural and educational spheres.

The objective of this book is to give some ideas to library professionals and all other concerned in the field of information and about its use in the avenues of application of Information technology in libraries and information services in the present day information environment.

This book is organized under 16 chapter. All Chapters are focused on the application of Information Technology in Libraries and Information Services ie. Modern Trends in Libraries and to produce need-based manpower required to manage the libraries at the 21st Century.

I record the loving memory to my father Shri R.L. Singh who is still an inspiring source. I record my deep sense at gratitude to my respect Guru Prof. H.N. Prasad for his whole hearted encouragement in my writing and academic endeavors. I record my sincere thank to Dr. Ajay Kumar and Dr. Ramod Maurya Who helped me a lot in giving suggestions during the course of the study. I extend my appreciation to my wife Smt. Manju Lata Singh who unstintedly supported me all along the study. I am extremely thankfull to Mr. Krishna Prasad who have brought out this book neatly in the best format within an unbelievably short time.

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Chapter – 1

TRADITIONAL VS DIGITAL LIBRARIES: RESOURCES, SERVICES AND PRODUCTS

The Digital Library is an ICTs based system for acquiring, storing, organizing, searching and distributing information in digital format The concept of a "digital library" is not merely equivalent to a digitized collection with information management tools. It is rather an environment to bring together collections, services and people in support of the full life cycle of creation, dissemination, use and preservation of data, information and knowledge. The IT explosion and its implementation changed the entire scenario of the present world. Dynamic multimedia information is needed to meet the requirements of user of today. Digital libraries have become important elements in this era of Information Technology.

Digital library does not mean library in the classical sense, but a network of multimedia systems, a media server or group of interlinked workstations, connected through high-speed networks. Unlike a conventional library, where clientele are provided with physical materials from many sources, a digital library is a group of distributed repositories that clientele see as a single repository in digital form. In other words, in the digital library, the information arrives as needed at the users' screen. Library without walls and digital library have been used interchangeably to describe this broad concept. Depending on the specific library, a user may be able to access magazine articles, books, papers, images, sound files, videos, etc. Numerous terms are used by organizations as well as individuals to denote the concept of digital libraries. Generally, it denotes converting a document from non-digital medium to digital medium for better information storage and retrieval.

Characteristics

Following are the important characteristics of a digital library;

- To expedite the systematic development of procedures to collect, store and organize the information in digital form.

- To encourage cooperative efforts to save and share the investments in research sources, computing and communication network.
- To strengthen the communication and collaboration between creator and the user of the information.
- To provide the leadership for the successor for dissemination of knowledge in the area of research.
- To preserve the library reading material for a longer duration and saving the space.
- To solve the resource crunch in the library budgets being spent for the purchase of hard copies of books and journals.
- To create a comprehensive networked information environment.
- To facilitate quicker and efficient handling of information.
- To provide better services in a more personalized way and also provide retrospective services efficiently.
- To maintain and handle large amount of digitized databases.
- To help to save the time of library personnel by avoiding routine jobs.
- To present coherent view of all information within a LIC (Library Information Centre) in any format.
- To serve to widely dispersed communities throughout the network.

Components

Important components includes; Hardware, Software's, well designed LIC systems with LAN! WAN facility, Databases of Holdings in machine readable form, On-line Compatible systems to coordinate and manage multifaceted digital LIC resources, Communication facility like, email, fax, etc., Accessibility to Server, Network with Internet facility, Competitive manpower, etc. A digital library can be built around specific repository software. The best known examples of this are DSpace, EPrints, Fedora, Greenstone Digital Library Software, etc. The Reference Model for an Open Archival Information System (OAIS) provides a framework to address digital preservation.

Digital Collection

It has the following components: Data- Technical data, Numeric data, Photographs, Audio, Video, Indexing, On-line resources, Local database of traditional books in machine-readable form, E-books, virtual books, electronic text, map, image, sound, video, multimedia, E-journals and off-line resources.

Advantages of Digital Libraries

- No physical boundary.
- Round the clock availability.
- Multiple access.
- Preservation and conservation.
- Solves space problem.
- Networking.
- Optimal use of ICT environment.
- Structured approach.
- Ability to deal with large data sets.
- On-line learning environment.
- Wider range of materials.
- Access to latest information.
- Faster information retrieval.
- Lower maintenance.
- Cost effective.

The advantages of digital libraries as a means of easily and rapidly accessing books, archives and images of various types are widely recognized by commercial interests and public bodies alike. Traditional libraries are limited by storage space; digital libraries have the potential to store much more information, simply because digital information requires very little physical space to contain it. As such, the cost of maintaining a digital library is much lower than that of a traditional library.

A traditional library spends large sums of money paying for staff, book maintenance, rent and additional books. Digital libraries do away with these fees. Both types of library require cataloguing input to allow users to locate and retrieve material. Digital libraries may be more willing to adopt innovations in technology, providing users with improvements in electronic and audio book technology as well as presenting new forms of communication such as wikis

and blogs; conventional libraries may consider that providing online access to their OPAC is sufficient. An important advantage to digital conversion is increased accessibility to users.

Disadvantages of Digital Libraries

- Initial cost is high.
- Copyright and IPR issues.
- Speed of access and Bandwidth problem.
- Lack of information policy and information culture.
- Efficiency issues.
- Environment problems.
- Preservation issues.
- Digitization is not a permanent /long term solution.

Traditional Libraries vs Digital Libraries

Traditional Libraries

- Manual form of catalogue.
- Searching the book/journal is difficult, limited search options.
- Difficult to know the status of issued out books.
- CD-ROM Searching is difficult, one CD/One Reader at a time.
- Hard copies of journals, abstracts- difficult to consult, etc.

Digital Libraries & New web based Library Services

- OPAC to WebOPAC.
- CD-ROM to web-based indexes and databases.
- Manual reference service to digital reference service/virtual reference service.
- Manual document delivery to electronic delivery services.
- Dedicated library networks, improved search interfaces.
- New information services, such as a home page linked to a collection of electronic texts, databases and other Internet resources.
- Documents may be shared across all major networking platforms.
- Information is accessible regardless of the user location.
- Fill-in forms used for feedback and services.

- Requests for purchases, reservation and general library suggestions.
- Interlibrary loan and circulation.
- Reference questions.
- Virtual Library Tours.
- Library maps & floor plans.
- Photographic Views.
- Library Web Sites.
- Subject Gateways or Library Portals.
- Web-based User Education.
- Library Calendar.
- Web Forms.
- Bulletin Boards.
- Discussion Forums and Listservs.
- Frequently Asked Questions (FAQ).

With the application of Web 3.0, following more expanded services are available for digital library users, i.e. semantic web, linked data, natural language processing, artificial intelligence, Mashups, APIs, etc. Personalized OPAC services includes; access to TM, RSS feeds, blogs, wilds, tags, public and private profiles within the library's network, etc. Libraries have become a place where one can not only search for books and other resources but also interact with a community, a librarian and can also share the knowledge and understanding with them.

Types of Libraries in Today's perspective

Traditional library : The collection of the traditional library is mostly print media, manuscripts, etc. and is not generally well handy organized.

Automated library : A library with machine-readable catalogue, computerized acquisition, circulation and OPAC is called as automated library.

Electronic library : When automated libraries goes for LAN (Local Area Networking) and CD-ROM networking/mirroring, etc. and started procuring e-journals, e-books and other similar kind of publications then it is known as electronic library.

Digital library : It is a later stage of electronic library. In digital library, high speed optical fibre, etc. is used for LAN and its access is over WAN and provides a wide range of internet based services i.e. audio and video conferencing, institutional repositories and like others.

Hybrid library : The libraries, which are working both in electronic or digital and print environment, are known as hybrid libraries. Most of the libraries, which have been computerized in India, are of this category.

Current Indian Scenario: Digital libraries, like in other parts of the world, are fast emerging in India. India has the expertise to meet the challenges and to set up digital libraries in the country. We are at the threshold of breaking into cyber space and navigate through internet and world wide web. Through internet, it has now become possible to be a part of "Global village" and exchange information instantly. To mention, a few national level examples of digital libraries are;

- Vidyanidhi.
- Kalanidhi.
- Digital Library of India, Department of Information Technology.
- KrishiPrabha: Indian Agricultural Doctoral Dissertation Repository.
- The digital library of ERNET.
- Centre for Development of Advance Computing (C-DAC) Digitization Project.
- Digital Library of Library and Information Science (DLL) at DRTC, Bangalore.
- Million Book Universal Digital Library Project.
- Nalanda Digital Library Project.
- National Institute of Technology (NIT), Calicut.

Following are some of the national digital library networks which are important in the country:

- DELNET (Developing Library Network).
- INFLIBNET (Information and Library Network).
- NICNET (National Informatics Centres' Network).
- I-NET (Integrated Network).

- ERNET (Education and Research Network).
- SIRNET (Scientific and Industrial Research Network).
- CALIBNET (Calcutta Library Network).
- eGRANTH: Strengthening of Digital Library and Information Management under NARS. etc.

Digital Libraries and Websites on Internet: Global examples

Project Gutenberg, Google Book Search, Windows Live Search Books, Internet Archive, Cornell University, The Library of Congress World Digital Library, The Digital Library at the University of Michigan and Carnegie Mellon University's Million Book Project are considered leaders in the field of digital library creation and management. Some of the others include:

- ACM digital library- www.acm.org/dll
- ALA (American Library Association)-www.benedict.com
- Alexandria Digital Library- www.alexandria.sdc.ucsb.edu
- Argus Clearing House- http://www.clearinghouse.net/
- Berkeley digital library Sun Site- www.sunsite.berkeley.edu
- BUBL Information Service- http:/Ibubl.ac.uk/
- California digital library- www.cdlib.org
- Columbia university digital library collections- www.cc.columbia.edu/cu/librariesdigital
- Digital Library Federation (DLF)- www.clir.org/diglib
- Digital library.net- www.digitallibrary.net
- IFLA digital libraries- www.ifla.org/ll/diglib
- Informedia digital video library- www.informedia.cs.cmu.edu
- Internet Index- http://sunsite.berkeley.edulintemetjndexj
- Internet Public Library-http://www.ipl.org/
- Library of Congress- www.loc.gov
- National digital library- www.memorvioc.gov/arnmem
  Penn Electronic Library http://www.library.upenn.edulresour ce/
- WWW Virtual Library-http://www.edoc.com

New Roles of Librarians in the Digital Library Environment

- Subject Matter Specialist like Bioinformatics Librarian.
- Cybrarian.
- Digital Librarian.

- Electronic Librarian.
- Electronic Resources Librarian.
- HTML Coder.
- Information Analyst.
- Internet Cataloguer.
- Web Classificationist.
- Internet Information Consultant.
- Internet Librarian.
- Knowledge Manager.
- Library Manager.
- Virtual Librarian.
- Navigator.
- Network Manager.
- Web Master, etc.

Copyright and Licensing

Some people criticizes that digital libraries are hampered by copyright laws and IPR issues, because works cannot be shared over different periods of time in the manner of a traditional library. The republication of material on the web by libraries may require permission from right holders, and there is a conflict of interests between them and publishers who may or may not wish to create web versions of their content for commercial reasons. There is a dilution of responsibility that occurs as a result of the spread-out nature of digital resources. Complex intellectual property matters may become involved since digital material is not always owned by a library. The content is, in many cases, public domain or self-generated content only. Some digital libraries, such as Project Gutenberg- to digitize out-of-copyright works and make them freely available to the public. Other digital libraries accommxiate copyright concerns by licensing content and distributing it on a commercial basis, which allows for better management of the content reproduction and the payment (if required) of royalties. The fair use provisions under copyright law provide specific guidelines under which circumstances libraries are allowed to copy digital resources. Four factors that constitute fair use are purpose of use, nature of the work, market impact, and amount or substantiality of use.

New Interpretation of Five Laws of Library Science in the Digital Library Environment

- Libraries serve humanity.
- Respect all forms by which knowledge in communicated.
- Free access to knowledge.
- Use technology intelligently to enhance services.
- Honor the past and create the future. Conclusion

Conclusion

Digital library technology is becoming an essential enabler of library services. The digital library network within the users' community saves a lot of access time and energy of both the users and the library or information personnel. Digitization involves huge money to create and maintain a digital library. There are many software packages available for digital libraries; among these Greenstone, DSpace and EPrints are becoming more popular in India and abroad. Digital preservation refers to the various methods of keeping digital material alive into the future, Digital libraries are not going to replace the physical existence of documents completely but no doubt to meet the present demand, to satisfy the non local users, digitalization must be introduced. So it will not be strange if now, my library or your library will go for digitalization.

In digital environment, the librarians and information scientists are needed for packaging and repackaging of information, for electronic publishing, for reference purpose, for virtual reference, to advise the user about the strategy to identify relevant electronic sources, etc. Thus the librarian is more or less a hypertext engineer. In the new environment, it is very difficult for the librarian to decide what should be organized? How to organize the collection? etc. because, the new environment is really challenging one for the librarians. In the new environment, any one who has access to the network of digital libraries can be a publisher by merely posting messages to an online discussion group or by other means. A virtual environment is really open for all. Large scale digitization projects are underway at Google, the Million Book Project, MSN, Google and Yahoo. With continued improvements in book handling and presentation technologies such as optical character recognition and e-books, and development of alternative depositories and business

models, digital libraries are rapidly growing in popularity as demonstrated by Google, Yahoo!, and MSN's efforts. Just as libraries have ventured into audio and video collections, so have digital libraries such as the Internet Archive.

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5. www.cdac. inlhtml/pdf/dkatre4 .pdf
6. http://dspace.iimk.ac.inlbitstreanil2259/. .J05-mgs-ps-paper.pdf
7. www.springerlink.com/index/kb5gnik7fp5umx2cu.pdf
8. http:I/ncsi net.ncsi .iisc.ernet.inlgsdllcollectldrtbraraJindexlasso c/.../doc.pdf
9. http://dli.iiit.ac.inlfaq.html
10. http://inflibnet.ac.in
11. www.vidyanidhi.org.in
12. http://en.wikipedia.org/wiki1Digita11ibrary
13. www.cesa8 .kl 2.wi.us/medialdigital_dictionary.htm
14. www.aluka.org/pagelhe1p/tipsTechniques/g1ossary.jsp
15. www.seils.rutgers.edukcarballo/glossary.html
16. www.lib.fsu.edu
17. http://wiki.osuos1.org/disp1ay/OCKPub/ORMDefinitions
18. www.wtec.org/1oyolaIdigi1ibs/d_01.htm
19. www. l23exp-computing.com1t103974056477/
20. http://hd1.hand1e.net/4263537/2091
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Chapter–2

LIBRARY AUTOMATION

On account of information & knowledge explosion it has become essential for librarians to provide a master key to this repository of knowledge. The librarian started mechanizing activities of libraries and research institution through various gadgets. The main aim of any library is to provide access to proper information explosion, due to growing demands of the user and shrinking of financial resources, library is not able to obtain all the reading materials on demand. The only way to overcome these problems is resources sharing through networking.

India has made great strides in computer and telecommunication technologies. It was one of the first few nations, which realized the potentialities of computer for bibliographical information work and routine library housekeeping operations.

Globally, libraries are facing the challenges due to the introduction of the IT in the profession and the escalation in the number of publications; whereas the user demands are getting very pinpointed and specific. The electronic Publishing has further changed the mode of services expected from the traditional libraries. The traditional mode of library services was based on the print media, whereas the present mode lays emphasis on digital information resources, web and Internet resources for providing the services.

Computer has gained its importance in every field of human activity because of its speed, Accuracy and capability of large scale processing .It is space saving device as well because information stored on computer readable devices takes much less space than the conventionally stored systems. The main aim of any library is to provide access to proper information explosion, due to growing demands of the user and shrinking of financial resources, library is not able to obtain all the reading materials on demand ,The only way to overcome these problems is resources sharing through networking.

Automation

According to Webster's dictionary "automation is the technique of making an apparatus, a process or a system operate automatically". Automation word is used for automatic technical process.

Automation is a technique to make a system automated means self-active .For these electronic machines are used to automate the libraries. Thus library automation means the application of machines to perform the different routines, repetitive and clerical jobs involved in functions and services of the libraries.

Automation requires planning, designing, and implementation. Library automation reduces the drudgery of repeated manual efforts in library routine by use of library automation collection, Storage, administration, processing, preservation and communication etc. It increases productivity in terms of both works as well as in service.

Library Automation

In Libraries Automation refers to the process of automation in house functions such as circulation, cataloguing Acquisition, serial controls etc.

Library Automation is the general term for information and communication technologies (ICT) that are used to replace manual systems in the library.

Need of Library Automation

There are various reasons for automation

i. Information Explosion (Growth of documents)
ii. New Techniques.
iii. Lack of space.
iv. To save the time of the reader.
v. To improve the control over collection.
vi. To avoid the duplication of work.
vii. Greater efficiency
viii. Accuracy and promptness
ix. To share the resources sharing among through computer networks nationally and internationally.

Steps In Library Automation

Planning for Library Automation

- Needs mapping
- Staff involvement
- User awareness
- Hardware requirement (Client /Server, Printer etc)
- Best possible package
- Budget (Purchase, Operation, Maintenance etc)
- Maintenance
- Platform (Operating System)

Selecting Automation Packages

- User friendly
- Minimum Training
- Support internationally known standards (MARC, AACR2)
- Training and support (Email, Discussion Forum)
- Well-designed screens logically arranged functions with extensive help messages
- Popularity of package
- Multi-user and unlimited user access

Basic Requirements for the Automation of Libraries

i. Adequate selection.
ii. Financial assistance.
iii. Computer hardware.
iv. Library software.
v. Training of the staff.
vi. Maintenance of development.

Library House keeping Operations

A library will have to perform minimum number of basic operations. There operations are conventionally referred to as "Housekeeping operations".

The basic modules of automated system are

i. Acquisition
ii. Circulation
iii. Cataloguing
iv. Serial Control
v. OPAC
vi. Administration

Acquisition

The purpose of acquisition is to manage and control the expenditure of funds for materials that meet the collection development criteria of the library and the needs of its clientele. This means that acquisition process must be accurate, efficient and responsive to the demands of library users.

The main objective of automated acquisition system is as follow.

i. To reduce lab our and paper incentive work involved in manual acquisition.
ii. To maintain up to date information or record of all activities involved in acquisition.
iii. To have effective & efficient control over ordering, ëlaiming & cancellation functions.
iv. To provide accurate & timely financial information.
v. To provide necessary management information reports, whenever they are required.

Through this module library staff can search the entire database of library holdings for the purpose of duplicate checking etc. Using various combinations, number of reports could be generated.

Circulation Module

In libraries the circulation system conventionally managed consists of charges, discharges, overdue control, reservation, renewal and appropriate records maintenance. These operations are quite amenable to automation. An automated circulation system acts as in interface between the user and the information system with

Functions Of Circulation

- Issue Returns Renewal of Documents
- Reminders (Manually, emails)

Documents Issued /Returned, Popular documents, Fine amount collected, Fine Receipt

Cataloguing Module

One of the major tasks in libraries is cataloguing In manual cataloguing say card catalogue requires multiple entries author, title ,subject series, etc. This means repetitive work.

The module performs various cataloguing tasks such as original cataloguing using the Machine Readable Catalogue (MARC) protocol, editing, copying, saving and retrieving catalogues records. When a record is saved in the cataloguing database, the record automatically appears in the OPAC, and a brief copy of the record is also generated automatically for the circulation module.

Serial Control

The complex job of keeping track of serials can easily and effectively be handled using SOUL through its Serial Control module. This module broadly handles following functions.

- Suggestions.
- Subscription (renewal and new subscription)
- Payment including fund control etc.

other backup services like acquisition, cataloguing serial control and housekeeping chores.

The circulation module performs the task, involved in the circulation function, such as material check-in, check-out, inventory, overdue notices, holds, and reserves, fines, and statistical reports.
The use of technological devices such as computers, barcode, scanners and its software in circulation helps in performing these routine operators easily and quickly.

- Recall reservation, reservation cancellation
- Reports
- Check in of issues including reduction of issues arrival.
- Reminder generations.
- Binding management.
- Search status of every item.
- Master databases management.
- Reports generation etc.

Online Public Access Catalogue [OPACI]

Module because cataloguing module is the OPAC is what users consult to find and retrieve information of interest. Generally, the OPAC is equivalent to the card catalogue, but it provides advanced search features. The OPAC function allows searching by author, title, subject or keyword; search using Boolean operators [AND, RO, NOT] hyperlink searching, wild character searching and combined search strategy options. The OPAC module is the only one that is

inseparable from cataloguing. A library cannot have the OPAC without the cataloguing heart of the automated systems.

Functionalities Of Opac

- Simple and advance searching
- Boolean search (and, or, not)
- Field based searching (Author, Subject, Source etc)
- Browsing: Field based and Hierarchical
- Personalized OPAC (My OPAC)-SDI, CAS, Subject list etc.

Administration

- Various reports
- Accession register
- Books by unique title, frequently
- Books by subject wise
- Books/Issued/renamed /reminder/reserved
- List (User/publisher/Supplier)
- Receipt for fine amount deposit loss of book
- New additions, catalogues (Main /Author/Title)
- List of books by author/Title/Pub/Year
- Issued books
- Frequently-accessed books
- Stock verification Report
- No dues certificate

Library Software's

- SOUL
- LIBSYS
- SANJAY
- MAITRAYBE
- LIBMAN

SOUL [Software For University Library]

- Developed by INFLIBNET
- Window based user-friendly software
- Based on client server architecture
- Multi user access
- Well Designed Screens; logically arranged functions with existence help messages

- Provides facility to create view records in regional language (multilingual)
- Nominal price (includes installation onsite training, one year support, Free future updates multilingual software)

Libsys

- Most widely Used in INDIA,
- Fully Integrated
- Multi User
- System design to run on Super, Micro, Mini Computer under UNIX/LAN Platforms

.

Advantages Of Library Automation

There are several advantages of library Automation a machine readable catalogue prepared at the time of acquisition may be required respectively for number of purposes. Automation has the following advantages

i. It increases productivity in terms of both works as well as in service.
ii. Professional staff need not spend much time to do the routine library work.
iii. Eliminates human errors while performing routine library work.
iv. Improved Computer awareness among users.
v. Cataloguing is faster, instant access to non- records.
vi. Excellent control over circulation.

Disadvantages of Library Automation

- Initial and Recurring Expenses.
- Hardware and Software Obsolescence.
- Continuous Staff Training.

Conclusion

For the successful implementation of an integrated library system all key factors must be in place support from administration, staff, competence, consideration of user requirements, presence of infrastructure, (Hardware, Software, Networks) available data, excellent managerial skill from the coordinator of the project.

Libraries, librarians, and administrations must initiate automation in order to provide effective and efficient services to users. Library

professionals must upgrade their skills in order to meet the growing expectations of users from libraries.

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Chapter – 3

DIGITAL LIBRARY: TODAY'S NEED

Information and Communication Technology has revolutionized the concept of libraries. Each and every library is slowly getting digitized. A 'digital library' comprises digital collections, services and infrastructure to support lifelong learning, research, scholarly communication as well as preservation and conservation of our recorded knowledge. It is also a process of democratization of information.

We are in the age of a networked society where IT in addition to its use in all spheres of human activity has been used extensively to record, store, and disseminate the information in the digital form. IT has almost converted the world into a global village. The revolution in the IT sector is influencing the information industry also. Libraries are also changing to meet the demand put on them. The new generation whose demand for information is never met is always demanding that traditional libraries should be developed as a well equipped and interconnected as digital libraries. If we consider that the information is for use and for all then why not libraries for all? Why not libraries become universal' open for all those who seek for information. By considering this view a number of large organizations in USA and Europe have already more or less switched over to digital mode. They are making digital images of periodicals which are not available in electronic form and there after no new procurement is being made on print media if a digital version is available. Examples of such organizations are University Micrographic Inc. (UMI of USA), National Institute of Scientific and Technical Information (P41ST of France) etc.

The term "Digital Library" escapes precise definition, often being used interchangeably with "virtual library", or "electronic library", or "cyber library" or "multilingual digital library", or "poly media library" or "hybrid library". Hence, different people have defined digital library in different ways.

Dr. A.P.J. Abdul Kalam, the President of India defines Digital Library as "Digital Library is where the past meets the present and creates the future.

According to Arms a digital library is a managed collection of information with associated services where the information is stored in digital format and accessible over a network. The digital library federation in the USA defines the digital library as: Digital libraries are organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities. A digital library is an organized collection of digitized material or its holding in the digital form, which can be accessible by a computer on the network by using TCP/IP or other protocol.

The Digital Library is:

1. Organized collection of multimedia and other types of resources.
2. Resources are available in computer process able form.
3. The function of acquisition, storage, preservation, retrieval is carried out through the use of digital technology.
4. Access to the entire collection is globally available directly or indirectly across a network.
5. Support users in dealing with information objects
6. Helps in the organization and presentation of the above objects via electronic/digital means etc.

Digital Library Components

- IT Infrastructure: It requires a library system with adequate number of computers with LANL Internet & requires soft wares.
- Media Collections: It contains digitized information different media such as CDROM, Disk, etc.
- System Functions: A variety of system Functions to coordinate and manage the data existing and retrieval of data.
- Manpower: Trained manpower is required.

- Methods: Digital library can be built by adopting the following methods:

Acquiring Digital Media : A Digital medium contains a vast ocean of knowledge. These methods of information can be procured according to ours needs.

Buying access : Now a good number of technical joumals are published in electronic form. Library can subscribe these sources of digital information.

Content creation by Scanning : This method of information can be converted in to digital media by scanning the materials. Scanned documents are stored liked pictures and this should be converted as text documents. Much software is available for this purpose.

Postal size : It includes address of websites. If the user is the interested to visit a site, he can directly click the address and he will be connected to that site. In this way our library can act as a postal size.

Integrated Access : Digital Collections can also be delivered by combining one or more methods discussed above.

Elements Of Digital Library

Donald J.Waters of the U.S. Association of Research Libraries (ARL) identified five elements common to all definitions digital library in1995.

- The digital library is not a single entity.
- The digital library requires technology to link the resources.
- Linkage between digital libraries and information services are transparent to users.
- Universal access to digital libraries is a goal.
- Digital library collections are not restricted to document surrogates but include digital artifacts that have printed equivalent.

There are few more elements are also added
here:

- Handling are websites & databases
- Web online public access catalogue(OPAC)
- A private or public network
- Patron access through a browser or dedicated client
- Initial content from physical to digital form.

Objectives of the Digital Libraries

- To collect, store organize and retrieve digital information;
- To provide effective and efficient digital information services;
- To minimize massive storage and space problem in libraries;
- To share the networked information;
- To save the time of the of the library staff as well as users;
- To perform various library activities economically to all people.

Advantages of the Digital Library

A digital library is not confined to a particular location or so called building it is virtually distributed all over the world. The user can get his/ her information on his own computer screen by using the Internet. Actually it is a network of multimedia system, which provides fingertip access. The spoken words or the graphical display of a digital library is again having a different impact from the words that are printed. In the new environment owing a document will not be problem for the library because the user will pay for its uses.

1. **No physical boundary :** The user of a digital library need not to go to the library physically, people from all over the world could gain access to the same information, as long as an Internet connection is available.
2. **Round the clock availability :** Digital libraries can be accessed at any time, 24 hours a day and 365 days of the year
3. **Multiple accesses :** The same resources can be used at the same time by a number of users.
4. **Structured approach :** Digital library provides access to much richer content in a more structured manner i.e. we can easily move from the catalog to the particular book then to a particular chapter and so on.
5. **Information retrieval :** The user is able to use any search term bellowing to the word or phrase of the entire collection. Digital library will provide very user friendly interfaces, giving click able access to its resources.

6. **Preservation and conservation :** An exact copy of the original can be made any number of times without any degradation in quality.
7. **Space :** Whereas traditional libraries are limited by storage space, digital libraries have the potential to store much more information, simply because digital information requires very little physical space to contain them. When the library had no space for extension digitization is the only solution.
8. **Resource sharing :** A particular digital library can provide the link to any other resources of other digital library very easily thus a seamlessly integrated resource sharing can be achieved.
9. **Less expensive :** The cost of maintaining a digital library is much lower than that of a traditional library. A traditional library must spend large sums of money paying for staff, book maintains, rent, and additional books. Digital libraries do away with these fees.
10. **Easily accessible :** The advantages of digital libraries as a means of easily and rapidly accessing books, archives and images of various types are now widely recognized by commercial interest s and public bodies. We can also access any user account simply through a link.

Disadvantages of the Digital Library

The computer viruses, lack of standardization for digitized information, quick degrading properties of digitized material, different display standard of digital product and its associated problem, health hazard nature of the radiation from monitor etc. makes digital libraries at times handicap.

1. **Copyright: -** Digitization violates the copy right law as the thought content of one author can be freely transfer by other without his acknowledgement. So One difficulty to overcome for digital libraries is the way to distribute information. How does a digital library distribute information at will while protecting the copyright of the author?
2. **Speed of access: -** As more and more computer are connected to the Internet its speed of access reasonably decreasing. If new technology will not evolve to solve the problem then in near future Internet will be full of error messages.

3. **Initial cost is high: -** The infrastructure cost of digital library i.e. the cost of hardware, software; leasing communication circuit is generally very high.
4. **Band width: -** Digital library will need high band for transfer of multimedia resources but the band width is decreasing day by day due to its over utilization.
5. **Efficiency:-** With the much larger volume of digital information, finding the right material for a specific task becomes increasingly difficult.
6. **Environment:-** Digital libraries cannot reproduce the environment of a traditional library. Many people also find reading printed material to be easier than reading material on a computer screen.
7. **Preservation:-** Due to technological developments, a digital library can rapidly become out-of-date and its data may become inaccessible.

Requirement for Digital Libraries

The Internet and World Wide Web provide the impetus and technological environment for the development and operation of a digital library. The Internet provides the TCP/IP and or its associated protocol for accessing the information and web provide tools and technique for publishing the information over Internet. In the digital environment it is reasonable to say that a central back up or archive should be created at the national level, which will store information output of the region as well as information from outside the country. Some of the requirements for digital libraries are:

I. Audio visual: Color T.V., V.C.R., D.V.D., Sound box, Telephone etc.
2. Computer: Server, P.C. with multimedia, U.PS. Etc
3. Network: LAN, MAN, WAN, Internet etc.
4. Printer: Laser printer, Dot matrix, Barcode printer, Digital graphic printer etc
5. Scanner: H.P. Scan jet, flatbed, Sheet feeder, Drum scanner, Slide scanner, Microfilming scanner, Digital camera, Barcode scanner etc
6. Storage devices: Optical storage device, CD-ROM, Jukebox etc.

7. Software: Any suitable software, which is interconnected and suitable for LAN and WAN connection.

Resources of a Digital Library

The resources of a digital library are those, which the computer can store, organized, transmit and display without any intervening conversion process. It includes both print and electronic or digital material. The digital material may be of multimedia types or any other i.e. only digital audio, video, full text information, photograph, thawing, digitized sound, e-book, v-book, electronic tax, map, image, 3D representation etc. The collection may also include structured /unstructured text, scanned images, graphic audios, video recording etc

On-Line Resources

1. Local database of traditional books in machine-readable form.
2. F-book, v-book, electronic tax, map, image, sound, video, and multimedia etc.
3. F-journal
4. LAN, MAN, WAN for web browsing, email etc.
5. Well trained manpower for online help

Off-Line Resources

1. C.D-ROM, Jukebox etc.
2. Audio visual aid etc.

Need of Digital Libraries

Some of the common factor which are influencing to change to digital mode are the limited buying power of libraries, complex nature of recent document storage problem etc are some of the common factor which are influencing to change to digital mode, some other factors are-

1. Information explosion
2. Searching problem in traditional libraries
3. Low cost of technology: When we consider the storage capacity of digital document and its maintained then it can be easily realize that the cost of technologies is much more less than that of traditional libraries.

4. Environmental factor: the use of digital libraries is the cleanest technologies to fulfill the slogan "Bum a CD-ROM save a tree"
5. New generation needs

The Digital Library Challenges

- Technological obsolescence will affect the longevity of digital information;
- Media fragility;
- Hardware and software compatibility;
- Periodic transfer of digital material from one hardware / software configuration to another;
- Legal and organizational issues;
- Problems of formats;
- Problems related to security aspects.

The Digital Library: Opportunities

- The digital library allows access to information to its users as and when they need it from anywhere in the world;
- The digital library facilities improved access to information to providing various sophisticated search and retrieval facilities;
- The digital library facilities for information sharing among user through notification, file sharing and cooperative document preparation;
- The digital library help the users to get the up-to-date information because the time lag is reduced with the help of the web and digital publishing and quick inclusion of digital information in the digital library's collection;
- The digital library breaks the barriers of the time, space, language and culture;
- The digital library facilitate improved collaboration among users which was profound impact on the scholarly information life cycle the process by which researcher and scholars create, use and disseminate information;
- The digital library reduces the gap between nations and people in terms of infrastructure, facilities and resources. Thus, it reduces the digital divide.

Role of Librarian in Digital Environment

Though the digital environment is built as a system, which can be used by its ultimate end user directly from their desktop pc, the role of librarian cannot be overlooked. In digital environment also the librarian and information scientist will be needed for packaging and repackaging of information, for electronic pubLishing, for reference purpose, to advise the user about the strategy to identifS' relevant electronic sources etc. thus the librarian will be more or less a hypertext engineer. In the new environment it will be very difficult for the librarian to decide what should be organized? How to give citation? How to organize the collection? Etc because the new environment will be really challenging one for the librarian to decide who are author who are publisher and who are user?

In the new environment anyone who has access to the network of digital libraries can be a publisher by merely posting messages to an online discussion group or by other means. A virtual environment is really open for all. In some cases, librarians have the opportunity to digitize unique material in their libraries' collections, which can then be made accessible to users of the World Wide Web at large. Some US libraries have done this with local history collections; see, for example, http://www.orange.lioninc.org/local.htm; http://www.pe quotlibrary.comlrarebook/southportp ics.html

Conclusion

The new generation whose demand for information is never met is always demanding that traditional libraries is never met is always demanding that traditional libraries should be developed as a well equipped and interconnected as digital libraries. If we consider that the information is for use and for all then why not libraries for all? Why not libraries become universal 'open for all those who seek for information. By considering this view a number of large organizations are working for the same. The information explosion, searching problem in traditional libraries, low cost of technology, environment factor and new generation needs are the factors that show need of the digitalization. The traditional libraries are shifting towards the hybrid libraries. The initial cost of digitization is high but ones digitization is introduced then the cost to manage this collection will be cheaper than that of any traditional

library. Day by day the cost of digitization is decreasing, the online publications are increasing, and the needs of user are shifting towards a different environment. The physical existences of document are not replaced completely by the Digital libraries but no doubt to meet the present demand, to satisfy the non local user digitization must be introduced so that at least libraries becomes of hybrid nature. We have new roles to fill. While the format of our resources may change, while access to information may change, while style of service may change, the vision of high quality, service-oriented, and information centers still fits the library's mission. We will serve our user communities best by the digital library.

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Chapter–4

BEGINNING THE GREAT TRANSFORMATION IN INDIAN LIBRARIES

According to the International Federation of Library Associations and Institutions (IFLA, 1999), "theworld of information and communication is going through a period of unprecedented andaccelerating change. The public library is profoundly affected by this process of change. As thegateway to the world's knowledge for all the world's citizens, the public library has an enormousopportunity to enhance the scope of its services and become a vital bridge between the citizen andthe existing world of information".

The UNESCO Public Library Manifesto defines the public library as "the localgateway to knowledge, provides a basic condition for lifelong learning,independent decision-makingand cultural development of the individual and social groups" [1].The public libraries happen to cover the widest population possible; their role in spreadin literacy& education has long been acknowledged and is considered to be indispensable. Thepublic libraries in our country are in an abject state without a constantly refreshing printcollection and vibrant non print multimedia sources that lure illiterate and semi literate folk dueto various infrastructure, manpower and monetary constraints as well as lack of priority on thepart of policy makers and implementing bodies.The Public library scenario is not uniform in India. It has been difficult to collect authorizedstatistics on public libraries in the country, as the same happens to be under the purview of differentagencies and they never disclose such information on a national scale for various reasons. Thesefigures force us to guess only about the number of public libraries and there is no doubt to imaginethe difficulties of facilitating information and library support to the mass of over a billionpopulation, spread over 32 lakhs sq. km., with a spectrum of literacy, intelligence, money, culturaland caste values. As states differ in size, population, literacy rate, status of books produced in theconcerned regional language,

economic growth, public library system also differ from state to stateso far as its infra-structural facilities and patterns are concerned. Also there are administrative andmaintenance problems such as the rural libraries in some states form a part of the public librarysystem and in some other states they came under the jurisdiction of Adult Education Department orPublic Relation Department. Wide-spread illiteracy is the greatest handicap for developing libraryservices in some urban and rural areas in the traditional pattern.Raja Rammohan Roy Library Foundation (RRRLF)'s program of assistance is most helpful to thecause of public library services in the country. The program provides the best example of resourcesharing between the centre and the state for the development of public library services at all levels.The Foundation has taken long strides in promoting library service in the country. During the last28 years, the Foundation has covered, out of 60000 public libraries located in the country in ascattered way, more than 31000 libraries at different levels .But many of these public libraries (approximately 70% may be rural) are mere reading roomswithout much books or good infrastructure or trained staff. According to International Federation ofLibrary Associations & Institutions (IFLA) standards, there should be one public library for every3000 people [2], and thus with over 1 billion people India needs more than 3,43,000 public libraryunits. India has around 568558 inhabited villages [3] and there may be just one public library for8-10 of them. One of the IFLA standards stipulate with the nearest library unit should not be morethan a mile away from the residential areas. The major constraints faced by the public library systemto effectively disseminate information are manifold, essentially as a result of:

- A considerable percentage of the population is illiterate or functionally literate forcinglibrary to be of minimal use to them
- Poor allocation for the infrastructure improvement and collection development for publiclibraries
- Lack of enough sanctioned posts, forcing most of the services to be operated by voluntarynon-professional staff, causing sufficient deterioration on information organization andservicing

- There is also a problem of educated professionals preferring to work in specialand academic libraries than public libraries.
- Little emphasis on adoption Information & Communication Technology for public librarysystems and services.

Five Fundamental Law of Library and Information Science

1st Stage	2nd Stage	3rd Stage
1. Books are for use.	1.Inforamtion are for use	1.Libraries serve humanity
2.Every reader his/ her book.	2.Every reader his /her information.	2.Respect all forms by which knowledge is communicated.
3.Every book its reader.	Every information its Reader.	3.Use technology intelligently to enhance service.
4. Save the time of the reader	4. Save the time of information user	4.Protect free access to knowledge.
5.The library is a growing organism.	5.Information is a growing organism	5.Honour the past and create the future.

Reading Materials and Retrieval Techniques of Early Period library to 21st Century library

Period	Reading Material	Retrieval Techniques
Early Period	• Early reading material such as Pinakes, Clay tablets, Parchment, Vellum Bark of trees, Palm leaves, Papyrus, etc.	• Scholar librarian usually depended in memory. • Limited collections confined to religious institutions, royals and rich.
Mediaeval Period	• Paper, printing and books: • Paper was invented in 11th century in China, but rest of the world came to know only in 13th century.	• Still books were limited called incunabula, often kept in chain and locked. • Scholars were the moving catalogues.

16th and 17th Centuries	• Printing press was invented in the mid 16th century. • Movable letter presses and changes in social structure such as democracy and sovern states, resulting in the movement for education for the masses. • Birth of many educational institutions including Universities.	• Production of books became easy • Demand for books has increased • Need arose for libraries storing books in rooms made of bricks with large collections. • This resulted for the birth of Librarianship as a profession. Librarians were still scholars and were mostly depending on their memory for retrieval. Often prepared list of books (what we now call catalogues)
18th and 19th Century	• Saw the production of large number of books • Libraries were created for the benefit of citizens	• Classification and cataloguing dominated as two techniques of Information retrieval, assisted by personal assistance leading to Reference Service.
20th Century	• Periodical/Publications and serials became handy as quicker and faster means of Information communication	• Documentation work and service by producing Documentation lists.
	• Non-conventional documents: • Microforms, microfilms, micro-fiche, micro card • Video-audio tapes • Computer readable material Floppy, CDs	• Indexing, Abstracting, CAS, SDI, Repackaging were invented for Information retrieval. • Creation of large data bases, on-line retrieval • Public access system, etc.

	and other e-documents, net worked libraries etc.	
21st Century	• Euphoria of Internet Revolution	• On-line services (with the help of clicks)

Libraries for Today, Libraries for Tomorrow

When people think about their expectations of libraries today, they generally think about the traditional services that most libraries carry out so well.Topping the public's list of priorities is that the basic services they have come to expect from libraries remain free of charge to the public. They also expect libraries to have enough current books for children; numerous reference materials; and friendly, knowledgeable librarians available.Libraries should offer convenient reading hours and special programs for children, and they should have well-maintained buildings along with books and information that are organized for easy self-service.The top-ten list of public priorities for libraries also includes making available safe and productive gathering places for teenagers, being open on eveningsand weekends, and having plenty of current books for adults. For the most part, these public expectations are matched by libraries' performance, the public told us. People give especially high grades to their public libraries for having buildings that are well maintained; comfortable places to read; and enough friendly, knowledgeable librarians to supply help when needed. Although people clearly want libraries to access the basics—materials, hours, and service—they also expect more and more from libraries in this age of the Internet. "Long Overdue" reveals a great dealabout libraries and technology. Libraries are anything but relics of the past. They are viewed as key players in our digitized future. Two-thirds of survey respondents say that having enough computers and online services for people should be a high priority for their local library. Seven in ten favor wiring libraries so that those who might not be able to afford a computer in their home can learn computer skills and get online.Those who think that libraries are merely becoming "information resources of last resort" for those who can't afford a home computer seem to be mistaken. Advanced computer users and families with higher income are even more

likely to use public libraries and the technology services they offer. But, not surprisingly,people with few computer skills are the most likely to say wiring libraries to provide for "have-nots" should be a high priority.

ICT driven Public Libraries –the need of the hour

H.K. Kaul (2002) opined that "Our public library system in the country failed totally in bringingknowledge to the doorsteps of every individual. It is advisable for us to look at the problem afresh,especially when the computer and communication technologies have now become available to us ata minimal cost .ICT does not include only the Internet but a gamut of other tools which could be used individuallyor in convergence with each other.The convergence technologies include community radios,Internet radio, local area networks, tele-centres, information kiosks, mobile phones, WAPapplications etc. Use of convergence Technologies reduces the skew in knowledge distributionbetween rich and poor, educated and uneducated, rural and urban and men and women. ICT drivenpublic libraries should act as intermediary centre with suitable awareness programs. As the nervecentre for improving literacy, awareness, welfare and cultural awakening, it is the intention to putpublic libraries in the right perspective to arrive at a single window integrated environment forinformation dissemination concerned with all aspects of human life.

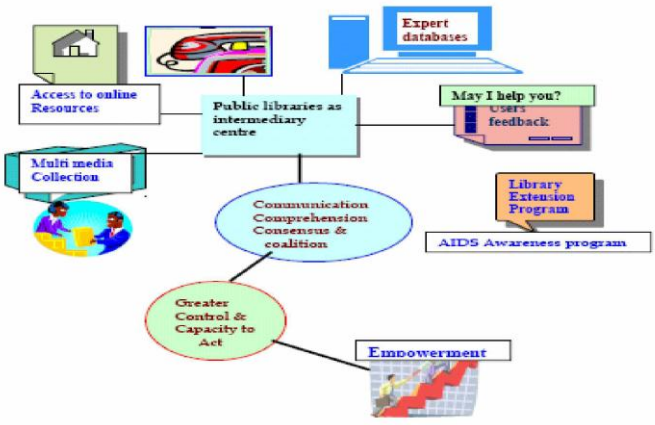

Fig-1: A proposed model of ICT- driven Public Libraries to empower unprivilegedmasses:

The emergence of Rural Digital Libraries in India

The emergence of intranet based "Gyandoot" digital libraries in Dhar district of MadhyaPradesh have changed the lives of unprivileged rural communities. "Gyandoot" is a uniqueform of G2C (Government to citizen) DL activity to address the hardship imposed bytransaction costs associated with government services. It connects 21 cyber cafes called"Suchanalayas" which provide services to about 10-15 gram panchayats, 20-30 villages andaggregate population of between 20,000-30,000 people. The Soochanalayas are located at theblock head quarters, haat bazaars and Bus depot centers and also on the road side where peoplenormally travel. These cyber cafes are operated by local operator called Soochak, who is alocal volunteer not a government person.

Beginning the Transition in Librariesi.e. Modern Trends In Libraries

We have transitioned from a time where information was scarce and precious to today where information is vast and readily available, and in many cases, free.

People who in the past visited libraries to find specific pieces of information are now able to find that information online. The vast majority of people with specific information needs to longer visit libraries. However, others who read for pleasure as example, still regularly patronize their local library.

Setting the Stage

We have put together ten key trends that the are affecting the development of the next generation library. Rest assured that these are not the only trends, but ones that have been selected to give their insight into the rapidly changing technologies and equally fast changing mindset of library patrons.

Trend 1 – Communication systems are continually changing the way people access information

Communication systems have been rapidly evolving. If you were to construct a trend line beginning with the 1844 invention of the telegraph, you will begin to see the accelerating pace of change : 1876 – telephone, 1877 – phonograph, 1896 – radio, 1935 – fax

machine, 1939 – television, 1945 – ENIAC Computer, 1947 – transistor, 1954 – color television, 1961 – laser, 1965 – email, 1973 – cell phone, 1974 Altair 8800, 1989 – World Wide Web, 1990 – Online Search Engine, 1992 – Web Browser, 1994 – Palm Pilot , 1996- Goggle, 1999 – P2P, 2002 – iPod, 2004 – Podcasting.

Certainly there are many more points that can be added to this trend line, but as you think through the direction we're headed, there is one obvious question to consider. What is the ultimate form of communication, and will we ever get there?

While we are not in a position to know the "ultimate form" of communication it would be a safe bet that if it not writing and reading books. Books are a technology, and writing is also a technology, and every technology has a limited lifespan.

Trend 2 – All technology ends. All technologies commonly used today will be replaced by something new

Media formats are continually disappearing. The 8-Track tape was replaced by the cassette tape, which in turn was replaced by the CD, which is currently in the process of disappearing altogether.

The telephone industry has bone from the dial phone, to push button phone, to cordless phones, to cell phones, to some sort of universal PDA, cell phone, music player, satellite radio, game machine device that will be totally unrecognizable by today's standards. Eventually the cell phone device will disappear. We don't need to see technology to interact with it.

In a similar fashion, every device, tool, piece of hardware, equipment and technology that we are using today will go away, and be replaced by something else. That something else will be faster, smarter, cheaper, more capable, more durable, work better, and look cooler than anything we have today.

Trend3 – We haven't yet reached the ultimate small particle for storage. But soon

We live in an awkward time where technological advances related to information storage are quite routine and expected. Each new breakthrough barely raises an eyebrow because they happen so often. However, Moore's Law will not go on indefinitely.

There are physical limits to how small we can make storage particles. Within the coming years, advances will slow and eventually stop altogether as we transition from our grand pursuit of tiny- ness to other areas on information efficiencies such as speed, reliability, and durability.

Once we conquer the ultimate small storage, particle, we will be able to set standards – both standards for information and standards for storage. This becomes extremely important as we try to envision the stable information base of the future, and the opportunities for libraries to interact with it and build new and exciting "information experiences".

But perhaps the most critical component of stabilizing information storage will surround the issues of findability.

Trend4 – Search Technology will become increasingly more complicated

Many people today think our present day search technology is fairly simple, and it is. But the simple search days are numbered.

The vast majority of today's search industry is based on text search. Text search is being expanded to cover the various languages of the world and some forms of image, audio, and video search are currently in place. However, next generation search technology will include the ability to search for such attributes as taste, smell, texture, reflectivity, opacity, mass, density, tone, speed, and volume.

As we achieve the ability to conduct more and more complicated searches, the role of the librarian to assist in finding this kind of information also becomes more and more important. People will not have the time and skills necessary to keep up on each new innovation in the search world, and they will need a competent professional to turn to.

Trend 5 – Time compression is changing the lifestyle of library patrons

The spectrum of human need is continually expanding. The paradigm of "need" is changing, evolving, and most importantly, speeding up. Time compression is affecting nearly every aspect of

our lives, but as we compress our time, we are also compressing our needs.

People today sleep, on average, two hours less per night than 80 years ago, going from 8.9 hours per night to 6.9 hours. 34% of lunches today are eaten on the run. 66% of young people surf the web & watch TV at the same time. In a recent survey, 43% of the people in our society are having trouble making decisions because of sheer data overload.

Basically, we have more needs faster.

So as the spectrum of human need grows, the opportunities for libraries to meet these needs is also growing. However, "needs" are a moving target, so the library of the future will need to be designed to accommodate the changing needs of its constituency. One of the needs that will be going away is the need to use keyboards.

Trend6 – Over time we will be transitioning to a verbal society

Dr. William Crossman, Fonder / Director of the CompSpeak 2050 Institute for the Study of Talking Computers and Oral Cultures, predicts that as we say goodbye to keyboards we will begin the transition to a verbal society. He also predicts that by 2050 literacy will be dead.

While the accuracy of his dates and the wholesale transition from literacy to a verbal society may be debatable, there will undoubtedly be a strong trend towards verbal information. Computers will become more human-like with personalities, traits, and other characteristics that will give us the sense of being in a room with other humans.

Trend7 – The demand for global information growing exponentially

Many secrets in tomorrow's business world lie in the writings of people who did not speak English or any of the other prominent global languages. A company's ability to do business in a foreign country will be largely dependent upon their ability to understand the culture, society, and systems within which that country operates.

The National Intelligence Council predicts "the globalization of labour markets, and political instability and conflict will fuel a dramatic increase in the global movement of people through 2015 and beyond. Legal and illegal migrants now account for more than 15 percent of the population in more than 50 countries. These numbers will grow substantially and will increase social and political tension and perhaps alter national identities even as they contribute to demographic and economic dynamism."

Our ability to learn about and understand the culture of the rest of the world are key to our ability to prepare ourselves for the global societies of the future. At the same time that we learn about global societies, a new era of global systems will begin to emerge.

Trend 8 – The Stage is being set for a new era of Global Systems

Most people don't think in terms of global systems, but we have many existing systems that have evolved over centuries that now play a significant role in our lives.

Our present global systems include international trade, global sea transportation, the Metric System, global news services, global mail system, time zones, global air transportation, and global stock trading. Two of the newest global systems include the GPS system and the Internet.

Few people think in terms of global systems and what they represent. But as we move towards more homogenized culture and societies, the need for creating cross – border systems will also increase.

Examples of future global systems include global accounting standards for publicly traded companies, global intellectual property systems, global tax code, global currency, global ethics standards, and an official earth measurement system. People will begin to develop these new global systems because each one represents a multi-billion dollar opportunity just from the sheer efficiencies created along the way.

Libraries will play a key role in the development of global systems because they will be charged with archiving and disseminating the foundational pieces of information necessary for

the new systems to take root. Libraries themselves are a global system representing and anchor point for new systems and new cultures.

Trend 9 – We are transitioning from a product – based economy to an experience based economy

As the world's population ages and the Baby Boom generation approaches retirement, many of them will begin to shed their belongings to create a more free and mobile lifestyle. Each item that a person owns demands their attention, and the accumulation of physical goods to demonstrate a person's wealth is rapidly declining in importance. Experience becomes the key.

How would you rate your last library experience? Chances are that you've never been asked that question. However, in the future, the patron experience will become a key measurement criteria.

Gone are the days of the solemn book-reading experience in the neighborhood library. Activities will be diverse and varied as a way of presenting and interacting with information in new and unusual formats.

But more importantly, books themselves will transition from a product to an experience. As books change in form from simple "words on a page" to various digital manifestations of the information, future books will be reviewed and evaluated by the experience they create.

Trend10 – Libraries will transition from a center of information to a center of culture

with the emergence of distributed forms and information the central role of the library as repository of facts and information is changing. While it is still important to have this kind of resource, it has proven to be a diminishing draw in terms of library traffic.

The notion of becoming a cultural center is an expansive role for the future library. It will not only serve as an information resource, but much more, with the exact mission and goals evolving and changing over time.

A culture-based library is one that taps into the spirit of the community, assessing priorities and providing resources to support the things deemed, most important. Modern day cultural centers include museums, theaters, parks, and educational institutions. The library of the future with developing an overall strategy that reflects the identity and personality of its own constituency.

Recommendations for Libraries

Libraries are in a unique position. Since most people have found memories of their times growing up in libraries have the luxury of time to reinvent themselves.

The role of a library within a community is changing. The way people interact with the library and the services if offers is also changing. For this reason we have put together a series of recommendations that will allow libraries to arrive at their own best solutions.

1) **Evaluate the library experience:** Begin the process of testing patron's opinions, ideas thoughts, and figure out how to get at the heart of the things that matter most in your community. Survey both the community at large and the people who walk through the library doors.
2) **Embrace new information technologies:** New tech products are being introduced on a daily basis and the vast majority of people are totally lost when it comes to deciding on what to use and what to stay away from. Since no organization has stepped up to take the lead in helping the general public understand the new tech, it becomes a perfect opportunity for libraries. Libraries need to become a resource for as well as the experts in each of the new technologies.
    - **a.** Create a technology advisory board and stay in close communication with them.
    - **b.** Recruit tech savvy members of the community to hold monthly discussion panels where the community at large is invited to join in the discussions.
    - **c.** Develop a guest lecture series on the new technologies.

3) **Preserve the memories of your own communities:** While most libraries have become the document archive of their community, the memories of a community span mush more than just documents. What did it sound like to drive down Main Street in 1950? What did it smell like to walk into Joe's Bakery in the early mornings of 1965? Who are the people in these community photos and why were they important? Memories come in many shapes and forms. Don't let yours disappear.
4) **Experiment with creative spaces so the future role of the library can define itself:** Since the role of the library 20 years from now is still a mystery, we recommend that libraries put together creative spaces so staff members, library users, and the community at large can experiment and determine what ideas re drawing attention and getting traction. Some possible uses for these creative spaces include :
    - **a.** Band practice rooms
    - **b.** Podcasting stations
    - **c.** Blogger stations
    - **d.** Art studios
    - **e.** Recording studios
    - **f.** Video studios
    - **g.** Imagination rooms
    - **h.** Theater-drama practice rooms

We have come a long ways from the time of da Vinci and the time when books were chained to lecterns. But we've only scratched the surface of many more changes to come. Writing the definitive history of modern libraries is a work in progress. Our best advice is to enjoy the journey and relish in the wonderment of what tomorrow may bring.

Conclusion

Public Libraries are often talked about as the possible solution to information poverty,libraries around the world have been working on the this daunting set of challenges for several year now.They have created many digital library initiatives and projects and have formed various national schemes for jointly exploring key issue with several years of accumulated experience,the initial

enthusiasm surrounding the development of digital library has been replaced by sober second thought.

Public Libraries in India should use new information and communication technologies to create online world which will further transform our lives.

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Chapter - 5

INTERNET, INTRANET AND EXTRANET APPLICATIONS IN LIBRARIES

INTERNET

The rapid growth in the web technology and its ever increasing usage has given librarians and educators with unprecedented opportunities to provide information to the students not within the four-walls of libraries and class rooms but also in the comforts of their home all over the globe. The changes, mainly driven by the new technological innovations and the new learning environment, has presented a scenario where student have access to a vast array or information in many fields from experts all over the world.

The Internet allows us to share information and resources such as government documents, electronic journals, electronic books, media publishing, human anatomical images, computer software, bibliographic and full-text databases, speeches, live concerts, audio and video clippings. The dynamic nature of Internet is derived from scientist, researchers and general public contributing their time, resources and energies to each other. Typical users consult electronic resources at near and distant libraries, download computer shareware and software upgrades, read and print publications, make travel arrangements and purchase goods and services. Electronic mail and news groups assist users to communicate with each other on topics of mutual interest. The discussion forum and listserv provides a platform to people with common interest to engage in thoughtful discussions. A few popular usage of Internet are as follows:

- Retrieving information from reference sources like dictionaries, encyclopaedias, etc. required for day-to-day work from reference sources available on the web;
- Retrieving information from databases of various libraries like the Library of Congress, British Library, Indian Institute of Science, IITs and several other libraries;

- Searching commercial and non-commercial databases like MEDLINE, INSPEC, COMPENDEX, etc.;
- Accessing electronic books, e-journals and other e-documents required for research work from the web sites of commercial and non-commercial publishers;
- Referring social and economic statistical data, such as census information, daily exchange rates, and government budgets and reports;
- Getting documents on fine arts and music, including digital images of art video and audio;
- Exchanging messages with people across the world;
- Searching for computer shareware freeware, and commercial software;
- Sending or receiving sound, animation and picture files across the Internet;
- Setting up temporary or permanent discussions or work-oriented groups;
- Distributing or reading electronic newsletters, newspapers, bulletins and similar publications, products and services;
- Trading with people or other organizations and other e-commerce activities; and
- Chatting with people using software like Yahoo Messengers, Hotmail Messengers, etc.

The explosive growth of the Internet and the World Wide Web in recent years has its impact on the information profession too. It has registered a sea change in the information seeking approach as well as the mode of dissemination of information. As librarians and information professionals, our prime responsibility is to acquire, organise, preserve, retrieve, and disseminate pertinent information to our clientele. This global forum, an emerging medium of communication, and a proven and concrete technology in sharing and exchanging information, has a lot to offer to the information professionals.

Internet Applications

Internet is the largest, vast and most complex and unorganised learning source in the world. The Internet hosts knowledge resources virtually in all disciplines. Besides, the Internet facilitates communication quickly and effectively with others who are also

interested in the same discipline. Teachers, students, and other educators can share ideas instantly across vast distances.

Individuals, companies, and institutions use the Internet in different ways. Business houses use the Internet to provide product information, online support service, etc. Companies carry out online trading, including advertising, selling, buying, distributing products, and providing after-sales services. Institutions use the Internet for audio and video conferencing and other forms of communication that allow people to telecommute or work from a distance.

The use of Internet Services over the Internet has resulted in increase in communication among companies, co-workers, and individuals. Media and entertainment companies use the Internet to broadcast audio and video, including live radio and television programs; to offer online chat, online news and weather programs. Scientists and scholars use the Internet to communicate with colleagues, to perform research, to distribute lecture notes and course materials to students, and to publish papers and articles. Individuals use the Internet for communication, entertainment, finding information, and to buy and sell goods and services.

A variety of Internet tools have been developed over the years to make effective use of resources and communication capabilities offered by the Internet. These tools can broadly be grouped into the following four categories:

i) Internet-based Communication Services
   a. Communication amongst Individuals: Electronic mail, Internet Telephony, Internet Chat
   b. Communication Services for groups: Internet Relay Chat, Electronic discussion groups, Listserv, News groups, Usenet and video conferencing.

ii) Connectivity
   a. Telnet
   b. Remote Login
   c. File Transfer (FTP)

iii) Information Resources
   a. Gopher
   b. WWW
   c. FTP Servers

Internet-based Communication Services

1. Electronic Mail (E-mail)

Electronic Mail, or e-mail, is a fast, easy and inexpensive way to communicate with other Internet users around the world. It is the most popular and widely used services of the Internet. E-mail is the term given to an electronic message, usually a form of simple text message, that a user types at a computer system and is transmitted over some form of computer network to another user, who can read it. Email offers speedy and economical transfer of messages anywhere in the world. Sending e-mail messages are virtually free even to long-distance destinations. The e-mail offers the following benefits over traditional paper based memo's and postal systems:

- ☞ Messages can be sent at any time across the world as easily as across the office, to a group of people or a single recipient, without the sender leaving their desk. Messages can be logged, ensuring some form of record is held, and messages are stored when the recipient is away from their desk.
- ☞ The recipient can collect their mail when they want, from, wherever, they are. Mobile users can collect their mail whilst out visiting customers, or at other locations.
- ☞ The person you are sending the message gets it directly, without passing through any third party.
- ☞ Unless printed, email messages require no paper or resources other than storage space on a computer disk drive.

2. Chat or Instant messengers

Chat refers to any live discussions conducted using the Internet, usually between more than two persons using their keyboard to communicate. Chat programs allow users on the Internet to communicate with each other by typing in real time. It is a feature offered by many online services or Web sites that allows users to "chat" by typing messages which are displayed almost instantly on the screens of other users who are using the chat room at a given time. After entering a chat room, any user can type a message that will appear on the monitors of all the other users. Chatting is one of the most popular uses of the Internet. Generally the users remain anonymous by using nicknames or pseudonyms to identify themselves online.

Internet Relay Chat (IRC) is a service through which participants can communicate to each other on hundreds of channels. These channels are usually based on specific topics. While many topics are frivolous, substantive conversations are also taking place. To access IRC, you must use an IRC software program.

Internet chat works on client-server model, i.e. it requires a chat server and a chat client, the former usually provided by an Internet service provider (ISP), the latter is used by the persons chatting. Usually, the "chat" is the exchange of typed-in messages requiring one site as the repository for the messages (or "chat site") and a group of users who take part from anywhere on the Internet.

A variation of chat is the phenomenon of the instant messenger. Instant messaging can be used to communicate privately with friends, relatives or co-workers. To send and receive instant messages, a user needs a connection to the Internet and instant messaging software such as AOL Messenger, Yahoo Messenger and MSN Messenger. The instant messaging software enables a user to set up a list of contacts who also use the same program. Once this list is set up, one can see each contact as they come online. A chat session can be started with them quickly and easily. Most conversations are typed text messages that are sent back and forth, though more advanced users can exchange voice, video, files and more.

3. Conferencing

One of the most exciting features of Internet is to communicate, talk, and see groups of people in different locations around the world, without the expense of travel. Conferencing can take many forms, such as web chat, audio conferencing, video conferencing, multimedia conferencing, screen-sharing, etc. The conferencing programs, such as the popular CU-SeeMe, allow workgroups to use the Internet to see each others' faces in small windows on the computer screen and to hear their voices through computer speakers. You can use the desktop video and audio simultaneously or use the audio alone, or just use the screen-sharing capability without either audio or video.

3.1. Voice over IP

Internet telephony or Voice over IP, where IP refers to the Internet Protocol that underlies all Internet communication. This phenomenon began as an optional two-way voice extension to some of the Instant Messaging systems that took off around the year 2000. In recent years many VoIP systems have become as easy to use and as convenient as a normal telephone. The benefit is that, as the Internet carries the actual voice traffic, VoIP can be free or cost much less than a normal telephone call, especially over long distances and especially for those with always-on **ADSL or DSL** Internet connections.

. The following components are involved in making a phone call on the Internet:

i) On the client side, a multimedia-equipped PC with special client software facilitates digitisation of voice. This can be done with a voice modem or other voice encoding method;

ii) A direct or dial-up connection to the Internet allows the voice to be transmitted in packet form to its destination;

iii) Connection with the far side is achieved by IP address search, common servers or beacons to identify the called party (and to "ring" that person's phone);

iv) A similar arrangement on the far end completes the call and allows both parties to speak.

There are also PSTN / Internet gateways that allow regular telephone callers to make Phone-to-Internet-to-Phone connections. There are PC-to-Phone connections and Phone-to-PC connections.

A growing number of firms now sell Internet telephone handsets-devices that look like telephone handsets but plug into computer and let you dial, for free, anyone else who owns a similar handset. Large corporations are already adopting these VOIP systems. The problems for VoIP include emergency telephone number dialing and reliability. Currently a few VoIP providers provide some 911 dialing but it is not universally available. Traditional phones are line powered and operate during a power failure, VoIP does not do so without a backup power source for the electronics.

Most VoIP providers offer unlimited national calling but the direction in VoIP is clearly toward global coverage with unlimited minutes for a low monthly fee.

3.2. Video Conferencing

Video conferencing is one of the most exciting areas of development in telecommunications, with applications ranging from business to government to education to home and family. Video conferencing involves sending video signals as well as audio and computer data signals. Conferencing can be done one-to-one, one-to-many (called multicast), and many-to-many (called multipoint). While video conferencing, one can talk as well as see the people sitting miles away as if all are discussing in one room facing each other. One of the most popular applications is transmission on news from various locations by the TV news channels. It also has enormous potential for enhancing communications for small and mid-sized companies, as well as distance learning. However, video conferencing requires sufficient bandwidth to transfer video files of acceptable quality. Desktop conferencing, therefore, is not yet widely implemented for business and educational use. As bandwidth increases, desktop video conferencing is expected to blossom. The PictureTel and Vtel are two of the largest companies that sell video conferencing equipment.

3.3. Net Meeting

Microsoft NetMeeting facilitates a new way of talking, meeting, working and sharing over the Internet. It uses Internet phone voice communications and conferencing standards to provide multi-user applications and data sharing over Intranets or the Internet. Two or more users can work together and collaborate in reach time using application sharing, whiteboard, and chat functionality.

NetMeeting can be used for common collaborative activities such as virtual meetings. It can also be used for customer service applications, telecommuting, distance learning, and technical support. The product is based on ITU (International Telecommunication Union) standards, so it is compatible with other products based on the same standards. Some of NetMeeting's built in features are listed here. Using NetMeeting, a user can:

- Place calls to anyone using the Internet or an intranet

- Talk to someone over the Internet or an intranet
- See the person being called
- Work with others in an application
- Use the Whiteboard to sketch in an online meeting
- Check Speed Dial list to see contacts that are logged on
- Send typed messages in Chat
- Send files to everyone in a meeting.

This software product supports text chat, video shared whiteboard, transferring of files, directory of connected users.

Using the directory, one can find someone to communicate with and call them. Communication can be established using text chat, video or audio provided both the parties have the necessary hardware support.

Files, such as documents or pictures, can be exchanged. One of the problems with net meeting is the break-up in audio that sometimes becomes inaudible when using it on the Internet, though it works fine over a high-speed company network.

Net meeting is normally installed with Internet Explorer, or it can be download from http://www.microsoft.com/windows/ netmeeting/. There is a web site dedicated to Netmeeting at http://www.netmeet.net/.

3.4. Net Show

NetShow is basically a low-bandwidth alternative to video conferencing. It provides live multicast audio, file transfer and on-demand streamed audio, illustrated audio, and video. It is also development platform on which software developers can create add-on products. According to Mircosoft, netShow takes advantage of important Internet and network communication technologies to minimize traffic while providing useful tools for multi-user collaboration. NetShow also uses streaming technology (as discussed above), which allows users to see or hear information as it arrives, rather than wait for it to be completely transferred.

3.5. Listserv

E-mail also provides a platform for sharing information quickly, and on a grand scale by using listservs. Listservs are electronic groups that typically centre around broad topics such as Digital

Libraries or Reference Service, etc. Listservers of IFLA with the name IFLA-l, Digilib-l, LIBJOBS-l are good example of this. Every e-mail message sent to the listserv is distributed to all members of that listserv, which is potentially hundreds or thousands of people. It does not cost anything to subscribe to a listserv, but simply requires that the user sends an e-mail message to the appropriate address with the message: subscribe (listserv) Firstname Lastname. Each Listserver has one address where a user sends requests to subscribe, un-subscribe, search the archives, etc., and another address to send actual questions or responses to the readers of the list. Apart from organising discussions, job announcements and conference announcements are popular usage of Listservs.

3.6. News Groups

Another Internet service similar to listservs is a newsgroup. News Groups are like an International bulletin board. Each group is a forum for a different subject, where a subscriber can post his / her questions or answers. There are thousands of groups covering just about every area of interest. The difference between listserv and news group is that when a user joins a group, the mail is no longer automatically deposited into his mailbox. Instead a user is expected to go to the newsgroup himself to read it. Some listservs can also be accessed as a newsgroup. A good analogy to a newsgroup is a bulletin board, i.e. one can go to it, as opposed to having mail delivered to his / her desk. The mails from newsgroup does not get cluttered and it can be easily regulate how often messages are read. A drawback of a newsgroup lies in the fact that a user must remember to go out to the newsgroup to look for the information.

There are hundreds of newsgroup communities. They centre around topics such as computing, news, recreation, social, and "alternative" topics. Each newsgroup's name begins with a code that identifies the type of newsgroup that is. For instance:

comp.human-factors is a newsgroup dealing with the human factors of computing.

soc.college.teaching-asst is a social newsgroup for college teaching assistants

alt.fan.jimmy-buffett is an alternative newsgroup for fans of Jimmy Buffet

clari.biz.market.otc a business newsgroup for counter stock market exchange.

There are newsgroups dealing with virtually every topic under the sun (although new groups appear every day). The only problem one might encounter is that it is left up to the service provider to determine which newsgroups will be made available on the new system. (this is comparable to the problem encountered with basic cable television.)

3.7. Usenet

Usenet is a worldwide bulletin board system that can be accessed through the Internet or through many online services. The USENET contains more than 14,000 forums, called newsgroups, which cover every imaginable interest group. For example, some newsgroups are self-help groups for victims of cancer or sexual abuse, and others give the latest in gossip about show business personalities. Anyone can contribute a message, called an article, to a Usenet newsgroup or post a reply, known as a follow-up post, to an existing article. With the aid of a newsreader (a program designed to access Usenet newsgroups), one can read an entire threat, i.e. all the replies to an interesting article.

The system is intended for exchange of information in an informal way. Anyone can post new messages to the group and reply to other messages. News groups are arranged in a loose hierarchical order covering about 5,000 subjects. About half of these are related to computing, the rest are for recreational subjects, professional discussion and trivia. To use Usenet, one requires a news viewer and access to an NNTP server. Most Internet service providers have such a server.

3.8 Wiki:

WikiWeb, or simply ***WikiWiki*** or ***Wiki*** (with a capital 'W'), is the first ever wiki, written in Perl. Ward Cunningham started developing WikiWikiWeb in 1994 and installed it on Internet domain c2.com on March 25, 1995. The term wiki is a collaborative software itself (wiki engine) that facilitates the operation of such a Web site, or to certain specific wiki sites, including the computer science site (the original wiki) WikiWikiWeb and on-line encyclopedias such as Wikipedia. A **wiki** can also refer to the

website that allows the visitors themselves to easily add, remove, and otherwise edit and change available content, typically without the need for registration. This ease of interaction and operation makes a wiki an effective tool for mass collaborative authoring. The word is sometimes interpreted as the backronym for "what I know is", which describes the knowledge contribution, storage, and the exchange function.

A wiki enables documents to be written very collaboratively in a simple markup language using a web browser. A single page in a wiki is referred to as a "wiki page", while the entire body of pages, which are usually highly interconnected via hyperlinks, is "the wiki"; in effect, a wiki is actually a very simple, easy-to-use user-maintained database for searching or even creating information.

A defining characteristic of wiki technology is the ease with which pages can be created and updated. Generally, there is no review before modifications are accepted. Most wikis are open to the general public without the need to register any user account. Sometimes session login is requested to acquire a "wiki-signature" cookie for autosigning edits. Many edits, however, can be made in real-time, and appear almost instantaneously online. This can lead to abuse of the system. Private wiki servers require user authentication to edit, sometimes even to read pages. Wiki is unusual among group communication mechanisms in that it allows the organization of contributions to be edited in addition to the content itself.

3.9 Blogs

The term "blog" is derived from "**Web log**." "Blog" can also be used as a verb, meaning *to maintain or add content to a blog.*A **blog** is a user-generated website where entries are made in journal style and displayed in a reverse chronological order.

Blogs often provide commentary or news on a particular subject, such as food, politics, or local news; some function as more personal online diaries. A typical blog combines text, images, and links to other blogs, web pages, and other media related to its topic. The ability for readers to leave comments in an interactive format is an important part of most early blogs. Most blogs are primarily textual although some focus on photographs (photoblog),

sketchblog, videos (vlog), or audio (podcasting), and are part of a wider network of social media.

Access to Information Resources

1. Gopher

A system, developed at the University of Minnesota, that pre-dates the World Wide Web for organizing and displaying files on Internet servers. A Gopher server presented its contents as a hierarchically structured list of files. The originators define Gopher as "a software following a simple protocol for burrowing (as a gopher does) through a TCP/IP Internet. The protocol and software follows a client-server model." With the ascendance of the Web, many gopher databases were converted to Web sites which can be more easily accessed via Web search engines.

From about 1992 to 1996, Gopher was an Internet application in which hierarchically-organized text files could be brought from servers all over the world to a viewer on his / her computer. Gopher was a step toward the World Wide Web's Hypertext Transfer Protocol (HTTP), which effectively replaced it within a short time. With hypertext links, the Hypertext Markup Language (HTML), and the arrival of a graphical browser, Mosaic, the Web quickly transcended Gopher. Two tools for searching Gopher file hierarchies were Veronica and Jughead.

Although the root directory for Gopher is sometimes still accessible at the University of Minnesota or elsewhere and despite some efforts to revive Gopher, virtually all Gopher servers are no longer active. It seems likely that almost all of the original Gopher content has been made accessible on the World Wide Web.

2. WWW as Information Resource

The web has established itself as the most widely-used information resource by all kinds of people for variety of reasons. There are all kinds and types of information resources available on the web. 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. The information resources available via the web includes electronic journals, courseware, tutorials, manuals, patents, preprints, news, software, technical reports, theses and dissertations, bibliographic databases, images, audio, video, equipment / product Catalogues, scientific data sets, library catalogues, museum and archives, virtual libraries, electronic books, online bookselling and print-on-demand, reference sources including dictionaries, encyclopaedias, biographies, abbreviations, thesauri, subject headings, handbooks, maps, organizations and people including employment & career sources, funding / grants sources, libraries / information centres, organizations, research institutes, companies, societies, people, experts, scientist, directories and subject portals.

4 Searching Information Resources on Internet

4.1. Archie

Archie is a file searching system that was developed at McGill University of Canada. It was originally formed to be a quick and easy way to scan the offerings of the many anonymous FTP sites that are maintained around the world. Currently it indexes about 12000 servers and over 2 million files. The archie service is accessible through an interactive telnet session, e-mail queries and command line and X-window clients. Each Archie server, independent of the others, collects data and stores it for future use. The data it collects is retrieved from anonymous FTP sites. Each Archie server stays in contact with anonymous FTP archive sites all around the world and maintains an up-to-data composite index of their holdings. Archie servers do not collect and store the actual files themselves; instead, they index only the directory names and file names.

Finding a file on the Internet by simply browsing through he directories of hundreds of FTP sites is physically impossible. Herein lies the purpose for learning how to to use Archie: Archie servers provide a search mechanism for locating files. Anyone who has access to the Internet can search the indexes. Search results tell you which FTP server stores a particular file or directory and what the pathname is for locating it. Although each Archie server is a

separate entity, they all perform the same service and even index close to the same FTP sites.

A query can be put to archie to find filenames which contain a certain search string or whose description contains a certain word. It returns the actual filenames that meet the search criteria, and the name of servers containing those files. Then you can retrieve the desired file using FTP.

4.2. Veronica

Veronica was a program that allowed a user to search the files of the Internet's Gopher servers for a particular search string. Veronica indexed the world of Gopher servers, much like Archie searches all anonymous FTP servers. Veronica was an indexing spider that visited the Gopher sites, read all the directory and file names, and then indexed them in one large index. However, with the almost complete demise of Gopher servers, Veronica has become a relic of the early 1990s.

4.3. Wide Area Information Search (WAIS)

Developed by Thinking Machines in collaboration with Apple Computer, the Wide-area information servers (WAIS) is an Internet system in which specialized subject databases are created at multiple server distributed at various locations and made accessible in real-time to the users with WAIS client programs. A users can either download a WAIS client or use Telnet to connect to a public WAIS client. The WAIS is used as a back-end search engine in combination with the Web. WAIS uses its own Internet protocol, an extension of the Z39.50 standard. A directory of servers keep track of servers distributed at various locations. The user of WAIS is provided with or obtains a list of distributed databases. The user enters a search argument for a selected database and the client then accesses all the servers on which the database is distributed. The results provide a description of each text that meets the search requirements. The user can then retrieve the full text. WAIS relies on indexed data collections, or libraries. These libraries are the collections that consist mostly of informational material.

Most Web users would consider WAIS as superfluous with abundance of server files and search engines. However, librarians

and specialist users may find some specialized information available through WAIS that is not currently available on the Web.

The WAIS was developed a generalized retrieval system for accessing data around the world i.e. to provide a common interface to multitude of Internet databases. WAIS works in two parts.

- ☞ The server side, which indexes WWW sites periodically and maintains this index for access by WAIS and WWW clients.
- ☞ The client side, which includes WAIS clients and WWW clients.

WAIS search engines support Boolean queries, truncation amd proximity searching.

Intranet, Extranet and their application in libraries

Intranet

An "intranet" can be, defined as an "internal internet"— a network of an institution, university or college or even a large library that runs on IP protocols. An intranet is a private network that is contained within an organization/ library. It may consist of many interlinked Local Area Networks and also use leased lines in the Wide Area Network. Typically, an intranet includes connections through one or more gateway computers to the outside Internet. The main purpose of an intranet is to share information within the organization and computing resources among employees. An intranet can also be used to facilitate working in groups and for teleconferences.

The *Intranet* is a Web-based architecture used for managing internal information. Another definition can be given as: Intranet is an organisation's internal information system that uses Internet tools, protocols, and technology. An Intranet could be something as simple as a single HTML document made accessible on a Local Area Network with no access to the Internet at large; or it could be as complex as one or more dedicated Web servers with thousands of HTML documents linking together a worldwide network of corporate offices; or it could be anything in between.

An intranet differs from a conventional LAN in two ways: it links more than one kind of networking technology using the Internet protocols, TCP/IP; and it uses a firewall to keep the larger Internet out of your

internal information resources. This means Intranets take the same features that make a World Wide Web useful - minus geographic and time barriers, integrating multiple information services into a single interface, interactive multimedia application, etc. - and bring them into the office.

Advantages of Intranet

An increasing number of organisations throughout the world are now using almost all the facilities/ provisions of Internet technology for internal communication. Access to internal document collections, document management system, chat, file transferring, e-messaging and video-conferencing are the popular usage of Intranet. Almost all the internal information of an organisation such as newsletters, telephone directories, calendars, policy manuals, current personnel lists, etc. are being made available through Intranets. The Interanets are becoming quite popular due to the following reasons:

i) The interface is easy to use; it also encompasses access to multimedia formats such as text video, sound and graphical images.

ii) A single interface to all formats of information using the Internet open standard removes the requirement for an organisation's network to provide several dedicated interfaces traditionally needed to interrogate proprietary systems such as databanks, bibliographic information retrieval systems and management information systems. Also, the user only needs to be familiar with one interface.

iii) Compared to the cost of employing proprietary information systems, or group ware, intranets are very inexpensive to set up. In addition, proprietary packages also use in-house protocols, which often result in a dependency on the software distributor, and update and utilities may only be acquired from the original vendor.

iv) They provide improved access in a number of respects:

a) documents may be shared across all major networking platforms.

b) information is accessible regardless of the user's location

c) a workstation configured for use on an intranet is also ready for Internet use if the necessary gateways are incorporated into the network.

d) access and use of groups using the intranet may be monitored, making it
possible to assess the value of services and resources offered on the intranet

e) user authentication systems can be incorporated into browsers, so that
access to information can be controlled.

v) They allow for maintenance of current documents, by offering access to electronic documents that will always be the latest version. The eliminates significant reprography, and time spent trying to locate lost paper-based documents.

Library Applications of Intranet

As Intranets become ubiquitous in the corporate world, there is no reason that these same concepts can't be applied to libraries[1] internal information system. Nonprofit library systems that are "single" library systems or multiple library systems confined to relatively small geographic areas a city, country, or college campus - may not realize the same benefits that national and international corporations realize, but there are still benefits to be gained.

Intranet in libraries can be used to link staff to copies of departmental handbooks, personnel manuals, copies of the library's mission statement, goals and objectives, annual reports, staff white pages, etc. The Intranet also can serve as a bulletin board where the library staff posts interesting news stories, job announcements, monthly reports, and training schedules. With applications like RealAudio, messages can be heard, not just read.

Libraries can also use the facility of Intranet for informing its readers within a parent organisation about the new arrival of publications and its CAS and SDI services can be rendered through it. The users can also access information about the availability of any publication in the library and its status (whether issued or not, if issued then to whom) through Intranet. A copy each of the reference queries earlier met by the library staff can also be kept on the Intranet servers so as to be accessed by the library users. An Academic Library can keep various forms such as, membership form, reservation request form, etc. on the Intranet so as to provide improved services to its users.

Almost all the Standard Libraries software programmes are now providing Web based access to its users. These include access to library catalogues, list of additions, Circulation Information, status of issues of Periodicals, Documentation List, etc.

Extranet

An Extranet, or extended Intranet, can be defined as a private network of linking branch offices or several cooperating organizations located outside the walls of any organisation. An Extranet service uses existing Intranet interactive infrastructure, including standard servers, e-mail clients and Web browsers. This makes Extranet far more economical than the creation and maintenance of a proprietary network. It enables trading partners, suppliers and customers with common interests to form a tight business relationship and a strong communication bond.

The Extranet can be defined as "a network that links business partners to one another over the Internet by tying together their corporate intranets". Extranets may be used to allow inventory database searches, for example, or to transmit information on the status of an order. They are being used by businesses of all types such as banks, airlines, railways, large corporate offices having several branches etc.

An Extranet is a private network that uses the Internet protocol and the public telecommunication system to securely share part of an organisation's information or operations with its branches (located within the same city or outside), partners, users, customers, suppliers or contacts. An extranet can be viewed as part of an organisation's intranet that is extended to users outside the organisation.

An extranet requires security and privacy. These require firewall server management, the issuance and use of digital certificates or similar means of user authentication, encryption of messages, and the use of virtual private networks (VPN) that tunnel through the public network.

Advantages of Extranet

An organization can use provisions of the Intranet to create systems with an idea to build them for improving employee productivity, sharing data, or updating human resources information, for example. Then they would build other applications for use outside the organization - either products for their customers or products to let the company

communicate better with their vendors. So in addition to internal company networks, or intranets, that are behind the firewall, companies are building external networks called "extranets" that reach out to people who may physically work outside the firewall but who are an important part of the business strategy, product-delivery system, or customer-support apparatus. The organisations can use an extranet to:

- Exchange large volumes of multimedia data using Electronic Data Interchange (EDI)
- Share office information, library, circulars, etc., at all the locations. Collaborate
- with other organisations on joint development efforts
- Jointly develop and use training programmes with other organisations.
- Provide or access services provided by one organisation to a group of other organisations.
- Share news of common interest exclusively with partner organisations.

An extranet is not the only method of connecting an organization to distant locations of the same organization but also to similar organisations, their employees, researchers, etc. to other businesses..

Less Time and Money. Lastly, and most importantly, an extranet can save a corporation money and time. The Intranet and Extranets are being popularly used for communication application like Audio and Video Conferencing, netmeetings, netshows, collaborative Multimedia computing, etc .

System Vulnerability. Its biggest drawback, at least for now, concerns security, a major issue for the Internet and intranets, as well. A system that runs over the Internet is more vulnerable than a proprietary one, and no one has yet come up with a foolproof, end-to-end security plan.

Library Applications of Extranet

Extranets can help libraries to improve their customer relations, user services, and save time and resources. Let us consider a University Library having its campuses at different locations or in another city or various colleges of the university located in different cities. In order to

provide library services to its faculty, students and researchers at al 1 the distant locations the library can develop extranets. This will help the users of the Library to access speedy information at much less cost. This will also improve services being given to the readers located at distant locations. A well-developed Extranet can give them a feeling of being part of the main campus even though they are sitting miles away from the main campus. In relation to its content and marketing potential, the term "third wave" also refers to the maturity process in the development of Web technology. Extranet is conceptualized as the key technology enabler for the development of the third wave large-scale electronic commerce sites. Moreover, this new concept is also at the heart of the re-engineering effort required to advance a traditional corporation into the state of the "knowledge factory". Its usage in the field of library and information services is likely to grow tremendously over the next 3-5 years. As depicted above, the evolution of the Internet and intranet systems leads to a natural integration point, the extranet, the new nexus of the relationship between a company and its customers and partners.

The difference among the three can be summarised as below:

	Internet	**Interanet**	**Extranet**
Access	public	private	semi-private
Users	everyone	members of a specific institution	group of closely related institution
Information	fragmented	proprietary	Shared in closely trusted held circles

World Wide Web

The World Wide Web, know as WWW, W3 or simply, the Web, is one of the several Internet resource developed to help people publish, organize and provide access to information on the Internet.

The WWW can be defined as a hypertext, multimedia, distributed information system that provides links to hypertext documents, as well as to many other Internet tools and databases. Contrary to some common usage, the Internet and the World Wide Web are not synonymous:

The Internet is a collection of interconnected *computer networks*, linked by copper wires, fiber-optic cables, wireless

connections, etc.; the Web is a collection of interconnected *documents*, linked by hyperlinks and URLs. The World Wide Web is accessible via the Internet, as are many other services including e-mail, file sharing,, etc..

Importance of the Web

The World Wide Web (WWW) is important for libraries because it provides an extremely powerful method of organizing and providing access to information. The web can provide a single interface to a large variety of information resources and systems including textual (unformatted or formatted) documents, images, sound and video files. The web can be used to provide interface to other Internet services like TELNET, FTP and Gopher. It can also be interfaced to online databases. There are several features unique to the Web that makes it the most advanced hypertext-based information system on the Internet. These features are:

- *The Web is a Hypertext System*
- *The Web is a Multimedia System*
- ✓ Normal text
- ✓ Features such as large fonts, bold, italics, indents
- ✓ Images such pictures, graphics, logos, illustrations
- ✓ Audio content such as sounds, music, commentary, voice messages
- ✓ Video content such as movie clips, animations, or computer generated simulations.
- *The Web is a Distributed System*
- *The Web Incorporates other Internet Tools*
- *The Web Provides an Interface to other Database Systems*

i) **Forms**: Forms are used to collect information through web browser. Forms are method of creating input boxes on a Web page into which users can type information, or select among alternatives.

ii) **Database System:** RDBMS system such as MS Access, MS SQL, MySQL, Oracle or PostGres can be used as back-end database.

iii) Control Gateway Interface (CGI): The CGI sits between the Web browser and database. It takes the information gathered from the Web browser and passes it to the database. Once the request is processed, the CGI passes the result back to the Web browser in a format that it can display.

Computer and communication technology with its capabilities of parallel processing, multitasking, parallel consultation and parallel knowledge navigation, put together, creates a semblance of artificial intelligence and interactively necessary for developing an interactive learning interface. Coincided with availability of software, hardware and networking technology, the advent of world wide web (WWW), its ever increasing usage and highly evolved browsers has paved the way for creation of a global digital library. The increasing popularity of Internet and developments in web technologies act as catalyst to the development of highly interactive library services.

Search Engines

Internet can be said to be the most exhaustive, important and useful source of information on almost all aspects of knowledge hosted on millions of servers connected to Internet around the world. It is a known fact that there is neither defined policies for hosting information nor there is a centralized database for organizing and searching the information available on the Internet.

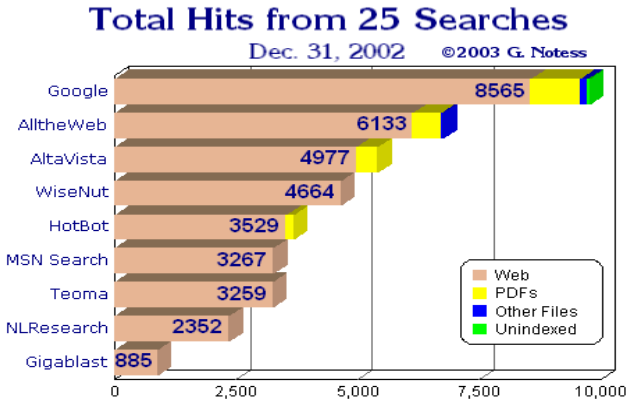
This makes the Internet as the most diverse and unorganized source of information. Searching for specific information is the main purpose of using Internet for several users. However, with availability of excessive information, it has become very difficult for a common user to search for precise and relevant information on the Internet. To tackle this situation, computer scientists came up with search tools that search through the information on the Internet to churn out required information by a user. There are varieties of search, resource discovery and browsing tools that has been developed to support more efficient information retrieval. Search engines are one of such discovery tools.

Search engines use automated programs, variably called bots, robots, spiders, crawlers, wanderers and worms developed to search the web. The robots traverse the web in order to index web sites. Some of them index web sites by title, some by uniform resource locators (URLs), some by words in each document in a web site, and some by combinations of these. These search engines function in different ways and search different parts of the Internet.

Search Engines: Definition

Search engine is a generic term used for the software that "searches" the web for pages relating to a specific query. Google and Excite are two examples of common search engines that index and search a significant part of the web. Several web sites have their own search engines to index their own websites. The World Wide Web has several sites dedicated to indexing of information on all other sites. These sites allow a user to search the web for any word or combination of words for information resources on the web.

A search engine is a computer program that searches documents on the Internet containing terms being searched by a user. A search engine can be defined as a tool for finding, classifying and storing information on various websites on the Internet. It can help in locating information of relevance on a particular subject by using various search methods. It is a service that indexes, organizes, and often rates and reviews Web sites. It helps users to find the proverbial needle in the Internet haystack. Different search engines work in different ways. Some rely on people to maintain a catalogue of Web sites or web pages, others use software to identify key information on sites across the Internet. Some combine both types of service. Searching Internet with different search engines for the same topic, therefore, provide different results. Fig.1 shows number of hits for 25 single word queries conducted on nine search engines. Google found more number of total hits than any other search engine.



other search engine

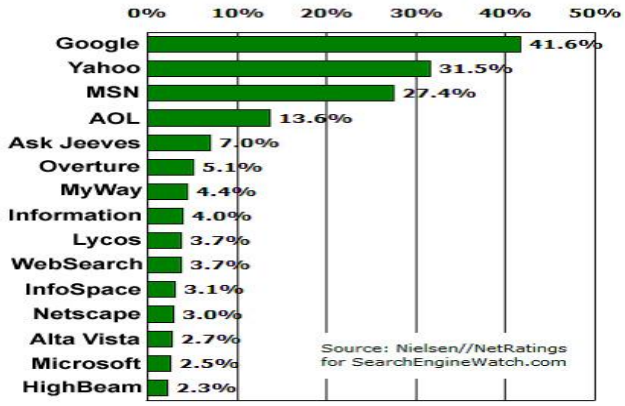
(Source: http://searchengineshowdown.com/stats/size.shtml

Search engines are also defined as online utilities that quickly search thousands of Web documents for a word or phrase being searched. Although there are some subscription-based search engines, most of them operate on profits from advertisements. It should be noted that no single search engine has the contents of every Web page on the Internet. Instead, each search engine defines its scope in terms of contents for Web pages that it would host. Moreover, some search engines index every word on every page. Others index only part of the document. Full-text search engines generally pick up every word in the text except commonly occurring stop words such as "a", "an", "the", "is", "and", "or" and "www". Some of the search engines discriminate upper case from lower case, others store all words without reference to capitalization. A user, therefore, gets different results from different search engines because of reasons mentioned above.

Search engines are usually accessed using Web clients called Web browsers. Each search engine provides different search options and has its own peculiarities. Search engines also differ greatly in the types of resources they allow a user to search. Many search engines offer both search and browse interfaces.

Important Search Engines

There are hundreds of search engines on the Internet, and more are being created every day. As shown in Figure first 15 search destinations.



Top 15 Search Destinations (SearchEngineWatch.com)

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Chapter - 6

ICT APPLICATION IN LIBRARIES

The Information and Communication Technologies (ICT) have brought revolutionary changes in handling delivering and storage of information. The transition of traditional library collections to digital or virtual collections presented the librarian with new opportunities and challenges. The internet, especially WWW has given the librarian a new dynamic role to play in the society and serve the new information based in better ways than every before, Because of the powerful features of web i.e. distributed, heterogeneous, collaborative, multimedia, Standards and Protocols, architecture, world wide web has revolutionized the way people access information and has opened up new possibilities in areas such as digital libraries, Virtual libraries, efficient information retrieval and dissemination.

Our world continues to become increasingly complex, interconnected, and dynamic. There are more people and institutions; they engage in more relationships and exchange; and the rates of change continue to grow, largely because of developments in technology and the importance of information to human and technical development. We live in an information society in which more people must manage more information, which in turn requires more technological support, which both demands and creates more information. The general consequences of the information society are threefolds: larger volumes of information, new forms and aggregations of information, and new tools for working with information.

Past three decade has witnessed unprecedented developments in computer and communication technology. Computers are being used increasingly to automate various activities in libraries with a suitable off-the-shelf general or specific-purpose software package that are now available in a wide range. Tremendous storage and processing potential of computers are being fully realized through

existing communication and networking technologies. The two technologies are interdependent, inseparable and share a symbiotic relationship. The computer's ability to store and process vast amount of information and communication technology with its ability to transmit this information from one location to another converged to form "information and communication technology" (ICT). The ICT refers to mosaic of technologies, products and techniques combined to provide new electronic dimensions to information and retrieval activities.

The term information and communication technology represents convergence of four strands of technologies, namely computer, communications, networking and multimedia. ICT is used to describe products and services that came-up with rapid changes in computer and communication technologies and their fusion. Thus technologies, which improve the efficiency and effectiveness of an information system or service, fall under the purview of information technologies. Some of these information and communication technologies are available to the libraries for many years, while a few are now emerging as important tools for overcoming the barriers in the access and dissemination of information.

The librarians and information professionals are required to develop skills that are required to use, develop and maintain IT-based services and products used by today's libraries. The programme deals with new information technologies, their applications in libraries and their products and services. It describes web-based library services, which are modified versions of existing services and technology-driven new web-based library services.

Elements of ICT applications in Libraries

Library automation can be defined in simple terms as the use of the Information and Communication Technologies (ICT) in the Libraries that are used to replace the manual systems in the Libraries. It has also been defined as a 'integrated systems' that computerize an array of traditional library functions using a common database, rapid technological change is forcing a re-examination of what it means to 'automate the library'.

In the context of computerization, a library information system may be defined as a set of library transaction, processing

systems designed to provide information to library members and to support the operational, managerial and decision making information needs of library staff. It includes computer as one of its components. Although computers have a major role in library automation, telecommunication, networking and multimedia technologies have equally important roles because of the support they offer to library automation.

An automated library is one where a computer system is used to manage one or several of the library's key functions such as acquisition, serials control, cataloguing, circulation and the public access catalogue. Thus, a computerized library and information system is a set of functional system encompassing:

- Computer Hardware
- Computer Software
- Communications
- People
- Procedures and standards
- Data/Information

Computer Hardware **-** the physical element of a computer system categorized according to the basic operations they perform: input, processing, output, storage and communications.

Computer Software - provides the step-by-step instructions that tell the computer what to do. Generally software is divided into system software and application software.

Communications **-** refers to networks including Internet, Intranet and Extranets for electronic transfer of data from one computer to another.

People - the most important part and beneficiary of a computer system, generally categorized as either end-users or developers

Procedures and standards- are descriptions of how things are done, i.e. manuals, documentations, etc.

Data/Information - raw facts (data) and processed data (information) that are used to produce the desired result.

History of ICT applications in Libraries

The word automation has been derived from a Greek word "Automose" which means some thing, which has the power of

spontaneous motion or self-movement. Automation, when used in a library context, refers to the computerization of various library operations. D. S. Harder first introduced the term automation in 1936 but the word library automation has been in literature for the last five decades when punch cards were used in library acquisitions and circulation.

The process of automation in libraries can be said started with Herman Hollerith of the US Census Bureau, who invented punched card machinery, attributes the idea to a suggestion by Dr. Jolul Shaw Billing, the then Director of Surgeon-General's Library now the National Library of Medicine.

In 1936 Ralph Parker modified the Hollerith Punched Card System for circulation control at the University of Texas and by the middle of 1940s had also experimented with its use in Serials Control.

Another milestone in the history of library use of punched cards was in the year 1942, when the Moniclair Public Library in New Jersey installed a specially designed book-charging system.

In 1945, Vannevar Bush envisioned an automated system that would store information, including books, articles and personal records. Bush (1945) wrote about a hypothetical 'memex' system, which he described as a mechanical library that would allow a user to view stored information from several access points and look at several items simultaneously. The development of the computer progressed substantially from 1946 to 1961, moving quickly through a succession of vacuum tubes, transistors and finally to chips. During 1946 and 1947 two significant computers were built.

In 1950, the Library of Congress produced a book catalogue using punched cards. There were a number of scattered experiments of mechanized systems in the late 1950s and the early 1960s but most of these were in specialised libraries. The history of library automation, replacement of manual operations by computerized methods in libraries, is linked to the history of modern day data processing and computer technology. In the early days of library automation, efforts to automate libraries were directed at the management of circulation records, using punch card technology. However, Due to the slow progress in the development of computer

systems, it was only in the mid 1960s that more effort was put into experimental projects on the use of computers in libraries, with emphasis on the management of circulation records, production of card catalogues. Librarians then moved beyond a vision or idea for the use of computers, given the technology, and they were able to make great advances in the use of computers for library systems.

This led to an explosion of library automation in the 1970s. The 1970s were the era of the dumb terminals that were used to gain access to mainframe on-line databases. During this period, commercial vendors started supplying turnkey library systems, and this contributed to the spread of library automation to other countries outside the USA and UK. Most systems supplied by vendors were hardware and operating system dependent, and were therefore beyond the means of many small libraries.

The arrival of microcomputers in the 1980s accelerated the pace of library automation and the development of library software systems that could run on mainframe, mini, and microcomputers. In addition, reductions in library budgets and the need for resource sharing and cooperation resulted in libraries implementing electronic networks for providing access to Online Public Access Catalogues (OPACs) and other cooperative electronic bibliographic databases. Use of telnet to access library OPACs and other commercial databases via the Internet also started. Compact Discs - Read Only Memory (CD-ROMs) appeared commercially which, were initially used to store text based data.

Modern integrated library management systems offer user-friendly graphical user-friendly graphical user interfaces (GUI), and users, through hypertext technology, can be referred to other resources, such as electronic journals and other full-text materials, from in-house bibliographic or Online Public Access Catalogue (OPAC) records. What is more, almost every module of modern integrated library management system is accessible via the Internet to the extent that ordering, circulation, cataloguing, invoicing (through Electronic Data Interchange-EDI), etc. are done electronically with minimum paper work.

The introduction of CD-ROMs in the late 1980s has changed the way libraries operate. CD-ROMs containing databases, software, and information previously only available through print, became

available making the information more accessible. Connections to external online databases such as OCLC. DIALOG, and RLIN continued, but, in the early 1990s, the databases that were previously available online became available on CD-ROM, either in parts or in their entirely. The World Wide Web, which had its official start date as April of 1993 is becoming the fastest-growing new provider of information. It is also possible, to connect to international library systems and information through the Internet and with ever-improving telecommunications. Expert systems and knowledge systems have become available in the 1990s as both software and hardware capabilities have improved. The technology used for the processing of information has also grown considerably. With the development of more advanced silicon computer chips, enlarged storage space, faster access and, increased-capacity telecommunication lines, the ability to quickly process store, disseminate and retrieve information has led to flourishing of the current information delivery services.

Technological advances will continue to open new opportunities for libraries to provide efficient and exhaustive information services and to link to computer networks worldwide.

Challenges before Libraries

The libraries rapidly evolve into something that looks quite different than it did lust a few decades ago. It is critical that librarians not only become aware of this evolution, but that the actively intervene to help reshape their libraries in ways that are consistent with the core mission of the respective organisations.

The library automation system, whether the software package came from CDS/ISIS, Libsys, SLIM++, TLMS, Easylib, SOUL or any of the other major suppliers, has become the centre of attention of the librarians and of high expectations of library users. Library automation, which started in late 1970s in a few special libraries, has now reached a large number of the libraries in the country. It is however yet to be reach majority of the libraries of college, school and public libraries in India. The challenges being faced by today's librarians are:

- High cost of Publications
- Shrinking budgets

- Increasing cost of maintenance of Publications
- Shortage of space
- Shortage of trained manpower
- Growth in size of storage
- Increase in processing speed
- Decreasing cost of hardware
- User-friendly software
- New services
- New Products
- Multimedia applications
- Telecommunication revolution
- Library users expect more than they currently receive.
- ICT savvy users
- Google and other modern web destinations set high user expectations

Need and Objectives of ICT in Libraries

The exponential growth of information has made manual system redundant giving way to computerized information storage and retrieval tools making the effective and efficient handling of huge quantum of information is only possible by using computers, which have the added advantage of being highly accurate and efficient that adds value to information. ICT applications in libraries has manifold advantages:

- Relieving professional staff from routine work
- Increased operational efficiencies
- Multiple Outputs
- Improves Quality of Services
- Redefining the existing services
- Instantaneous answers to multiple queries
- Provide new services
- Participate in library networks

***Relieving professional staff from routine work*:** Routine and repetitive jobs are handled easily saving and eliminating drudgery. The time saved from labourious and routine wok could be effectively used for providing new library services.

***Increased operational efficiencies*:** By contributing to efficiency it improves productivity. Many of the library functions like acquisitions and cataloguing are partly clerical and partly professional involving decision making and are tedious. As a result, backlogs in the acquisition section/cataloguing section are fairly common. Computers can help solve this problem by improving productivity.

***Multiple Outputs*:** A variety of multiple outputs may be generated with a single input in automated systems. This feature has provided enormous advantages. Outputs of various sequences and various kinds of reports maybe generated without spending additional energy or resource. For example a database of bibliographic records can be used for generating accession lists, shelf lists, special purpose bibliographies, searching catalogue, querying, etc. Thus a variety of services, which were hitherto contemplated but could not be offered, can now be provided.

***Improves Quality of Services*:** Application of ICT has opened up new vistas in library services and also has immensely improved the quality of services offered.

***Redefining the existing services*:** ICT offers a new range of products processes and services. Traditional services like current awareness services (CAS) and selective dissemination of information (SDI) can be given to the users very easily.

***Instantaneous answers to multiple queries*:** A variety of queries are posed to library sub-systems, for example, to find out the status of a book recommended for acquisition, the users would like to know the whereabouts of a document through the circulation system, etc. Answering such queries is easy, and instantaneously in an automated system. Decreasing costs, versatility and stupendous processing power of computers have made automation -very cost effective. Reducing of time wasted, immediate access to data and sharing of limited resources are some of the advantages.

***Provide new services*:** Some of the concepts/ services considered Utopian at one time are now a reality. It is now possible to offer a

range of new services like instant document delivery, on-line reference service, etc.

***Participate in library networks*:** ICT empowers us to share resources appears only in electronic format (e.g. CD-ROM, Internet resources, databases, etc.) at local, national and global level through high speed library networks.

Application of ICT in libraries has opened up varied means of fast and portable access, encouraged new research routes, refreshed the information consumer-base and redefined the public domain, among other obvious benefits. Use of ICT in libraries is critical to enabling:

- ready access to services, 24/7/365, regardless of geographic location;
- effective resource discovery, online access to digital and digitized content and seamless navigation around content;
- unmediated service delivery, adaptive to the purposes and capacities of individual clients;
- proactive engagement of clients with information and ideas through innovative virtual exhibitions and packaging of content;
- interaction and communication between clients – community website publishing services, web based interactive public programs, chat services, discussion lists, and online forums and debates;
- access to a Library system by other libraries and institutions;
- effective and efficient information and knowledge management.

Areas of ICT Applications in Library and Information Services

The library automation refers to computerization or mechanization of all library activities. It deals with the design and development of process and system that minimize the necessity of human intervention in their operations. The library automation is defined as "integrated systems" that computerize an array of traditional library functions such as acquisition, cataloguing, circulation and serials control, etc. using an integrated library software. A computerized library and information system is a set of functional system encompassing:

- ***Automation of library management functions*** (e.g. Acquisition, Cataloguing, Circulation, Serials Control, Reference, etc.)
- ***Office automation*** (e.g. word-processing, spreadsheets, databases, etc.)
- ***CD / DVD ROM and their Networking***
- ***ICT based services*** **(**including accessing remote electronic resources e.g. electronic document delivery, virtual reference service)

(A) Automation of Library Management Functions:

The technology pertinent to library functions has therefore been that dealing with the storage, processing, organization, retrieval and dissemination of knowledge contained in library materials. ICT is an invention of direct relevance to libraries' prime concern, which enables performance of the housekeeping operations more efficiently and results in the optimum utilization of library manpower.

The performance of a library largely depends on the organization of its housekeeping operations. Most of the activities related to library housekeeping follow some definite routines and obviously are amenable to computerization. It means a computer or a group of computers can perform routine clerical chores quickly and cheaply.

I. Acquisition

Acquisition of documents is one of the basic functions associated with any library. A library must acquire and provide all the relevant documents to its users within its budgetary limitations. An acquisition subsystem performs four basic operations. They are selection, ordering, receiving and accessioning of documents. Let us try and understand as to how these operations are performed in a library.

i) Selection

Selection of documents of library users is a very responsible job and should be based on definite principles and accepted norms. For a given library the book budget is a limited quantity and it should be spent judiciously to provide services to an optimum number of library users. Therefore, book selection becomes necessary. There are a number of tools (such as bibliographies, publisher's

catalogues, etc.), which will be useful to library staff in selection process. Requests from library users and suggestions from library authority are also considered for selection purposes. Such selection of documents needs the approval of the competent authority, before they are purchased for the library.

ii) Ordering

This procedure starts with pre-order searching, especially to avoid duplicate orders. In the next stage, purchase orders are generated and placed either directly to the respective publishers or to the list of vendors approved by the competent authority. Additionally, generation of reminders for overdue items and cancellation of orders also comes under the purview of ordering procedure.

iii) Receiving

Documents and invoices or bills usually arrive together. Bills are checked with the order list before processing for payment. Newly arrived books are tallied with the bills and the order list to check whether the books received are as per the order and the author, title, edition, imprints and price are correct before accessioning. It is essential to ensure that books are not defective in any way before accessioning.

iv) Accessioning

A stock register is maintained by libraries in which all the documents purchased or received in exchange or as gift are recorded. Each document is provided with a consecutive serial number. The register is called Accession Register and the serial number to each document is referred to as Accession Number of the document. Accession register is one of the important records of the library.

The above processes have been automated by using library application software packages, which can easily be picked up off the shelves. The details of various software packages have been discussed in subsequent modules.

II. Processing

The processing procedure is the pivot round which all the housekeeping operations revolve in a library. Processing helps in

the transformation of a library collection into serviceable resources. The procedures under this subdivision are classification, cataloguing, labeling and shelving.

i. Classification of Documents

Classification is grouping similar objects together. This principle is used to organize documents in libraries according to their subject content. It forms the foundation of librarianship. The following are the important classification schemes, which are used in different libraries of the world: Dewey Decimal Classification (DDC), Universal Decimal Classification (UDC), Library of Congress Classification (LC), Colon Classification (CC), and Subject Classification (SC), etc. The purposes for classifying of documents are to:

a) help the user to find a document whose call number (i.e., class number + book number) he/she knows. The class number represents the subject of a book while the book number individualises it among books of the same subject.

b) find out all the documents on a given subject.

Classification is a mental process and demands intellectual exercises from a classifier. As a result, automatic synthesis of class numbers requires the application of Artificial Intelligence (AI) techniques in the development of software. In India, some research work has already been carried out at DRTC, Bangalore for building class numbers (based on Colon Classification) automatically through a software (called Vasya), written in PROLOG (PROgramming in LOGic) – a non-procedural programming language. The electronic version of Dewey (Electronic Dewey) is available on CD-ROM.

ii. Cataloguing

All the cataloguing procedures start with technical reading of the document to be catalogued by studying title, sub-title, alternate title, editor, edition, reprint, imprint, dedication, preface, table of contents, collation, series, bibliographies, etc. In case of manual cataloguing, the cataloguer makes separate cards for author, title, subject, cross-references and analytical entries by following any standard catalogue code (such as AACR-II, CCC, etc.) and file them as per the rules laid down by the library.

Computerised cataloguing begins with entering bibliographical data in a pre-designed worksheet. The worksheet or datasheet is very similar to a data entry form and is based on any standard bibliographic record format (such as MARC 21, CCF, UNIMARC, etc.). Finally bibliographical data recorded in the worksheets are entered into the computer to produce a machine-readable catalogue file and OPAC. Computer-based cataloguing supports importing of bibliographical records for the library resources acquired by it either from centralized cataloguing service agency or from other libraries and exporting of bibliographical data of its own collection to other libraries and exporting of bibliographical data of its own collection to other library systems. This facility reduces unit cost of cataloguing and ensures standardization in cataloguing. The recent trend of cataloguing is to utilize Z39.50 protocol to download bibliographical data from other libraries and to provide global access to its own collection through Web OPAC.

III. Circulation

Most libraries lend books and other library materials to be read elsewhere by users. This is convenient for the users, increases the use made of libraries' collection and reduces demand for reading space within library building. This function requires some sort of record keeping arrangement of what has been lent and to whom. The reasons for keeping loan records are to: reduce the loss of library materials; and help library staff to answer users' queries about the location of items not on the shelves.

A variety of systems of record keeping of loans have come into being based on needs. These are known as circulation systems. These involve some common jobs for successful implementation such as enrolment of members, issue and return of library documents, reservation of documents, renewal of documents, maintenance of documents and records, maintenance of statistics, inter-library loan, issuing of gate pass, etc.

In a computer based circulation system, the machine-readable file consists of records for all items on loan from the library updated periodically with new records. This file is called "transaction file" and it takes required data from other two files – "document file" and "borrower file". Modern library management software support barcode based circulation system. In such a system, a barcode

reader scans barcoded accession number of a document and the barcode in turn acts as a pointer to the document file. It helps to minimize labour and error in data entry operation. The concept of RFID (Radio Frequency Identification) based circulation system is emerging rapidly in developed countries. It comprises three components: a tag, a reader and an antenna. The tag contains important bibliographical data. The reader decodes the information stored on the chip after receiving it through the antenna and sends data to the central server to communicate library automation system. RFID technology supports patron self-checkout machines and has the ability to conduct inventory counts without moving a single book from the shelve. As a whole, RFID improves library workflow, staff productivity and customer service.

IV. Serials Control

Serials in general and periodicals in particular are essential for research and development (R&D) activities. These are the primary means of communication for the exchange of scientific information. The periodicals or journals subscribed by libraries can be grouped into the following categories:

- Indexing/Abstracting periodicals
- Periodicals containing news items
- Periodicals containing full-text research articles and technical papers

Acquisition of serials/periodicals in a library is different from book ordering system. In contrast to books, the libraries regularly subscribe periodicals against advance payment. The modes of subscription of periodicals in a library are as follows:

- Through local vendors/subscription agents
- Through foreign vendors/subscription agents
- Direct from the publishers
- As gift or complimentary
- In exchange

The fundamental tasks of any serials control system, manual or mechanized, can be listed as below:

- Selection of serials
- Selection of subscription mode
- Formulation of terms of procurement

- Selection of vendors
- Order
- Advance payment
- Receiving and registration of serials issues in Kardex
- Sending reminders in case of issues not received
- Adjustment of advance payment for missing issues
- Preparation of list of journals procured, new arrivals and serials holdings for the users.
- Binding and accessioning of back volumes of serials.

In an automated system all these tasks are performed by library management software efficiently. It reduces workload of library staff. Computer based serials control systems may be predictive or non-predictive. Predictive systems predict the arrival of individual journal issues and can generate reminders in case of non-receipted issues. Prediction means the ability to inform that a named issue of a named journal will arrive in the library within a stated time interval. Modern library management software supports predictive mode of serials control with the facilities of online acquisition and access of journals through World Wide Web (WWW).

(B) Office Automation and Computer-based Electronic Message System (CBEMS)

Libraries, besides using integrated library packages, also use office automation software like word processing (MS Word or Word Pro), spread-sheet (MS Excel or Lotus 123), database management systems (MS Access or Lotus Approach), presentation packages (MS Powerpoint or Lotus Freelance Graphics) and graphic applications (Photoshop or Paintshop). Librarians and information professionals, therefore, require basic training in use of such general-purpose packages.

Similarly, libraries also use computer-based electronic message system while attending their day-to-day routine works. A computer-based electronic message system (CBEMS) allows communication between computer users hooked into a network. A message or a unit of communication is sent by its originator to one or more recipients. CBEMS is used for communication between person-to-person, human-to-machine and machine-to-machine. A document or

message sent through electronic system may contain text, graphics, image, speech as well as other types of information.

All local, national and international communication networks offer CBEMS facilities. A computer-based system used for sending a message or document may have facilities to create, edit, file, receive, transmit and print it electronically.

Computer-Based Electronic Message System (CBEMS)

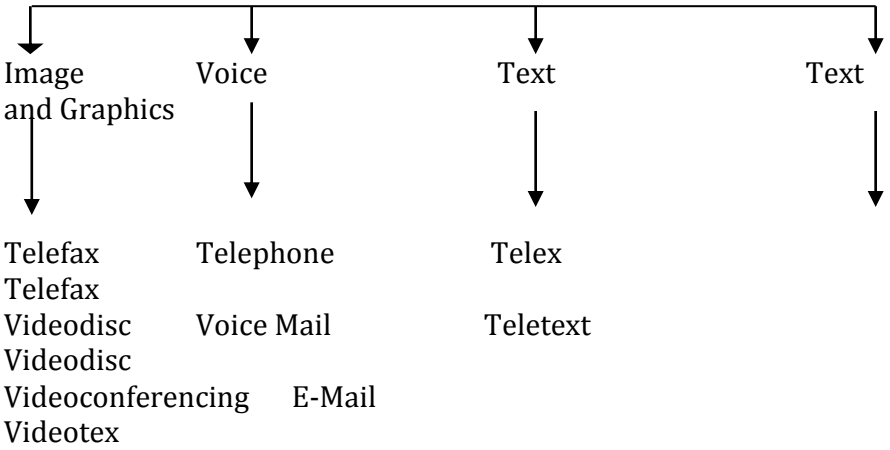

Fig. 1: Computer-Based Electronic Message System (CBEMS)

Computer-based electronic message handling offers many advantages over its conventional counterparts. The system improves the information flow process and does not require the presence of two communicating parties simultaneously. A group of persons working on the same project geographically dispersed over a large area can communicate with each other using CBEMS. Some of the important CBEMS modes of communication are given in figure 1 above.

(C) CD / DVD ROM and their Networking

CD-ROM technology uses hand-size, circular plastic platters made from polycarbonate with a shiny underlay that stores digital information optically. A typical disc used in a computer-based CD drive stores 650 MB using 333,000 sectors. All sections and sub-sections can be digitally labelled, located and read, but not altered by the user. CD-ROMs comes with data already encoded onto them. The data is permanent and can be read any number of times, but

cannot be modified. The CD-ROM drive's nominal speed is the same as its transfer rate. Single-speed drives have a 150 kbps transfer rate while the rate for 12x drives is 1.8 Mbps. 48x and 52x drives are now available in the market.

Writable CD ROMs are now available as WORM (write-once, read-many). With a WORM disk drive, the disk can be read and reread but once it is recorded it cannot be changed. Data on erasable-Optical disks (EO) or CD-re-writable disc can be erased and loaded, just like magnetic disks. An optical disk drive reads and writes data onto the disk using laser technology.

Digital Versatile Disk or DVD initially stood for Digital Video Disc. Like a CD, it is an optical storage system for read-only, recordable and rewritable applications. But, being similar to a CD in many ways, DVD is considered as potential replacement for CDs.

The DVD format provides several configurations of data layers, moving from 2D storage to 3D storage. Each configuration is designed to provide additional storage capacity. The similarity between the DVD and the CD gets smaller with each upgraded configuration, DVD-5 utilizes two layers to store the information and two laser beams to retrieve the data. Even higher storage capacity is achieved in DVD-9 by going 3D. The first layer is semi-reflective in DVDs, which allows the second beam to reach the second layer, which is fully reflective. Likewise in three-layered DVDs three laser beams are used to retrieve data, while the first two layers are semi-reflective, that allows third beam of laser to reach the third layer to retrieve the data. The disk is made by bonding together two 0.6 mm thick substrates using transparent (with no internal defects or bubbles) UV-cured (UV = ultra-violet) lacquer. This disk design allows almost twice as much data to be stored as DVD-5. Labels are printed on the other side of the disk conventionally.

The libraries are acquiring CD ROM-based information products in increasingly larger numbers. Networking CD ROMs is essential to facilitate simultaneous access to these CD ROM products to multiple number of users. The benefits of networking CD-ROMs include easier management, installation, configuration and updates, and better security. They also offer cost savings in hardware and network software licenses and ultimately, higher user productivity

and higher performance. The CD ROM networking solutions available in the market includes i) plug and play mini-server; ii) dedicated CD ROM servers; iii) Hard disc-based CD ROM servers (thin client / server technology; and iv) Silver Platter's Electronic Reference Library (ERL).

(D) ICT based services

I. Traditional Library Services Modified through Internet in ICT Era

- OPAC to WebPAC
- CD ROM to Web-based Indexes and Databases
- From Manual Reference Service to Digital Reference Service
- From Manual Reference Service to Real time Digital Reference Service: Library Chat Rooms
- "Groupware" as Knowledge Repository (E-Reference)
- Inter-Library Loan and Union Catalogue
- Audio-visual Services
- Customer Relations and User Education
- Current Awareness Service.
- Tables of content services
- Automatic notification from tables of content
- Book alerting services and e-mail notification from publishers and vendors
- SDI or alerting services available through aggregate services
- Alerting services available through search engines and meta-indexes
- From Manual Document Delivery to Electronic Delivery Services

OPAC to WebPAC

Remote access to the Library catalogues was possible only through a telnet connection till recently. The web-based interfaces are now available for most of the integrated library software packages including Libsys. Web sites are increasingly providing links to their WebPAC instead of telnet links to their Library OPAC. Exploiting the provisions of hyperlinking that the web provides, various searchable elements of a bibliographic record in a webPAC are hyperlinks to other records in the database. For example, an author is a hyperlink to all records in the database for that author, a

series is an hyperlink to all serial title under that series; a keyword for a record is a link to all records in database having that keyword, etc. In effect, a web PAC adds software-based functionality to a conventional OPAC. A user has additional incentives to visit the library web page hosting webPAC. With web-based resources and services in place, many libraries are phasing out their dumb terminals. The library web sites are increasingly becoming a more logical gateway to the catalogue and other web-based library resources. The acceptability of web-based interfaces to the Library OPAC is much greater because web interfaces are familiar to the users with its graphical and navigational interfaces. The users can click complex subjects instead of typing them in or remembering complex unix commands.

CD ROM to Web-based Indexes and Databases

Availability of CD ROM in late 1980s, as a media with high storage capacity, longitivity, and ease of transportation triggered production of several CD ROM information products which were earlier available through online vendors or as conventional abstracting and indexing services in printed format. Some of the important secondary services including "Guide to Current Periodical Literature" (H.W. Wilson) discontinued their print version in favour of CD ROM version which had improved functionality in terms of search and browsing interfaces. The libraries are witnessing yet another migration from bibliographic databases on CD ROM to web-based bibliographic databases akin to the one that was witnessed earlier from print based secondary services to CD ROM databases. This phenomenon has further been fuelled with availability of web-interfaces for most of the online search services. The web-based interfaces provide several advantages to users that are either not possible or not yet available on CD ROM. Most web-based bibliographic databases use hyperlinks and other facilities possible in a web documents including link to the full-text of articles to a publisher's web site. Several bibliographic databases have discontinued their CD ROM version in favour of web-based version. Besides advantages mentioned above, migration to web-based services open-up resources to remote users.

From Manual Reference Service to Digital Reference Service

Reference service and imparting instructional training to the library users are key areas of activities for any library. The technology now allows reference librarians to reach out to the users using the network instead of waiting at the reference desk for users to come by. Besides, imparting instructions on mechanisms of using a library, a reference librarian is also involved in delivering reference service that require deep intellectual understanding of subject. Although automated libraries are not yet sufficiently advanced to offer interactive reference services, electronically-mediated reference services are increasingly available through libraries and information centres.

Digital reference service, also called "Ask-An-Expert" or "Ask-A-Librarian" services are Internet-based question and answer service that connect users with individuals who possess specialized subject knowledge and skill in conducting precision searches. As opposed to static web pages, digital reference services use the Internet to place people in contact with people who can answer specific question and instruct users on developing certain skills. The people who serve as digital reference experts (also called volunteers or mentors) are most of the time information specialists, affiliated to various libraries. Some of the different types of quick reference sources available online are named below:

Reference collections

Bartleby.com – This site offers a selection of ancient and modern titles in full text. The collection includes poetry, literature, essays and general reference works. Search by keyword, or browse by author, title or subject.

Dictionaries and thesauri

OneLook – This service will simultaneously search online dictionaries and glossaries worldwide for definitions. The collection includes both general and specialist reference sources, including works for art, business, computing, medicine, science, technology and slang.

Online Dictionaries – This page on the Higher Education & Research Opportunities in the United Kingdom (HERO) web site

provides links to general and specialist dictionaries, thesauri and reference resources worldwide.

Thesaurus.com – This site uses Roget's Interactive Thesaurus to provide synonyms for words and phrases.

World Wide Words – Compiled by lexicographer Michael Quinion, World Wide Words is an online guide to contemporary English and its usage. The site includes a collection of articles about the use and evolution of the English language; definitions of new and unusual words; a guide to phrases; answers to queries submitted by site visitors; and a notes about words currently featured in the press.

Abbreviations and Acronyms

Acronym Server – This is a database of general, technical and specialist acronyms. Enter an acronym to find its meaning, or search for a word that may appear within an acronym.

Quotations

Bartlett's Familiar Quotations – The content of this site is taken from the tenth edition of Bartlett's published in 1919. The collection includes examples from ancient and late nineteenth century authors. Search by keyword or browse by author name.

Quoteland.com – A collection of quotations from both ancient and modern authors, as well as contemporary commentators, political figures, celebrities and characters from fiction. Search by keyword or browse by topic or author name.

Maps and street plans

MapQuest – Offers online maps and street plans of countries worldwide. Use the zoom option to alter the scale of a map, and the North, South, East, West buttons to navigate your way around.

Multimap.com – Includes a complete interactive atlas of Britain. The free service will allow you to search by town, street name, or postcode. Aerial photographs are also available for many British locations.

Perry-Castañeda Library Map Collection – This broad online map collection from the University of Texas at Austin offers reference, political, shaded relief and historical maps from countries worldwide.

Atlapedia Online – This online collection offers both political and relief maps of countries around the world. Background notes on the the geography, history and economy of each country are also available, as well as brief demographic statistics.

http://www.eci.gov.in/ElectionMaps/ElectionMaps_fs.htm : Election maps of India.

http://www.khoj.com/Reference/Guides/Maps/ : Directory of Maps of India.

How does it Works? ***Most "Ask-a-Librarian"*** services have a web-based question submission form or an e-mail address or both. Users may submit questions by using either form. Once a question is read by a service, it is assigned to an individual expert for answering. An expert responds to the question with factual information and or a list of information resources. The response is either sent to the user's e-mail account or is posted on the web so that the user can access it after a certain period of time. Many services have informative web sites that include archives of questions and answers and a set of FAQs. Users are usually encouraged to browse archives and FAQs before submitting a question in case sufficient information already exists.

Virtual Reference Desk (http://www.vrd.org/) provides resources and links to experts that offer digital reference services. The site hosts searchable database of high quality "ASK-A" service along with alphabetical and subject wise listing. Virtual Reference Desk also hosts a listserv called "Dig-Ref" to promote and explore the growing area of digital reference services.

From Manual Reference Service to Real time Digital Reference Service: Library Chat Rooms

Several libraries have started experimenting with offering real time digital reference service, using chat software, live interactive communication activities, call counter management software, web contact software, bulletin board services, interactive customer assistance system or related technologies.

Many libraries are experimenting with Internet chat technology as an innovative method to extend and enhance traditional and remote reference service. While digital reference service is asynchronous method of information delivery, the Internet chat

providing the benefit of synchronous communication between a user and a reference librarian (or mentor). Interactive reference services facilitate a user to talk to a real, live reference librarian at any time of day or night from any where in the world. Unlike with email reference, the librarian can perform a reference interview of a sort by seeking clarifications from the user. The librarian can conduct Internet searches and push websites onto the patron's browser, and can receive immediate feedback from the patron as to whether his or her question has been answered to his satisfaction. Most libraries currently involved in real-time reference service are part of a collaborative network so that they can share staffing and work around the clock to truly provide reference service any time. Library of Congress Collaborative Digital Reference Service is one of such services. Several institutions including Cornell University, Internet Public Library, Michigan State University, North Carolina University are offering Internet chat-based service using software like LivePerson, AOL Instant Messenger, Conference Room and Netscape Chat. The librarians have observed that their relatively new chat-based service logged significantly more questions in a relatively short time than did their well established e-mail digital reference service. LiveRef(sm) (http://www.public.iastate.edu/~CYBERSTACKS/LiveRef.htm) maintains an online registry of real-time digital reference services.

"Groupware" as Knowledge Repository (E-Reference)

In the corporate world, collective, experiential information gathered over the years, are called "institutional knowledge." Recently discovering the value of this commodity, companies have invested heavily in knowledge management systems that collect, store, redistribute, and ultimately leverage this corporate information in support of profit. Likewise, busy IT departments use Q&A knowledgebase and ticketing systems to help manage the on-slaught of daily IT questions. Regardless of its name (a knowledgebase, ticketing system, or a knowledge repository), a modern library may need a formalized system to preserve local reference knowledge and to facilitate reference collaboration.

So how would a knowledge repository work in a library? Suppose, a user e-mails a question to the Reference Librarian. When the reference coordination logs into the knowledgebase, he is

immediately alerted to the new electronic request, made by the patron. He performs a keyword search in the knowledgebase and finds two similar reference questions in the archive. The archived questions may not exactly match the current one. So, he refers the query to a subject specialist. A third librarian, who is monitoring the activity in the reference system, posts a message about his dealings with similar types of questions, if any, in the recent past at the reference desk. The subject specialist responds immediately, sending an answer directly to the patron and routing the answer to all of the reference librarians. In this example, the subject specialist is the one who answered the question, but everyone contributed to the solution.

OCLC's Question Point software/service is an excellent application of this kind of collective reference service; it facilitates interlibrary reference services to a great extent. While reasonably priced, the Question Point service may still be just beyond the budget constraints and needs of some smaller libraries. There are several open source reference service management packages available. Many smaller libraries don't need a full-fledged reference management system. But, these smaller libraries may always have the basic components to create a simple, question management system.

Over the last 7 years or so, the e-mail server industry has moved beyond basic e-mail to a more powerful product category called groupware. As the name implies, groupware facilitates collaboration within an organization through e-mail, calendaring, contacts, project management, and scheduling capabilities: It's about information sharing. If you are not sure if you have groupware, you might want to check with your systems administrator. Some common groupware products are Microsoft's Exchange Server, Lotus Notes, and GroupWise.

Groupware provides the means for increased collaboration and information transfer, this type of product be used to share the work on reference questions? To build a collaborative knowledgebase with as "Ask a Librarian" form forwarding queries to a departmental e-mail account. The next step is to share this centralized account with all of your reference librarians. This simple act of information sharing brings big benefits: All of your librarians can see, learn and

contribute to the reference questions as they come through the departmental e-mail account. In an academic library, you know that entire classes with a common assignment are likely to cycle through the library with a specific reference question.

However, certain personal/cultural workplace prerequisites, considered to be necessary for such systems to work, are, Reference skills and a "safe" environment, where collegiality is fostered. Collaboration, electronic or otherwise, almost never happens in a hostile work environment. Given the proper resource-sharing environment, a participant library simply has to type the question it has come across and the answer in an e-mail message and send it to the reference account. Then all the reference librarians will have access to these "in-person" transactions. Another great feature of groupware is the ability to search every e-mail via keyword. For those who still don't want to deal with the vagaries of keyword searching, are allowed by most groupware applications to organize the e-mail in electronic folders. In this way one can classify the reference questions any way --by subject, patron, or date. Groupware can function as a simple knowledgebase and collaborative tool. Groupware applications also feature group calendaring functionality.

Another helpful feature is that the system automatically generated a reassuring e-mail to the patron. This e-commerce technique can easily be replicated in most groupware applications, without requiring difficult scripting skills.

Inter-Library Loan and Union Catalogue

It is not possible for any single library to fulfill all the needs of its users from its collection. Resource sharing through Inter-library Loan (ILL) is a necessity for the libraries. Access to the catalogue of partner libraries is crucial to inter-library lending. Union catalogues, standardization and machine readable catalogues are aimed at promoting resources sharing. Printed union catalogues and Computer Output on Microfiche (COM) catalogues and CD-ROMs are now being replaced by Web OPAC and web-based union catalogues. Librarians can now access catalogues of thousands of libraries across the world using Internet. Developments in digital library and Internet technologies have made it possible to automatically update the catalogue records from member library

systems, distributed searches using a single user interface, and valued added services.

Audio-visual Services

Audio-visual materials are important sources of information, education and entertainment. Many libraries particularly media libraries and large academic and public libraries hold audio-visual material such as music, films, pictures and photographs, etc. Old media of LP records and tape slide have long been replaced with audio and video tape. The new multimedia of audio CD, Video CD(VC), and Digital Video Disks (DVD) have advantage of higher storage capacity, random access and longer life than audio and video tapes and cassettes. Many libraries allow their members to borrow these. Multimedia documents can now be played on standard PCs, stand-alone or networked. Recent developments in storage media, compression and encryption technology have made it possible to storage large amount of multimedia documents on hard disk and disseminate through Internet. Software such as Quick Time Player, Microsoft Media Player, etc. are now freely available to play or see these documents in a browser. You will learn more about various hardware, software and document formats that are used for creation, storage, distribution and use of digital multimedia documents later in this course.

Customer Relations and User Education

LIS being service profession, customer services and user training are important aspects of its activities. A continuous interaction with users for feedback and information is a must to maintain the standards of service. While the conventional means of interaction such as meetings, suggestion box, surveys and interviews are still important, use of new means of communications such as e-mail, web forms, bulletin boards, discussion forums and listserv are fast replacing these. Not only these tools provide a fast, convenient and transparent and cost effective medium, but also offer scope for innovations and greater peer participation. Some of these tools can even be used by the libraries to involve the users in book selection etc. LIS customer relations can be tremendously improved by innovative use of technology like virtual library tours, making interactive library maps and floor plan available on the library web site. A highly ICT enabled environment requires

appropriate training to its users also. The contents of user training must include use of Internet tools and resources. Conventional user education programmes can be supplemented with web-based instructions and guide for use of resources. In the conventional classroom based user education also ICT tools are used for presentation and demonstration.

Current Awareness Service.

There is a wide variety of CAS methods and also specific products. The more conventional or traditional methods include accession lists, newspaper clippings, current awareness bulletins, displays, abstracting bulletins, periodical circulation, photocopies of the tables of contents of periodicals, indexing and abstracting journals, internally produced abstracts and indexes, press clippings, personal notifications and selective dissemination of information (SDI). To this can be added electronic tables of content, electronic newsletters, electronic news alerts, electronic notification systems, push services, pre-print archives and alerts offered by search engines. CAS is now been made available via the World Wide Web (WWW or Web). There is a whole range of services that go under different names for example Table of contents services, push technology, webcasting, intelligent agents, e-zines and newswires, etc. Some of the services are available for free or at a modest fee, while others are fairly expensive and definitely aimed at the corporate market. Some services provide automatic notification, for example via e-mail, while others require users to visit their sites on a regular basis. There are numerous CAS available via the Internet. The following categories can be covered under CAS: table of content services, automatic notification from tables of content, book alerting services and e-mail notification from publishers, SDI or alerting services available through aggregate services, alerting services available through search engines and meta-indexes, e-newsletters and e-zines, newspaper filtering services and newspapers, monitoring through intelligent agents, website update notification services, web pages with newsworthy content, weblogs, discussion groups and electronic mailing lists, etc.

Tables of content services

Tables of content services are not new to librarians; they are now, however, also available via Web. The WWW services are much

more up-to-date than their printed or CD-ROM counterparts, and much more convenient to use. Tables of content services allow users to scan the tables of contents of new as well as backdated issues of journals. These are especially useful in keeping track of new publications on a variety of topics. Such services are offered mostly by aggregator services such as *Ingenta* or directly bypublishers. Ingenta also offers a document delivery service. The advantage of aggregator services is the diversity of titles from various publishers that they offer. Users can subscribe to these services for free, or for a modest fee. The subscriber selects the journal titles they are interested in and as soon as a new issue of a journal is available, theyreceive an e-mail message with the table of contents.

There are also the services of a more limited scope that may be of interest to librarians. BUBL (Bulletin Board for Libraries) offers tables of contents and abstracts for major Library and Information Science (LIS) journals. BUBLhowever, does not provide e-mail alerts so that one has to visit the site on a regular basis. Current Contents (Social and Behavioral Sciences), EBSCO Alert, Emerald E-mail Alert Service, and Science Direct also offer excellent opportunities for librarians and users. These services are, however, expensive to subscribe.

Automatic notification from tables of content

The latest literature can also be identified through the use of automatic notification from tables of content as provided by publishers, such as Elsevier ContentsDirect, Ideal: International Digital Electronic Access Library and SARA. Although there are many other publishers such as Audio Books: Chives Press, Blackwell, Cambridge University Press, De Gruyter, Institute for Scientific Information, Kluwer, Whitaker, Wiley, and Wilson librarians should focus on publishers relevant to their field of interest. Some publishers do not offer automatic e-mail notification. They do, however post the tables of content on their websites, where it is free to check it on a regular basis for new books, articles, reports, etc. Sometimes (e.g. as is the case with Searcher) some of the articles are available for free in full-text format. It is therefore useful to identify a list of journal titles of potential interest and to ensure that one checks them either through a table of contents service, automatic updates from publishers or by regularly visiting

the journal's website. There are many such LIS journals like Diglib, Ariadne, Interlending & Document Supply, Journal of Academic Librarianship, Library Collections, Acquisitions & Technical Services, Online Information Review, etc.

Book alerting services and e-mail notification from publishers and vendors

New book or other document titles (e.g. videos, CDs) can be identified through automatic notification services according to an interest profile of broad categories. These services are offered by book alerting services such as Amazon.com, Barnes and Noble, Ingenta, etc. Some of these service and most of publishers such as Elsevier Science also offer free e-mail alerting services. Such services are extremely important to know about new titles in the disciplines of once interest. New publications (books, journals and other document types) can also be identified through a number of resources created especially for the use of librarians. These include The Bookwire Index (Publishers) and Directory of Publishers and Vendors (available via AcqWeb).

SDI or alerting services available through aggregate services

SDI services (also known as alerts or alerting services) involve the automatic notification of users when new records are added to the database. The records are matched against a search strategy reflecting the user's interest profile. In the case of SDI services, the search strategy is often referred to as the search profile. There are a variety of SDI services available through aggregate services such as Emerald, Dialog, SilverPlatter, ScienceDirect, or EbscoHost. These services are very useful for keeping oneself abreast with latest publications in the field of interest. These services are, however, expensive to subscribe. Databases such as Library and Information Science Literature, Library Information Science Abstracts, and Library Literature are quite useful for the librarians.

Alerting services available through search engines and meta-indexes

NorthernLight is one of the very few search engines offers free e-mail alerting service. It is based on one or more interest profiles, and whenever the search engine picks up new sites relevant to the profile, the user is notified. Steven Bell's Keeping Up Page is also a

useful meta-index. These services can be used in addition to SDI services available through aggregate services to keep one self updated in the subject field of interest.

From Manual Document Delivery to Electronic Delivery Services

Abstracting and indexing services have proved themselves as most effective means of finding recent and retrospective published research work. The effectiveness of these secondary services are further enhanced with availability of these secondary services on CD ROM with efficient search interfaces and other features that are possible only in electronic media.

Once a researcher gets bibliographic references relevant to his research work, the more arduous task of locating the full-text of research article begins. While the parent library may cater only to 10 - 20 % of his references, remaining articles may have to be arranged through Inter Library Loan (ILL) or through Document Delivery Services (DDS) which can be very time consuming. Most Library use commercial (Informatics India) and non-commercial (BLLD and INSDOC) document delivery services to ensure quick and efficient access to primary information for the library users. Most online search services like DIALOG, ESA /IRS and STN have been offering manual document supply services since their inception. The process is labour-intensive and time consuming.

The term "electronic document delivery systems" implies delivery of electronic version of a document that might involve reproduction of an electronic copy of a document if it is not already available in electronic format. The libraries had been using fax machines for immediate delivering photocopies of articles via telephone lines. The first use of electronic document delivery was based on scanning technology. With maturity of scanning equipment and technology, document supply services started scanning the documents as bitmap page images. Applications are built in such a way so as to automatically produce a hard copy together with a header page containing the address of the applicant which can again be send by snail mail or facsimile. A software package known as "Ariel" is used in several libraries in developed countries for delivery of scanned articles via the Internet. The Ariel software is loaded on an Internet-enabled computer can receive and send electronic information to other libraries which have installed

Ariel. The ADONIS system developed in late 1980s is a document delivery system based on bit-mapped page images.

Availability of most of the peer reviewed research journals in electronic format, inexpensive technology to scan articles and improved electronic delivery mechanisms are some of the enabling factors that have contributed to well-established electronic document delivery system now available commercially. More recently most of the secondary services that were available on CD ROM or through online search services are now available on the Internet where the journals are linked to the publisher's site. The technology has now been perfected and there are several electronic document delivery services that allow a user to download an article in full-text from their site or deliver them electronically as attachment to e-mails. Most electronic publishers and aggregators like OCLC, Blackwell, OVID, etc. are offering document full-text of articles through their web sites. Different vendors have various payment options; some charge each time the journal is used, whereas others provide open access for a set annual fee. A user who wishes to have the item delivered can enter a credit card number and specify a delivery method (postal, UPS, fax, e mail, etc.) and indicate whether it is a rush item (with a rush order fee attached.)

The ADONIS (Article Delivery Over Network information Systems) can be considered as a landmark development in electronic document delivery system. The project was launched by a consortium of five major publishers - Academic Press, Blackwell's Scientific Publications, Elsevier Science Publications, Pergamon Press and Springer Verlag. The project uses combination of laser scanning, printing and digital optical storage technology for storage and retrieval of complete pages of over 650 scientific, technical and medical journal articles. The issues of journals are available on CD ROM with weekly updates for distribution to each centre in various countries licensed to use the system for document delivery.

Some of the important Electronic Document Delivery Services include:

- Uncover http://uncweb.carl.org/uncover/subtitle.html
- Articles in Physics http://ojps.aip.org/
- Bioline Publications http://bioline.bdt.org.br/journals

- Chemport http://www.chemport.org/
- ScienceDirect http://www.scienceDirect.com/
- OCLC www.oclc.org/
- Northern Light www.northernlight.com/

II. Internet-based New Library Services In ICT Era

- Virtual Library Tours
- Library Maps and Floor Plans
- Photographic Views
- Library Web Sites
- Library Portals
- Subject Gateways
- Full Text Resources
- Automatic Identification and Data Collection Technology

i Bar Code Technology
ii Radio Frequency Identification (RFID)

- Web-based User Education

Virtual Library Tours

Several library web sites facilitate virtual guide to the physical facilities including collections, services and infrastructure available in the library through their web sites. The combination of the following three web-based interfaces are used to facilitate the virtual library tours:

Library Maps and Floor Plans

Most library web sites provide library layouts and floor plans to guide users to physical location of facilities and services along with link to relevant information. Client-side image maps are used to make various parts of floor plans as clickable image maps. An example can be seen at the Central Library Home Page of the Central Library, IIT Delhi at: http://www.iitd.ac.in/acad/library/layout.html

Photographic Views

A view of 360° photographic environment using plug-ins like Quick Time and iPix are available at a few library sites. Examples can be seen at Botsford General Hospital Library site. (http://www.botsfordlibrary.org/tour.html).

Library Web Sites

Academic libraries in developed countries started using web technology to create home pages as starting points or as gateways for searching information about the library. A home page reflects characteristics of an academic institution. It provides an opportunity to the library to propagate its services and facilities to the academic community worldwide. The home pages of libraries are increasingly used as an integrated interface designed to deliver detailed information about a library as well as to provide access to all computer-based services offered by a library.

Besides offering information, the library web sites of academic institutions invariably hosts subject gateways or subject portals that contains links to web resources for subjects of interest to the institution. Most of the services (modified or new) included in this article are offered through the web sites of most of the academic institutions especially in developed world. The IIT Delhi Central Library also offers several of these services through its web site available at http://www.iitd.ac.in/library/.

Library Portals

A library Portal is a site on the World Wide Web that typically provides information about library to its visitors, users, patrons and also providing a pathway to other content. It is designed to use distributed applications, different numbers and types of middleware and hardware to provide services from a number of different sources. In addition, library portals are designed to share collaboration in workplaces. A further requirement of portals is that the content be able to work on multiple platforms such as personal computers, personal digital assistants

Subject Gateways

The web, being a hypermedia-based system, allows linking amongst electronic resources stored on servers dispersed geographically on distant locations. The portal sites or gateways redirect a user to the holders of the original digital material. The librarians, being the earliest inhabitants on the web, and following their professional instincts, immediately began to create link to collections on all sorts of subjects.

A subject gateway can be defined as facility that allows easier access to web-based resources in a defined subject area. The simplest types of subject gateways are sets of web pages containing list of links to resources. Some gateways index their lists of links and provide a simple search facility. More advanced gateways offer a much-enhanced service via a system consisting of a resource database and various indexes, which can be searched and / or browse throughout a web-based interface (O'Leary, M., 2000).

Subject gateways are also known as Subject-based Information Gateways (SBIGs), subject-based gateways, subject index gateways, virtual libraries, clearing houses, subject trees, pathfinders and other variants thereof. Subject gateway is an important component of a library web site designed for the library users so as to help them discover high-quality information on the Internet in a quick and effective way.

In the traditional information environment human intermediaries, such as publishers and librarians, filter and process information so that users can search catalogues and indexes of organized knowledge as opposed to raw data and information. Subject gateways work on the same principle, i.e. they employ subject experts and information professionals to select, classify and catalogue Internet resources to aid search and retrieval for the users. Users are offered access to a database of Internet resources descriptions which they can search by keywords or browse by subject area. A description of each resource is provided to help users assess very quickly its origin, content and nature, enabling them to decide if it is worth investigating them further. In the process users get benefited from the expertise of librarians and subject experts with subject gateways rather than having to locate, evaluate, filter and organize the resources themselves. Specialized software are available as freeware or as priced software to create and maintain professionally developed subject gateways. Some of the major portal sites or gateways that provide access to electronic resources on the Internet are as follows:

- WWW Virtual Library http://www.edoc.com/
- Internet Public Library http://www.ipl.org/
- Michigan Electronic Library http://mel.lib.mi.us/
- Penn Electronic Library http://www.library.upenn.edu

	/resources/
• BUBL Information Service	http://bubl.ac.uk/
• Argus Clearing House	http://www.clearing house.net/
• Internet Index	http://sunsite.berkeley.edu/ InternetIndex/

Full Text Resources

Full text resources are increasingly available on the Internet. A few are listed below. You might want to find more of your own through the search engines listed above.

New York Times (www.nytimes.com)

The New York Times on the Web provides access to that newspaper's articles. You are requested to register, but at least until now, no fee is assessed.

The On-Line Books Page **(**http://digital.library.upenn.edu/books)

An Index of books online indexes over 11,000 on-line books. Search or browse by author, title, new book listings or subject. A rich collection with numerous book related links.

Tales of Wonder: Folk and Fairy Tales from Around the World

(http://members.xoom.com/darsie/tales)

Tales of Wonder was created by Richard Darsie. This site has full text of a variety of folktales. There are a number of interesting links from his home page including an award winning set of poetry links, cooking links and music connections.

A Children's Literature Web Guide (www.acs.ucalgary.ca/~ dkbrown/index.html)

A Children's Literature Web Guide offers children's bestsellers in Canada and the United States, conference and Book related events and reviews online.

BookWire (www.bookwire.com)

Book Wire is developed by R. R. Bowker and includes connections to their periodicals, e.g. SLJ, LJ, etc. The site also includes reports on author tours, provides excerpts from review sources for prose and poetry and includes awards listings.

Project Gutenberg (www.promo.net/pg)

Project Gutenberg is a collection of full text books no longer copyrighted that is continually augmented. This site is set up for full text searching via author or title indexes. A number of sites provide links to this resource.

CTHEORY (www.ctheory.com)

CTHEORY, an electronic review of books, international in scope, is a bit esoteric but the authors make some interesting observations about society in general and books and electronic information in particular.

African American Web Sites (http://home.earthlink.net/~ anthony/africa.html)

African American Web Sites links to a number of sites of interest to African Americans and to multicultural curricula.

Britannica.com (www.britannica.com)

The entire contents of Encyclopedia Britannica is available at this Web site. Searchers can access information using a directory of topics or a search engine. Advertising does appear in this version of Britannica. The electronic version of Encyclopedia Britannica that is advertising free and includes more sophisticated search options is available at www.eb.com for a subscription fee.

Web-based User Education

The www provides a dynamic environment for distributing information over a large network and web-based instructions is a suitable tool to do so. Web-based guides and teaching tools can be easily updated, accessed, and printed on demand. They may include colour graphics, and screenshots. The web-based user education provides a high degree of interactivity and flexibility to the users offering them the benefit of self-pace, graduated to teach from basic to highly advanced levels and designed in a wide range of formats that accommodate diverse learning styles. The proliferation of digital resources will generate greater demands on reference and instructional services. With availability of digital resources that can be used any where at any time, requirement for instructional and reference services would also grow. Failure to develop both the technological aspects and required service components would lead

to under utilization of digital resources. The library web sites can use web-based user education for imparting training to users in the following area:

- Basic library skills along with glossary of library terms;
- Using Library OPAC / WebPAC, locating books, magazines and other library materials;
- Instructions for searching CD ROM and web-based databases and other electronic resources; and
- Instructions on subject searching training, using Boolean operators and searching Internet resources through search engines.

The web technology provides for incorporating both synchronous and asynchronous interactivity in the web-based user education.

Skill Development in IT for Librarians

The Library and information centers are going through a process of transformation with increase in the use of new information technology its products and services in libraries. The librarians and information workers find difficulties in copying with fast technological developments due to lack of sufficient continuing education for them. A great deal of strategically planning is required to address this issue.

While it is important to revise library science curriculum with introduction of strong components of IT for fresh library science graduates, it is equally important to train existing manpower in the libraries through continuing educational programmes. Continuing education may include educational activities primarily designed to keep practicing librarians and information professionals abreast of their particular domain in library, and to provide them with training in new fields of IT. Continuing education activities in our country, is generally offered on irregular basis through training programmes organized by institutions, individuals, association and departments of library and information science of universities.

Conclusion

Rapid growth of information technology, particularly, the Internet and associated technologies, has opened up an entirely new medium for providing improved information services and resources for the users. As information professionals, we have the opportunity

not only to play a leading role in the organization and navigation using new tools and technologies, but also in the development and maintenance of IT-based services and resources for our users and organizations. With availability of web-based resources and services, the local collection of a library is not the only source of information for a user. The users are interacting virtually with the library collections and resources as well as with host of resources that the librarian did not select or may not even know about them. The librarians can no longer stay behind the desk to wait for the users to come, assuming that the users would approach at the right time and for the right things. The role of library as a primary aggregator of content for its user is less and less unique. In an environment of self-service databases, electronic forms, web information and the growth of distance education, a user is likely to approach the librarian after he has already begun his search, but was not satisfied with the results.

The future will require the librarians to reorient themselves, think creatively and adopt new technology to generate services and resources where their skills of structuring and organizing resources are put to its best use. With myriad of disorganized and unverified information, the web is in need of librarians who are trained in the structuring and organizing information, have the ability to locate and evaluate information resources, and have in-depth subject expertise. If the librarians are committed to sustain their roles as providers and facilitator of information in the emerging and competitive space of higher education, they would need to adopt new technology, interact with users to learn about their requirements and expectations. The librarians have to join the academic community as facilitators and collaborators, guide the students through the complex maze of print and digital resources, teaching them how to search effectively and helping them judge the quality and usefulness of the information that they encounter. The opportunities are limitless especially in the chaotic scenario of Internet.

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Chapter - 7

MULTIMEDIA APPLICATION IN LIBRARIES

In the information industry parlance "multimedia" has become one of the frequently used words today. It is conjectured that in near future multimedia might become a standard term applicable in all sectors of our personal, professional and business life. It is, therefore, imperative that every one of us is aware of multimedia and its applications. The term "multimedia" ordinarily means a combination of more than one media. Media is an abbreviation for "Magnavox Electronic Data Image Apparatus" meaning a unit system of information retrieval, printed and audiovisual forms of communication and any necessary equipment required to render them usable. So multimedia conveys the meaning of number of forms of information communication. The journey of idea/expression, which has been recorded, from clay tablet, stone, parchment, bhojpatra, fabric, paper has now entered into multimedia domain like microform, electronic and optimal media. Multimedia technology is thus designed to integrate and manipulate data from diverse sources such as video graphics, animation, audio and text on a single hardware platform. It also epitomizes technology integration through the use of multimedia tools. The mode of storing all type of data on a single disk is done through digesting all forms of information. Multimedia now has become a powerful tool for instruction, which has influenced significantly the present process of teaching and learning.

Definition

The concept of multimedia is not new. We, as human beings, can hear, speak, write, draw, make gestures, play music and act out our thoughts and feelings to one another. The integration of these media into the computer provides additional possibilities for the use of computational power currently available in the form of multimedia. Multimedia is an Information technology product of 1990's which integrates text, sound, images, three dimensional

objects and animations into one form/document (Upadhya, 1998; Aptagir, 1996).

Etymologically the term 'Multimedia' is a combination of two words i.e. multi [Latin : much] means many, much, multiple and medium (Latin : Middle, Means) means an intervening substance through which something is transmitted or carried on. The medium through which the transmission of information is carried out can be a text, graphics, speech, music, image or animation. Therefore *multimedia* is any combination of text, graphic art, sound, animation and video transmitted by the computer or other electronic means to its users.

Multimedia systems denote those computers which have the capability to handle audio, video and graphical information in addition to the text, all at the sametime in an integrated manner (Panda & Gautam, 1998). *Multimedia Libraries* denote those libraries having a collection of information in the variety of forms ranging from printed books to electronic publications and video tapes to motion pictures (Singh & Dabas, 1997). Thus the connotation of the term 'multimedia' is varied in nature and means differently in different situations.

Components of the multimedia system

In a multimedia system every file containing different information is an 'object'. The files are text files, image files, audio files, digital video, animation files, sound tracks and application software programmes. All these files are linked to each other. The essential components of the multimedia system are briefly mentioned below.

Text

Most multimedia systems use text because it is such an effective way to communicated ideas and provide instruction to users. Normally the text included is in the form of plan ASCII text. The text can be keyed in directly through the keyboard or can be scanned. Usually the text is presented in the form of hypertext by hyperlinking pieces of the same text or related pieces of other texts.

Graphics/Images

Graphics/Images as objects of links are presented through multimedia systems. Graphics often appear as backdrops behind

text to create a pictorial framework for the text. Pictures, intermixed with texts, serve as options which may appear on full screen in place of only text, with parts of the picture serving as triggers, when selected, launch other multimedia objects or events. Images and photographs can be acquired by scanning the original and incorporating either the original as it is or part of the original by selecting it.

Video/animations

Motion video and computer based animations are basic media for multimedia. There are four types of video that can be used as the objects of links in multimedia applications : Live video funds, Videotape, videodisc and Digital video.

Video has the ability to convey information more accurately than text, graphics or still pictures, Video in digital form becomes even more widely applied since it can be captured, edited, played back and integrated into other systems.

Animations are like video in which the animation sequences are used to generated animate objects digitally.

Audio/Sound

Audio is a major component of multimedia. It enhances multimedia applications with music, sound effects and speech. The audio files are usually included in the form of wave files or as recorded speech using a waveform audio digitizer board and a microphone. The music is included using a device called Musical Instrument Digital Interface (MIDI). The files in which music is stored are called MIDI files. Inclusion of sound in multimedia serves as a more powerful and useful tool to provide information to users which otherwise is not possible using any other methods.

2D and 3D objects

Two dimensional (2D) and Three Dimensional (3D) objects add flair to the presentation of objects in multimedia. 2D objects like line drawings, cartoons, sketches can be drawn in hand and are created by using packages like Animator Pro. 3D objects are like real world life-like presentations and are created by using packages like Auto Desk 3D Studio. The impact of 3D objects is much more significant than the traditional presentation of a page or screen.

Object Linking and Embedding (OLE)

Each of the media components in a multimedia product is incorporated by treating each as an object. Object Linking and Embedding (OLE) is a method in which an image, a piece of music or animation can be treated as an object and included in presentations. In Linking the different components like image, audio and video are called upon from their original applications and played or displayed at a given point in the program whereas in Embedding each of these components is brought as object and inserted into the program itself.

Authoring Tool

Integrating the different components into a sequenced presentation is referred to as 'authoring'. The software which is the object oriented presentation system and helps in linking other software applications is called the Authoring tool. For example, Director, Extreme 3D, Authorware, Graphic Design Studio etc are the authoring tools.

Hypertext

The concept of 'Hypertext' is introduced by Ted Nelson in 1965. He defines Hypertext as the combination of natural language text with the computer capabilities for interacting branching or dynamic of a non linear text which cannot be printed conveniently on a conventional page. This leads to the modern definition of Hypertext as a large number of information/fragments/chunks (such as text, graphics and images) linked together electronically forming a multi-faceted indefinite shaped database in which one can write and read the information non-sequentially and non-linearly.

Hypermedia

Hypermedia consists of hypertext combined with still, moving images and sound. Hypermedia system is a system in which all the elements are connected together by logical links and everything integrated through an interactive hypertext system. When a multimedia programme is developed in a Hypertext environment, the resulting product is called the Hypermedia. Thus all Hypermedia products are multimedia but not vice versa. The information/fragments/chunks are organized linearly in

multimedia whereas they are organized non-linearly with linkages in Hypermedia.

Historical development

Although the concept of multimedia (more than one medium) existed earlier, it was only after the second world war, Vannever Bush in 1945 visualised the concept of Hypertext which gave rise to the idea of multimedia in its present form. Bush introduced a machine which facilitated multiple access in browsing and making notes in an extensive online text and graphic system which he called the 'memex'. In the memex, Bush could store his books, records and communications and then retrieve the information through the association of 'links' with exceeding speed and flexibility. In 1960, Doug Englebert designed a system which had interactive multiperson editing and branching of different files and texts having searching facility. In 1965, Theodon H Nelson designed a system called Hypertext. By 1980, the multimedia was available which was based on the hypertext/hypermedia concept. From 1980 to 1990 there was a rapid growth in the use and application of hypermedia in all spheres of life. By 1990, the multimedia/hypermedia was fully established. Sophisticated multimedia systems are now available for any person to purchase with affordable prices. Multimedia has become part of the home PCs and is very useful to individuals who own it.

Multimedia Creation

For creating multimedia applications, multimedia tools are to be used. Development of multimedia depends on the nature of application and how it will be viewed and used. Although there is no multimedia development formula, the process does follow a series of basic steps**.** *The steps include* **:**

Concept

Content and Interface

Product

Concept relates to conceiving an idea, planning the development process and outlining and prototyping.

On the other hand, content is the information and material that forms the heart of the multimedia project. Content comes from somewhere, either one makes it or one acquires it.

After the content is created, one has to design the architecture and interface by creating interface elements.

The third step is the production i.e. assembling the elements into a cohesive product; testing and making adjustment and duplicating and distributing the final product to the public.

Usefulness of Multimedia

Multimedia is useful whenever a human interface connects a human user to electronic information of any kind. It may be useful at home, in business, in school, in public places, institutions, libraries and museums by different people. Some of the general uses of multimedia are given below :

- Instructions/training and technical presentation,
- Multimedia communication like e-mail, personal conferencing, videophone and video conferencing,
- Public information points/Kiosks for libraries, museums, hospitals, tourist sites and monuments,
- Point of sale displays,
- Product information catalogues,
- Technical documentation including engineering, drawings and specifications,
- Archival systems,
- Multimedia newsletters and multimedia book,
- Reference Sources,
- Entertainment, leisure and home,
- Exhibitions such as conferences, trade show and new products,
- Multimedia databases and information banks.

Application of Multimedia Technology

The applications of multimedia technology can be seen in many areas. The most important areas where multimedia technology finds its applications are:

- Presentation of products and services,
- Information System,
- Entertainment,
- Creative arts and cultural informatics,
- Education including professional drawing,
- Medical applications,

- Business and industry.

Multimedia applications in libraries

In this age of electronic era, librarians come forward to integrate multimedia services into regular service of the library. Libraries in the advanced countries even do not have separate department for this purpose. There seems to be marked improvement in the use of multimedia services in libraries for the last few years, particularly, in metropolitan libraries, necessitating huge budget provision. Multimedia resources for reference service, instructional and entertainment purpose are mostly available at national level institutions and organizations. Due to availability of internet services in office, library and houses, multimedia has become more popular and attracted the attention of the decision makers, financial authorities and educational administrators. Developed countries have now started various projects like archiving different forms of information, multimedia databases, multimedia catalogues, walkthrough programs/multimedia library information kiosks, instructional packages, electronic books and digital libraries. In India, American Centre Libraries, British Council Libraries, DESIDOC Library and a few other libraries at national level are using good number of multimedia PCs for providing multimedia resources. Some of the multimedia applications in libraries are summarized as follows :

- Multimedia helps in satisfying different information needs such as, reference, enrichment and entertainment.
- It can meet the requirements of scholars, scientists, artists, technocrats and other professionals.
- Remote users on a network can also access information in digital format.
- It helps in overcoming the barriers of boundaries, proximity and physical capacity of a library to accommodate users.

Multimedia Library and Information Guides

Some of the important examples of multimedia library guide/Web Library Guide/Electronic Tours are :

- Electronic Library Guide in the University of Birmingham's main library, using hyper card,

- Multimedia Database of Tourist's information using hyper card by the public library of Gateshead libraries and Arts Services,
- Drexel Disk hypermedia walk-through program to Drexel University students using hyper card.
- Multimedia Library Kiosk of the Defense Science Library, DESIDOC, designed using hyper card.

Instructions and Training Guides

A few multimedia based CAI packages designed using hyper card for library staff training/instructions are :

- Hyper Card-based AACR2- a self-learning CAI package for preparing catalogue cards,
- Hyper Card-based University of Hawaii OPAC Tutorial,
- Cafskills – an interactive multimedia package to teach AACR2, available in CD both Mac and Window Platforms, marketed by Library Association, London,
- Teaching Mini Medline- a training tool for library users,
- STAR (Students Tutorial Access and Resources) CAI package designed for OSU Libraries.

Self-Learning Tools

The linking capability of hypertext with multimedia provides an ideal learning environment to learners. Addition of graphics, photographs, music, speech and video put a lot of impact on the learners interest, speed of learning and retaining of information in their brain. Some of the important training applications available in libraries are :

- National Geographic Animal Sampling,
- ABC Golf,
- Data City,
- Cartoon Jukebox (an interactive coloring book for children),
- Magic Flute,
- Think and Talk (French, Spanish, German, Russian and Chinese),
- Online Internet Resource Guide.

Multimedia Databases

Multimedia is helping the librarians in integrating large number of photographs, artifacts, audio recording and textual materials in

various collection/sources/forms subject-wise and making meaningful multimedia databases both for day-to-day use and achieving. Some of the examples are :

- Mendocino County Library, Ukiah – developed a multimedia database of historical and cultural information i.e. relevant to the Californian Indians in that area.
- CD-ROM on "Gathering together a Nature American History" by the same Library is another example.

:

Multimedia Catalogues

Printed catalogues are one of the important information sources particularly in technical libraries. These catalogues consume large percentage of postal carrier bags. Today the interactive multimedia catalogue offers a high volume of information on a small disk. Several international publishing companies are also bringing out their catalogues in interactive CD-ROMs, for example :

- CD-ROM Catalogue Shopping,
- SW Catalogues,
- Macromedia Showcase,
- Silver Platter Directory of Electronic Resources,

.

Some of the public libraries and school libraries have also started developing their catalogues in multimedia.

Multimedia Information Resources

These are various types of multimedia systems/information sources available in libraries and information centers. These are :

- CD-ROMs
- Video Disks (VD)
- Laser Disks (LD)
- Audio and Video Cassettes,
- Web,
- Databases on servers,
- Digital Video,

.

Most of the reputed publishers started converting their reference books in print forms to multimedia format. Hence libraries have to choose either print or multimedia publications. Some of the important multimedia publications are listed below :

Encyclopedias

- Crompton's Interactive Encyclopedia, 1998,
- Britannica CD, 98 & Britannica Video CD,
- Encyclopedia Americana, 98,
- Grolier Multimedia Encyclopedia, 1998,
- World Book Multimedia Encyclopedia,
- Microsoft Encarta, 98.

Dictionaries & Directories

- Oxford English Dictionary,
- Webster English Dictionary,
- The Dictionary of Living World,
- National Geographic Mammals,
- British Birds,
- Microsoft Dinosaurs, etc.

Reference Manuals

- MIT Movie Manual,
- Interactive Graphic Documents,
- The Manual of Medical Therapeutics.

Year Books

- The Guinness Disc of Records

Reference Books

- Earth Quest,
- World Climate,
- Interactive Periodic Table,

Electronic Books

- Manual of Medical Therapeutics,
- The electronic Whole Earth Catalogue,
- Microsoft Musical Instruments,
- Introduction to Classical Music,
- The Oxford Textbook of Medicine on CD-ROM.

Electronic Newspapers/Journals

- The Times/Sunday Times/the Guardian,
- Times/Newsweek,
- Multimedia Tech for Electronic Newspapers,

37 Indian popular magazines are available on the Internet,
21 Newspapers are available on Internet.

Multimedia Fiction

Now-a-days several multimedia fiction books/packages are available for all levels of people. For example, The Manhole, a children fiction takes the kids to a fantasy world with talking animals and dragons where magic beanstalks grow into the sky.

Geographical Information Systems (GIS)

- National Capital Planning (NCPC) Washington, DC-It is a multimedia GIS application which uses online video clips and images of buildings along with their maps.
- Bangalore On-Line – It is a multimedia GIS application designed with map info Software.
- Escorts, India developed multimedia for several cities in India.

A good number of Commercial GIS reference tools are also available in the market for library use. For example : Quick Reference Atlas (Rand McNally New Media ; PC Globe Maps 'n' Facts; 3D Atlas and World Atlas MPC)

Multimedia use in Museum Libraries

Some of the Indian multimedia guides, which are available for use, are :

- An Interactive Multimedia Guide of the National Museum of Natural History designed using Director.
- An Interactive Multimedia Guide of the National Rail Museum designed using Tools Book.

Multimedia Information Resources Available on Internet

An exhaustive information search conducted on Internet providing information on the use of multimedia systems for library application by C.K. Ramaiah categorises them under four groups :

- Multimedia Digital libraries,
- Integrating multimedia into Libraries Management and Access Issues,
- Instructional multimedia Resources on the Web,
- Selected list of magazines on multimedia.

Electronic/Digital Libraries

Digital information, which includes digital books, scanned images, graphics, data, digital A.V. Clips may also form items of

multimedia services in libraries. USA is the first country to start digital library project in 1955 in the universities followed by UK. Some of the important library projects and their site information are given below :

- Carnegie Mellon University- full Content Search and retrieval of video
  http://www..fuzine.mt.cs.cmu.edu/in/informedia.html
- Elite Project
  http://www.cosimo.ing.unifi/it/research/ilitiinfo.html
- International Institute of Electronic Library Research
  http://www/ford.mk.dme.ac.uk
- National Library of Canada Electronics Collection
  http://www.nic-bnc.ca/eppp/e-coll-e.h
- Stanford University- Interoperation mechanisms among heterogeneous services
  http://www.warrus.stanford.EDU/diglib/
- University of California at Berkeley work centered digital information services
  http://www.elib.cs.berkeley.edu
- University of California at Santa Barbara Specially referred map information
  http://www.alexandria.sdc.ucsb.edu/
- University of Illinois at Urbana-Champaign Ferreting repositories of Scientific Literature
  http://www.grainer.uiuc.edu/dli

Limitations of Multimedia

Though multimedia systems have gone a long way in their road of journey to office, schools, colleges, universities and homes, they have to suffer in three fronts namely, technology, skilled manpower and standardization.

Technology

- Hardware and software requirements are expensive with large investments.
- Adaptation of different media for integration and the latest human interfaces are not possible with the existing software.

- Because of the limitations of the storage technology, converting all multimedia resources into digital media and storing them is difficult.
- Existing distributed networks do not support real time multimedia services.

Skilled Manpower

- Lack of trained manpower for the development of multimedia databases.
- Vast amount of work (i.e. 100 to 800 person hours) required creating an hour interactive multimedia content.
- Good multimedia content creation requires multidisciplinary knowledge, multitechnological skills and experiences.

Lack of Standardization

Absence of standardization among the various platforms and between hardware and software is the main barrier to the wide-spread use of multimedia.

Conclusion

The effectiveness of the multimedia CD-ROMs, multimedia database and reference tools is dependent upon various factors like well-developed software programmes, information content and the development of new information handling skills. The key to making sense of multimedia in all its forms is understanding the technologies involved and their interaction. The first step is to understand how digital audio and video works. Second, most of the multimedia applications are confined to affluent libraries in the metropolitan cities only, perhaps due to lack of technological know-how, insufficient funds and skilled manpower. Third, unless all the library schools introduce the latest technologies in their syllabi and the teachers get trained, it would not be possible to change the present scenario of the libraries. Therefore, it is high time for the library professionals to rise to the occasion in removing these hurdles, so that a variety of multimedia information sources can be produced with simple, easy and independent of time, place and subject discipline.

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Chapter-8

M-LEARNING AND LIBRARIES SERVICES

Changes in society and technology made variations in the life style of people and their views and attitude towards M-Library (Mobile Library) technologies. In this situation new means of communication practices are necessary to keep in touch with library users. Mobile technology is feasible in terms of cost and efficiency to meet the communication needs of all types of libraries

When people talk about mobile libraries, they tend to mean a bus or truck that has beenkitted out as a roving branch library. However with a growing number of people accessing the internet from their pocket PCs and mobile phones, libraries are investigating ways to deliver their services to mobile phones and other small-screen devices so their customers can access them any time anywhere. This can be as simple as sending text message alerts about reservations becoming available or overdue books, or as complex as the Athabasca University Library's Digital Reading room, which allows readers to access full eBooks and journal articles through their library's subscriptions on any mobile device. These services have collectively become known as 'rn-libraries'. (Needham, Ally 2008)

Mobile learning, sometimes called m-learning, is learning accomplished with the use of small, portable computing devices. These computing devices may include: smart phones, personal digital assistants (PDA5) and similar handheld devices. Mlearning is a type of personal learning that has infinite possibilities; it allows more and more people to gather knowledge on the go, to realize their dreams of a better future and it is provides a way to access the applications that support learning anywhere, anytime. M-Learning has very supportive to learners from all walks of life to develop their skills, confidence and motivation to learn comparatively past computers or laptops.

Developing m-library services is usually expensive and resource intensive. Setting up text alerts, for instance, requires technical expertise from staff who understand how the library management system produces notifications, as well as staff or consultants who can help to set up an interface with a slim card modem or a suitable service in order to deliver those notifications as text alerts.

Concept of M-Library

According to Hoppe, Joner, Millard, and Sharples (2003), "M-learning is e-learning using a mobile device and wireless transmission."

Harris's (2001) described "M-learning is the point at which mobile computing and e-learning intersect to produce an anytime, anywhere learning experience."

Wikipedia Defines Mobile Learning as

Any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of the learning opportunities offered by mobile technologies"

In recent years mobile technology has suffered a great growth and a great progress, so new possibilities are available. Some of these possibilities are: transmitting, receiving and storing information, connecting to Internet or running applications; moreover, this growth has caused that users would require both new available services and new applications over this "recent" platform.

With these new features, we think that it can be supplied to users libraries basic-services, so that they can be most accessible to those users.

Origin of M-Library

When in 1979 the first Mobile devices appeared, they are based on analogue technology and it was unthinkable provide such services through mobile phones, but these devices are evolved a lot since then; the great breakthrough came in 2001, when the first devices with colour LCD display appeared. In the same year

appeared in Japan the third-generation phones (30) based on UMTS (Universal Mobile Telecommunications System); the main innovation was the incorporation to the device of a second camera to video calls. Currently these 3G or 3.5G devices are commonly used.

Today, as a result of developments and advancements in information and communication, the mobile technology becomes essential for connecting with Internet. Users are currently more positive about accessing and seeking information from their mobile phones. Mobile is a device through which people access their information and do business. With the recent advancement of mobile technologies, such as smart phones, digital cameras and PDAs (Personal Digital Assistants), and tablet PCs mobile learning provides opportunities for formal and informal education in a wide range of settings. In particular, the use of mobile technologies to access digital libraries opens up doors for providing unique learning experiences, both inside and outside of the classroom. We translated this needs assessment into a list of twelve functional attributes for digital library infrastructures and mobile device applications that will facilitate informal learning. In order to test out the recommendations, a conceptual design was developed as a lesson plan that uses mobile devices and digital libraries to teach the concept of simple machines. This paper summarizes the needs assessment research, implementation, testing and recommendations for future work. Our goal is to provide recommendations for mobile learning technologies that will increase access and enhance mobile learning experiences for students of all backgrounds.

Definition of Mobile Learning

Over the past 5 years there have been wide ranging debates about how to define, precisely, what mobile learning is? The difficulty in reaching a consensus is partially because of the rapid evolution of this as a field, and partially because mobile learning works best when it is a part of something else.

Our current best definition comes from the eLearning Guild who defined it as:

Mobile Phones and Library Services

For some years now, people have been creating applications which can be downloaded to mobile phones in addition to the software supplied with them. Examples include mapping software, games, mobile email clients and software which provides a way of uploading photos or other content to the user's blog or social networking accounts. Until recently the take-up for these applications was relatively low, but iPhone users download a great many more applications than owners of other phones

ICT has collapsed barriers and promoted fast communication and interactions across boundaries.

The need to meet life's basic challenges and responsibilities has informed the invention and the use of information technologies. Libraries are deeply interested in channels for the transmission of information, such as telephones and telephone lines, cellular networks, cable television, and the Intemet. The Intemet and World Wide Web (www) have made it possible for university teachers, researchers, and students to locate what they need without going to the library. Most academic libraries have started exploring the viability of Intemet technologies. These would support library- to-user, user-to-library, and user-to-user online interactions.

Telephones and e-mail are important tools to facilitate prompt handling and response to the stream of patron questions from within and out of the library user community. Mobile phones could be deployed at the enquiring desks." Short Message Services (SMS) or text facilities available on all mobile phones, could be used to create awareness amongst the academic library clientele about upcoming events and new arrivals. This could be flashed through a facility called "broadcast" where one text message is sent to all the library contacts listed in the address book on the mobile phone at once.

Mobile Technology has now come up with "Libraries in Hand" trend. Our librarians are in move to determine how these devices are affecting information access and ensure that they are communicating with patrons and providing web content in the most appropriate and effective ways. Our Librarians must be prepared to

take this challenge and put his efforts to increase the market and demand for mobile access to personalized facts and information anytime, anywhere on one's own handheld device.

Libraries today are covering most of the technologies given by mobile industry like PDA's, Blackberry, iPod, Cellphones, UM PC's (Ultra Mobile PC) and mobilising library contents in a portable form suitable for small screen and delivering short services in the form of contents/ information with device's multiple searching

The most important mobile services are:

Sms Service

This service allows sending text between mobile terminals with a maximum of 160 characters. Despite being short text messages, the service is the most popular in the history of mobile telephony. Text messaging is accessible these days to practically anyone, for relatively low costs, so it is an easy way to get into providing a mobile friendly service for a library. Perhaps the easiest service for a typical library of any sector to introduce is a 'text a librarian' service. This is simply allowing members of your library to text a question, alongside all the other ways your reference service may be accessible. It can be as easy as puffing a cheap pay-as-you-go mobile phone in the drawer of your main enquiry desk.

Multimedia Service

Multimedia message service is not as popular as SMS. On the one hand because all terminals have not available this service and on the other hand because they have a high price. Most of current mobile phones can store and send ring tones, logos, photographs, graphics or music. They have become small multimedia consoles.

Mobile Opac

Traditionally the Online Public Access Catalogues (OPAC5) served as the binding wine between the user and the library collection. With the advent of mobile services, new Mobile based OPACs are being developed for mobile users in various libraries. Development of mobile optimized OPACs nicely cater for both the regular desktop OPAC users and mobile OPAC users. The biggest challenge in this endeavor is to scale the information display into

the mobile optimized output. Sometimes it is very difficult since most of the library catalogues make use of the web 2.0 advancements and use lot of content enrichment and other allied services to their regular catalogues which will be very difficult to scale for the mobile phones.

Digital Collections

Libraries are moving forward in providing access to digital collections via mobile devices. No longer do visitors have to visit a library to find a computer with internet access. Now they can experience digital collection s in the palm of their hand through a mobile phone.

Data Service

The last generation of mobiles has the possibility of Intemet connection. So, this connection can be the base to others services. For example e-mail in a terminal and Web browsing are now two of the main applications of data service and it is expected to grow in the future.

Audio Books

Digital audio books continue to grow in popularity. It is difficult to believe that the service was initially offered in libraries only as recently as 2005. Recently, most mobile devices did not have the memory needed to house huge audio book files. As mobile devices have increased storage and memory. The number of phones and other devices that can now accommodate audio files continues to increase. Audio book vendors now offer downloadable audio books compatible with the iPod. Playawayoffers libraries the opportunity to loan out audio books on a port able player so an individual does not have to have a computer or even owns a mobile device.

Oxford University Press Launches Roaming Support for Mobile Journals Users

Oxford University Press (OUP) is announced that users of its mobile-optimized journals service can now authorize their mobile devices for offsite access to institutional subscriptions.

While connected to the institution's network, by choosing 'Authorize this Device' on any journal's mobile homepage,

institutional users can connect their mobile device to their institution's Oxford Journals subscription, thereby granting access to protected content even after stepping out of the institution's network.

The Significance of M-Learning

Unpacked here is the socio-technical significance of rn-learning, the why you should care portion of the paper. Keep in mind that mlearning technology includes hardware such as cell phones and mp3 players and software such as operating systems and applications. M- learning still faces barriers to widespread adoption. The disposition of these barriers is web-based, economic, and design.

New Technology

M-learning as a phenomenon has been in process, unintentional progress since the late twentieth century. The unintended consequence of smaller and faster computing is the enabling of an anywhere and anytime learning. In the course of scientific discovery products are produced which have novel application that are wholly unintentional.

This is the unplanned nature of science phenomena occur and exist before being named and investigated. Students learn through new technology before educators have inquired to their attributes. In this way we now play a game of catch-up.

M-learning represents possibility (Eisenberg, 2007) minimally developed and remains as yet unrealized and has not been made of experiential and active use for users of our libraries or our students. M-learning represents a well-intentioned effort (perhaps not wholly fad-free, but withhold judgment for a moment) to further assist humanity in the development of its learning. For our highly scheduled, commodified, pressured students, there exists a need for any time anywhere information structured information that is organized and accessible. This is surely the domain of the librarian; better yet, the librarian qua teacher. This article suggests that there exists an rn-learning impulse occurring outside the domain of librarianship of which it would be wise to take notice. Demographics of use and users: the dispersion of mobile technology

According to the Pew Internet and American Life Project report Mobile Access to Data and Information, the cell phone ranks as the most highly valued technology in America, finding that it (the cell phone) is the technology which Americans are most unwilling to part with. This preference has surpassed the Internet and television: these results indicate a flmdamental societal preference shift occurring in the past five years. Indeed it is crucial to note, as the report does, in large bold and italicized type that: "62 percent of all Americans are part of a wireless, mobile population that participates in digital activities away from home or work. The confluence of significant demographics include: the finding that for English speaking Hispanics the cell phone is a crucial part of theft lives as they "are much more likely to say it would be hard to be without a cell phone than to be without the internet or email, more so than Blacks or White Americans; of those who reported they would not wish to give up the cell phone over any other technology, the majority were people between the ages of 18-29 analysis from Seeding the Cloud: What Mobile Access Means for Usage Patterns and Online Content is that "cell phone users are more likely to be found in groups that have generally lagged in internet adoption, such as senior citizens, blacks and Latinos". By extension, it could very well be that mobile digital library services may be able to reach populations that have been heretofore underserved.

Open Source Software

The Open Handset Alliance (www.openhandsetalliance.comf) is an important resource to watch, and may help erode the barriers to mobile learning both inside and outside of library space. Google Code(http://code.google.com/) andSourceforge.net (http:II source-forge.netl) are essential resources for acquiring open source software for mobile devices. One such incredible application is the Encyclopedia download (http:// sourceforge.netiprojects! encyclopodiaf), which allows users to place an e-book of Wikipedia onto their iPod. Separating content from representation Presented earlier with regard to e-books is the nature of content representation. Covered also is the presentation of format using reformatting principles. The separation of content from presentation in line with the logical model would actually negate some aspects of reformatting challenges, thus succeeding in the

extensibility of library resources — beginning with the most obvious, the library homepage. XSLT is an important document processing solution for navigating the content/presentation dilemma.

Applications of M-Learning

Applications of mobile technology enabling m-leaming occur across a wide range of disciplinary space. HCI and medical informatics groups are perhaps most experimental within this domain. Innovations by these professionals will lead to service innovation in libraries. After exploring the implications m-leaming means for service innovation generally, this section goes on to review mobile technology use in disparate library types: special, academic and school, and public; initiatives discussed in each are not mutually exclusive to the library group to which it belongs.

Service Innovation

The student may be seeking information with limited space, i.e. the constraint of either not wanting to go to the library physically or the physical library being closed. A student may simply not know, given the stressors of time, what information resources may be available to them at the present? The mobile devices, which students carry, can be loaded with an application directing them through the information seeking process in a manner, which considers space-time constraints. This is the yet unrealized potential of computing ubiquity and the library.

Technological capabilities of cell phones include, but are in no way limited to the following protocols, file productions, and allowances; true GPS, WiFi, video, picture, text (SMS), multimedia messaging (MMS) data processing and storage capabilities. Many higher-end phones are able to create digital video, digital photos, as well as playing mp3s. Medical informatics approaches for services on mobile devices include solutions. which enable data sharing across multiple disparate workspaces. These initiatives can be viewed as an attribute of ubiquitous computing, Cell phone capabilities, the use of a patient “smart card” and web services are explored by Chan (2000) with their ability for facilitating access of patient data across multiple medical case sites. Further research

into the ubiquity of what mobile devices enable include articles exploring prescription tracking on PDAs and further work on data entry and data access A reoccurring theme in the literature is the notion of a personal area network (PAN), the significance of which is explored by researchers exploring mobile device use in assisting patient treatment or to expedite the processing of paperwork and patient check in by way of mobile phone Smart A usability study of mobile assisted localization finds that navigating a physical library collection through the use of a mobile device may be most applicable to campus libraries which feature disparate collection locations. Research, which sought to make full use of all cell phone hardware and software capabilities in tandem would be creating a service which did not have a true analog in the physical library. Combine the features of context aware solutions with student profile data and OPAC data or other search data with digital picture data and what you have is a truly unique resource — a library application that will guide students through research confusion and with a new tool for navigating the university successfully. The library as a lab for m-leaming services is a future worth pursuing and realizing. The development of such a platform provides the library with a way to be an instrumental part of the student's life.

New applications for mobile devices to suit library needs necessarily require a new discourse. Just as interface design and usability study was not a librarian skill-set when librarianship became a profession, so too must mobile technologies be integrated into the professional tool-kit. Librarians can understand what device development is most applicable to their students by accessing or collecting data about the technology their students carry. Surveying mobile use and needs "in the field" before tools are developed is a necessary first step for service development. Academic librarians will fmd technological infrastructure for rn-learning already exists on their campus. Educational information technologists are interested in new computing applications. Developing the infrastructure for rn-learning need not be produced by librarians alone - - researchers in engineering, computer science, education, psychology, and sociology may be investigating mlearning or may have similar interests in new technology. Researchers may not be aware that what they are investigating

could serve a public service need and look for practical application for their hardware.

Librarians are well suited to provide this practical viewpoint Conclusion, with thoughts about rn-learning philosophy for the librarian and the library. M-learning gives the library a way of becoming something more than it is now. Mlearning is activeness in the leamer and life for the library space. Building on this experience for our profession, being a librarian and experiencing learning of a type made possible through technology is a grounding philosophy of m learning for the library. Be wary of the having orientation, and seek to focus on being, which is to say a state of progress and for the person, in his Five Laws of Library Science promulgated the idea that a library is a growing organism.

The existence of the library in mobile digital form will be something altogether unequal to the physical realm. The rn-library is not truly the library on a portable device but rather a new unequivocal resource that can reshape scholarship, study, research, and librarianship. Digital library content on mobile devices is a new existence for the library.

The m-library does not mean the end of useflilness for libraries or librarians. Mobile devices are an opportunity for crafting new library services such as in-library exploration, social engagement, and outreach to traditionally underserved populations, as well as microinstruction and learning — all of which lead to new efficiencies which enable the possibility of turning the tide on the unequal dispersion of information resources and perhaps one day closing an unjust digital divide. This orientation shows the institution, the profession and the person becoming something they have not been before, as opposed to having something it did not have. An alteration in your existence is no doubt terrifying. And yet, to assert existence in the face of non-existence is true courage.

Future Potentials of Mobile Application in the Libraries

More and more changes are expected within four to five years in the field of mobile technology and its application to the libraries, the day is not far when we will use phone to read barcodes or RFIDs in the library and OPACs will develop GIS sensitivity and be able to

communicate with users through their mobiles for holds, fines, late notices, alerts, etc.

Conclusion

Libraries are moving forward in providing access to digital collections via mobile devices. In the near future, more and more people will be able to experience digital collections in the palm of their hand through a mobile phone. No longer do visitors have to visit a library to find a computer with internet access. In order to meet these requirements, libraries are also facing some challenges.

Though mobile communication technology is not a problem, our librarians should know how to use this technology to serve our readers. We have to think about the access authority to our data bank, otherwise the may be a tort incurred. How to find a proper operator whose gateway is trustworthy to cooperate with us. Besides, user interfaces are nearly always varied and lack of standards. We have several operators and it's laborious to develop services.

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Chapter–9

SOCIAL NETWORK AND LIBRARIES

The social networking services can effectively be used by the libraries to share information with its clients in the easiest way possible. With social networking tool one can create bookmark collections, share notices and more.

Up to some years back, there was no problem in identifying the information sources in libraries as the majority of them were in only printed from such as books, periodicals, govt. publications, dissertations and thesis, patents, standards, specification etc.

The emergence of the internet particularly the WWW as a new medium represents a revolution in information storage and retrieval. It has shown a paradigm shift in information render and information seeking behaviour of the regular users.

In the present era of information explosion, more and more information is available on web. All the sources of information are now available in electronic media like on-line and other stored electronic formats. The old traditional methods and models of information seeking needs to be redefined in new context i.e. in digital age.[1]

Social networking is a concept that has been around much longer than the internet or even mass communication. People has been always social creature; our ability to work together in group, creating value that is greater than the some of its part, is one of the our greatest assets. In traditionally networking terms, what are being linked are device or object; phones, fax machines, computer, documents etc.The rapid rise of social networking sites has alreadyprovide this a reality, eventhough they are “wall garden”. By mid-2004 there were over 200 social networking sites, including Friendstar, Linkdline, Ryse, Orkute, ZeroDegrees, Meetup, Tickle, and many more are comingIn this communities, an initial set of founders send out message inviting members of their own personal network to join the site. New member repeat the process, growing

the total number of members and link in the network site then offer feature such as automatic address book updates, viewable profile, the ability to form new links through 'introducing services'and other form of online social connections.[2]

Conceptual meaning of Social Network/ Media

Social network is a social structure that lets the user interact and work collaboratively with other user, in an environment where the facility to browse, search, and invite friends and to connect and interact with WWW.[3]

In other word Social networking is an evolutionary development of online participation where people of common interest communicate, share and contribute content on the social cyberspace. It is a viable tool for cooperation and sharing of knowledge in an open access platform. In the Social Network Space (SNS), people with common interests are able to share information with each other via a huge variety of social networkingsites (*sites created specifically to make sharing, communicating, and creating information as simple and efficient as possible*). Social networking is a new way of providing library service through new internettechnologies, with emphasis on "user-centered", two-way interaction and communication of information. With new networking tools, information can now flow in a multi-faceted dimension *(library to user, user to library, library to library, and user to user)*, rather than the one way stereotype form of library to user. It is constantly expanding the world of participatory and collaborative scholarly communication and learning. It is a new model of online service that encourages an increased flow of information from library to users and from the user back to the library. Online participation and contentcontribution are core issues in the present social networking practices. Social networking tool is a platform where users are both consumers and producers of online content. With these tools, librarians can constantly evaluate and update content to meet the changing needs ofusers. These tools are used for collaboration and sharing of ideas and it is becoming an integral part of library services. It also calls for libraries to encourage users' participation and feedback mechanism in the development and maintenance of library services. The active participation of users enables them to contribute content, establish

communication links, and stay informed of new developments in the social network space. With information and ideas flowing in both directions – from the library to the user and from the user to the library – library services have the ability to evolve and improve on a constant and rapid basis.[4]

Useful Social NetworkingTools for Librarians

Social networking site iscommonly known as social networking website and promote a number of social network services. It allows to user to share ideas, activities events and interest within the individuals networks. Some social network have additional feature, such as ability to create groups that share common interest or affiliation, upload or stream live videos and hold discussion in forums.

As a librarian, you want to be able to share information with patrons and students in the easiest way possible, and social networking offers a great way to do just that. With social networking tools, you can create bookmark collections, share notices, and more. We have profiled some of the best here. With these social networking tools, it should be easier than ever to stay in touch, organized and well connected. You may even find that you have got more access to information than you ever did before. Of course as an added bonus, you will now be known as the "cool" librarian because you are on Facebook.

Some of the popularly used social networking communication, distribution and organization sites are briefly discusses as follows:[5]

Communication

Facebook: most popular now because it is librarian- friendly, with many applications like JSTORsearch, World Cat, and much more. Librarians can interact with users to know their information need.Libraries try to link some of these specialized library applications to Facebook.

MySpace: In Academic institutions where the students are; libraries have taken advantage of this siteto post, calendar, custom catalog search tools, and blog features to improve their presence.

Ning: Librarians can get connected with users, library associations, and more. You can also use it to share information with many people at a time.

Blogs: Here, librarians can periodically post messages; share information on a particular subject orissue, and allow users to contribute to content. They can write articles, news on topical issues andexpect an instant reaction from their users.

LinkedIn: Librarians can get patrons connected with specialists in their particular field of interest viaLinkedIn. Librarians can use this platform to render specialized services such as StrategicDissemination of Information (SDI).

Twitter: a micro blogging application, to keep staff and patrons updated on daily activities, likefrequently updated collections. Users can utilize this platform to type in short messages or statusupdate.

Distribution

YouTube: Institutions can highlightthe inaugural lectures,conferences and workshops disseminated via the YouTube.We can see how other libraries are using YouTube by checking out the youtubeandlibrarieswiki.

Flickr: Librarians can use this tool to share and distribute new images of library collections. Coverpage of new arrivals of both books and journals can be disseminated to users via Flickr.

Wikipedia: Wikipedia is an online encyclopediaupdated by users. You can use this tool to share your knowledge by editing or simply point library patrons in the right direction.

Organization

Library Thing: Atool that enriches the library OPAC. Once an account is created, a list of books withISBNs is sent to Library Thing which sends back a piece of code which is pasted into the footer of theLibrary OPAC. Librarians can utilize this to send a list of current publications to users.

aNobii: This site for book lovers is a place to share reviews and recommendations. You can also take advantage of due date alerts, lending and discussions.

Lib.rario.us: Another social cataloguing site, you can put media such as books, CDs, and journals on display for easy access and tracking.

The important characteristics of social networking for libraries are

- **Participatory**- Users have the opportunity to actively engage in the construction of knowledge rather than being passive consumers of content;
- **Educative**– Users are kept abreast of the latest developments and can have open access to knowledge;
- **Collaborative**–Social Network ensures knowledge sharing, establishescommunication link with experts andallows users to develop a teamworking skill and
- **Fascinating**– It is inspiring, interesting and users can be engrossed in theuse of social networksites; some users garner information withthese sites in an easy and unencumbered manner; andFlexibility – Easy content creation and sharing, easy to update files andpersonal contact.

Role of Librarians in Social Network Era

Libraries play important roles in providing information for research and access to knowledge. In order to stay relevant in the socially networked environment and meet the growing needs of their users, librariestherefore need to pro-actively embrace the new technologies and face the challenges for better services delivery. Librarians are responding to the popularity of social networking sites and their expanding role in the creation, use, and sharing of information by engaging them as a central medium for interacting with library patrons and providing services to meet their information needs. The ways in which people communicate, acquire and share knowledge, will inevitably have an impact on the library, its services, and its staff. Librarians should follow the public conversations, posts, updates, and events of these key individuals, and pro-actively offer advice, resources, and help. He should act as an active participant of the social space and be able to identify the needs of the members of the librarycommunities and to proffer solutions by offering information, links to the websites that are relevant to their information needs; and even direct offers of help. There is an urgent need for libraries to adopt the new social networking tools in their services as a strategy to embrace change while promoting a participatory role for library users in knowledge

creation. The growing use of social networking tools calls for librarians to develop 21st century skills on digital technologies. Libraries can connect their social networking sites with their library Websites to links to their catalog, chat reference pages, research guides, calendar of events, news etc. Some of the roles of the social networking librarian include: understanding andarticulating the nature of social networking sites, creating webpage and content, establishing friendly user interface over the network, creating online database management, evaluating and applying information,and assisting users with skill acquisition. Other skills for a social networking literate librarian include: searching and navigating the web, creating social network space, teaching, and providing quality online library services. The Model below is an adaptation of Richter and Koch (2008) model on *process of IT supported social networking.* This model encapsulates the future roles of the 21st century librarians in the dynamic technological environment. Librarians must possess these skills:

Identity management – Librarians should be able to examine profiles of users to mirror their information needs and match them with the library collections.

Network awareness - Should be able to share views and create awareness of the different social network sites and their uses

Expert search – The 21st century librarian should be an expert in web navigation; able to find friends of friends, and potential library users with common interest.

Contact management – Librarians can cross-link people and ideas among the conglomerate of different groups.

Context awareness – should be diversified in knowledge and able to link information to people's profiles.

Challenges of Social Networking

- Lack of awareness
- Bandwidth problem
- Technophobia
- Poor connectivity
- Afraid of handling computers
- Unreliable power supply
- Lack of maintenance

- Lack of training staff
- Government intervention
- Copyright Issue

The above idedntified challenges could be solved by librarian through the following strategies

- Organizing a public awareness forum such as library orientation, conferences, symposia, workshops to create awareness and educate librarians and users on the social networking services and applications.
- Embracing current change in order to remain relevant and adapt to the new ICT driven environment.
- Imbibing a maintenance culture so as to manage the few available ICT facilities effectively.
- Provision of stable power supply will encourage and facilitate the effective use of these tools.
- Pro-active training of librarians to acquire 21st century skills to adapt to the changing ICT environment.
- Government should take an active role in providing ICT facilities to institutions.
- Educating the public on the issue of copyright law and violation.

Conclusion

In conclusion, this paper has tried to examine the concept of social networking and its application to library services. It has been observed that librarians not fully embraced these social networking tools in library services. As such, there is a need for a pro-active awareness and training to educate both the librarians and the users on the invaluable importance of utilizing social networking in library services. 21st century librarians adapt to the new ICT driven environment and will be able to implement a successful social media programs, and utility to prove the value of their collection.

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Chapter–10

NETWORKING, RESOURCES SHARING AND CONSORTIA

Information has come to be seen as the fundamental currency of human activity. For libraries and information services, information is their reason for existence so it is all the more important that they should treat information as their most strategic asset. Information Technology can no longer be seen simply as an addition to the existing range of services but must be viewed as the central backbone of the library services. An IT strategy is thus viewed essential for making the most effective use of information assets in the library.

Libraries which until recent times were essentially stacking print material, have now begun to acquire electronic media like CD-ROMs and multimedia packages. Libraries will have to prepare themselves for conversion to electronic libraries, commonly referred to as digital libraries. The beginning has been made in India also, to convert hard catalogue records in machine readable form and provision for electronic based services has also been initiated, besides creation of institutional repositories and taking up of digitization projects at a fairly decent page. These datasets are essentially the building blocks of the digital library that provides a fillip to the active collaboration and participation in networking, thereby facilitating resource sharing in true sense of the term.

Libraries, as intermediaries are dependent upon the actions of suppliers of information on the one hand and users of information on the other. The libraries have to build into their future strategies the concept of continual change. They may be required or expected to operate and make provisions for more sophisticated and integrated options. Some such options could be:

- Connect into more networks
- Provide more ways for their users to access information
- Offer a wider range of services

- Be prepared to take on more functions
- Be well-established organizers of information in counteracting confusion and uncertainty.
- Be advisers and helpers in the information process which will be in more demand than ever
- Continue to introduce innovative technologies to improve services and facilities
- Make provision for users to plug portable devices into library networks
- Provide multifunctional terminals for users
- Have servers accessible via the Internet
- Provide access to the Internet as a routine service
- Provide necessary skills to organize the internal information resources of the parent organization
- Be prepared to provide a wider range of communication facilities in the future, allowing users to communicate more effectively with the library, with each other and with the external world.
- May not need to plan for ever-increasing storage of physical materials
- Consider the most effective ways of helping their users to navigate through the mass of electronic information available to them.
- Help users by developing better information retrieval tools based upon a knowledge of user preferences
- Consider the loan of a wider range of electronic media to users in future
- Make provision on their networks for devices that can read the new media at convenient points
- Play the role of gateways to external systems, providing access to information over which they have no ownership rights and little control
- Consider subscription to Internet-based services for their users as an alternative, due to spiraling cost of certain products in physical format.
- Provide services for remote users who may or cannot visit the site physically
- Offer something more than can be obtained by users at

home, thereby making their services effective enough to attract users away from alternative information providers

- Provide remote access to their networks through a variety of technologies and may be demands for such devices to be made available for users.
- Design policies to deal with enquiries from global users.
- Make provision for providing global access to the unique resources in case of special collections available at various libraries and information centres.
- Learn to compete effectively with other organization if they are to survive in the future
- Lastly, commit themselves fully to the increasing use of IT in the future and develop strategies to make the best use of IT for their users.

Networking, Resource Sharing and Consortia

Networking

Library Networks are set up to share resources and services amongst member libraries. As this topic has been already addressed in Module 3, so we will not focus on this here in this Module. However it may be reiterated here that there are several library networks at both international and national level that have been successfully implemented and are facilitating assorted services and carrying out multifaceted activities.

Resource Sharing

Resource sharing is the treatment and management as a single collection of the collections of several institutions. The resource sharing facilitates the co-ordination/ co-operation/ partnership/collaboration between and among libraries to share resources.

Consortium

A consortium is basically a cooperative association of Libraries of different types. Set up with a purpose to share human and information resources so that the collective strengths of the institutions facilitate the research and learning of the member's constituents

Alternatively a Library Consortium consists of a number of libraries, preferably with some homogeneous characteristics by subject, institutional affiliation, or affiliation to funding authorities, that come together with an objective to do certain job collectivelyA consortium supports resource sharing and provides services to users through programmes such as -

- Cooperative acquisition,
- Access to electronic resources
- Access to physical collections
- Enhanced interlibrary loan and document delivery
- Group licensing / purchasing of electronic resources is one of the key activities

Need

There are several reasons that led to the need of networking, resource sharing and consortia formation. Some of the important ones are:

- Information Explosion and revolution brought about by development of internet and World Wide Web
- Shift in the character of libraries from traditional storehouse of information to information providers
- Information Hunger Society (Increased User demands/expectations)
- Proliferation of web-based full-text resources. For instance there are over 20,000 e-journals; 70,000 and odd E-books through NetLibrary alone; over 5,000 Online databases, etc. .
- Enhancement of technological changes
- Budgetary limitations
- Publishers-backed Initiative to provide Increased Access to E-resources within Limited Budgetary Resources
- Other such parameters necessitated resource sharing & providing services through a common gateway

Thus consortium also came into existence and became a reality, as necessity is the mother of all inventions.

Services & Facilities

Broadly speaking the networking, resource sharing and consortia collectively help and facilitate the following.

- Cooperative Cataloguing
- Subject Gateways (Cooperative Cataloguing of Internet Resources)
- Database Services
- Document Delivery Services
- Inter Library Loan
- Shared Electronic Reference / Real-time Reference Service
- Collective Acquisition of Resources
- Consortium Purchase
- Wider access to electronic resources at affordable cost and at the best terms and conditions
- Joint Archives and Cooperative Storage Facilities

Linkages between Networking, Resource Sharing & Consortia

The term "Network" is being increasingly used in place of "resource sharing" or "cooperative systems". Networking & modernization are becoming very important in all types of libraries as they enable the users to have access to the resources of many other libraries in addition to their own.

The term "Library Consortium" is also used, sometimes, interchangeably with the Library network. Library consortia are being formed these days to subscribe to electronic resources on behalf of a group of institutions. However, existing networks are also subscribe to e-resources on behalf of its members as one of its Activities

From the above discussion, it appears that there is lot of commonality between the three concepts and hence there seems to be only subtle difference between the three. Let us try to find out this subtle difference in these three entities.

Networking	Resource Sharing	Consortia
Makes provision for getting connected for active	outcome of Collaboration Facilitating/endorsing R&D activities	Facilitates sharing the fruits of collaboration and Better understanding of resource sharing in more meaningful way, while

collaboration		shedding of (some)earlier reluctance/inhibitions/barriers to resource acquiring/sharing (in e=environment)

2. Resource Sharing

The common form of library co-operation was sharing of union catalogue information, storage facilities, collection development & human resources at local, national and regional level At the second level co-operation based on inter library loan services and reciprocal borrowing & use of materials from other libraries was also on the agenda.

Resource sharing through formal and informal partnerships helps a library to deliver wider range of services. Technological advancements offer new dimensions to resource sharing with shift from sharing bibliographic information to sharing full-text electronic resources. Most electronic publishers allow inter-library loan wherein a library subscribing to a given electronic resource in full-text can take a printout of a paper and send it to the requesting library. Fully automated comprehensive inter-library loans and document delivery management system are now facilitating available that facilitate resource sharing between libraries and deliver documents directly to users. Taking the example of J-Gate Custom Content for Consortium (JCCC) from M's Informatics India Ltd. that facilitates resource identification and document delivery for effective resource sharing and document delivery mechanisms. For instance JCCC for INDEST Consortium has been designed to facilitate resource sharing and document delivery.

1.1 Components of Resource Sharing

There are principally 4 important components for executing the resource sharing activities successfully.

- Agreement among participating library managers;
- Availability of union catalogues for identification of source materials;
- Formation of consortia among the libraries; and
- Formation of computer communication networks among the libraries.

1.2 Tools for Effective Resource Sharing

Resource sharing is the ultimate goal of any network. Inter-library loan and document delivery are supposed be the key to success of an effective library resource-sharing model. Several bibliographic utility networks have come-up with software solution to automate the process of inter-library loan for member libraries. Research Library Group (RLG), for example, uses ILL management software for inter-library loan under SHARES Partnership Program.

The ILL Manager, used by the RLG members is a Windows-based, state-of-the-art software that eliminates dependence on multiple legacy systems for interlibrary loan, reduces operating costs and streamlines workflows. The ILL Manager is a standards-based system that handles borrowing and lending transactions with other interlibrary loan systems. It streamlines workflow, automates several routine procedures and increases efficiency.

The OCLC has developed the ILLiad which is a resource sharing management software that helps libraries to automate routine interlibrary loan functions. The software helps to reduce paperwork dramatically and increases productivity. The software serves as an integrated interface for the library to handle borrowing, lending and document delivery through a single Windows-based interface that includes access to WorldCat and OCLC ILL. The ILLiad automates the processing of interlibrary loan requests, compiles lending and borrowing statistics, provides financial tracking for lending and borrowing and delivers articles and other documents electronically. It even notifies users when requests are fulfilled. Moreover, users can submit and track their own requests via the Web.

Fully automated comprehensive inter-library loans and document delivery management system like VDX (Virtual Document eXchange) and ARIEL are also available that facilitate resource sharing between libraries and deliver documents directly to users. There are however now several other tools also available for resource sharing. Several leading libraries are promoting their services and resource access by inducting Web 2.0 and Lib.2.0 features. Since this is not the theme of the present module, hence, it may not be feasible to discuss these issues.

1.3 Levels of Resource sharing

The level of resource sharing may vary from one resource sharing network to another. The important aspect to look at as part of the resource sharing is as to what resources are there that can be shared. Broadly under such collaboration it is presumed to share the following resources:

1.3 .1. Resources that could be Shared :

- Space
- Collections (use and development)
- Staff (use and development)
- Technology

The shared systems could therefore range from document sharing to technology sharing. A resource sharing network or a consortium, can help libraries to share expertise, save costs and enable library staff to concentrate on providing services to their users rather than developing computing infrastructure. The library consortium can take up the role of an Application Service Provider (ASP), which manages and distributes software-based solutions to its customers across a wide area network from a central data server. Library automation package may be offered as an application for smaller member institutions, which, in turn, may use server infrastructure offered by consortium in a wide area network without bothering for maintenance and up gradation of their own infrastructure.

1.3 2.Types of Collaboration

There are broadly two types of collaboration under the resource sharing activity. These are:

1 Basic Collaboration

2 Extensive Collaboration***Basic Collaboration: The nature of collaboration here would broadly cover the following activities:***

- Inter Library Lending (ILL)
- Photocopy/ manual document delivery

Extensive Collaboration : The nature of collaboration here is presumed to encompass many more services and activities that would broadly cover the following activities:

Extensive collaborative activity; e.g.:

- ILL/Document supply

- Shared bibliographic records
- Facilitating Access to resources
- Provision for Borrowing
- Staff training
- Archiving
- Others…

3. Consortium

The library consortia as an activity needs to go beyond co-operative acquisition. In this module we will tackle the topic of consortia in a detailed manner and address the following topics and issues that include almost every key component associated the consortia:

2.1. Concept, Definition of Library Consortium

2.1.1. Concept

The scholarly journals have suffered very high rate of inflation for past several decades. The situation in India is a compounded with continuous decline in the value of Rupee against major foreign currencies that resulted in steep decline in procurement of scientific journals in Indian libraries causing a very wide gap in journals that are required and one's that are actually available in the libraries. There are several examples of well-established Indian Universities that have cancelled their subscriptions to foreign journals substantially or completely for reasons of affordability. Information access-gap, which, in turn, leads to knowledge-gap in the developing worlds like India, is primarily a result of this situation. Resource sharing is being practiced for decades as a means to counter the crisis caused by this inflationary trend. Traditional models of document delivery like inter-library loan and inter-library photocopying services are widely practiced world over. Traditionally, primary purpose of establishing a library consortium is to share physical resources including books and periodicals, amongst members.

However, the mode of cooperation has gone under a transformation with infusion of new information technologies from print-based environment to digital environment. The post-Internet era is witnessing a significant jump in the access to and usage of information. While on one hand, increasing number of publishers

are using the Internet as a global way to offer their publications to the international community of scientists and technologists. One the other hand, this new means of information access and delivery is redefining the major functions of the libraries that are dramatically different from the way they acquired and provided access to information in the past. These new technologies are continuously driving the library resources to new peaks of usage, significantly beyond the library's subscribed content.

Let us view the concept behind the consortia from three perspectives,

(i) Library perspective,

(ii) Publisher perspective and

(iii) Users perspective.

From the library perspective, the concept of consortia is a well thought out practical model by library profession for resource sharing. The concept has however, suffered in its understanding by its potential beneficiaries. Libraries think about consortia as a means to derive the best possible purchase bargain with collective buying power, which is true, but is not an end in itself. The general perception among the libraries is that a consortium should enable the libraries to purchase and provide access to more resources than they currently have, with lesser spending than what they currently spend and gain net savings in current spending.

From the publisher perspective, publishers look at consortia as an instant mass-market opportunity with big deals to expand their market base in multiple folds, both in terms of client base and revenues. While the benefit can reach a larger mass of researchers based on wider reach-out through the web, the buyer population for research journals is a niche market.

While the user is altogether a different entity with both the above two mentioned entities (Libraries and publishers) trying to facilitate them access to resources where first entity (in general) buys & facilitates and the second entity offer & sells the content streams (resources). That means the concept from a third perspective is of a balancing nature. The reality lies between the two perspectives. The scholarly and academic publishing industry has a

need to grow its client base and the usage for its titles to sustain publishing as a mandatory obligation to its authors who publish without seeking any financial rewards, solely for the purpose of reaching out their research ideas and findings to the scientific community. Libraries have this scholarly client base, and have an institutional obligation to meet the needs of this community. Both serve the same community and have a need to globalize and maximize the access to scholarly knowledge created by this community for its own research needs. Hence, publishers and Libraries act as partners in the distribution and dissemination process of scholarly content but work with different and often conflicting economic imperatives of the real world. A consortium is found to be a feasible approach to address these complimentary needs and social obligation of both the publishers and libraries.

2.1.2. Definition

Consortia are resource-sharing organizations formed by libraries. Variably termed as cooperatives, networks, collectives, alliances or partnerships, etc. the library consortia are association of libraries established by formal agreement, usually for the purpose of improving services through resource sharing among its members. Activities and functions undertaken by a library consortium may vary to a great extend, but often compromise of cooperative collection development, education and training, preservation, centralized services and network alliances featuring library automation services, system support, inter-library lending, union listing, retrospective conversion, consultation and cooperative purchasing.

Cooperative purchasing of e-resources is one of the key activities of a library consortium. The concept of consortium itself has evolved from the idea of cooperation, coordination and collaboration. Collaborative arrangements for acquisition and management of electronic information resources can result in lower prices and saving in terms of actual cost, time and staff. Moreover, access to resources is now considered more important than collection building itself especially if the access is perpetual in nature.

Consortia models are still in the evolving phase, constantly affected by technological changes. Hence, consortia development requires an open dialog between these two parties in a spirit of partnership to help their common beneficiary whose needs and usage volumes alone can justify the sustenance of whatever new consortia models that the publishers can offer and the libraries can adopt.

3.2. Advantages of Library Consortium

Consortium supports resource sharing and provides services to users through various programmes For instance:

- Consortia based services helps library networksProvides each institution with the ability to share resources without sacrificing their individuality
- Collections of the Consortium libraries enable each member library to support scholarly research for its users
- Cooperative R&D in application of information technology enhances service & realizes cost efficiencies
- Staff development and interaction enhance the quality of service
- Increase the cost-benefit per subscription for participating institutions
- Promote the rational use of funds
- Ensure continuous and long-term subscription to the subscribed resources
- Provide opportunities of local storage and hosting of subscribed information resources
- Help in developing local expertise in operation and handling of electronic resources
- Prompt institutions with common interest to come together and purchase e-resources in a consortia mode at reduced costImproved resource sharing amongst member institutions
- Cap on the annual increase in the rates of subscription The usual increase: 15 to 20%, consortia cap: 5% to 8%;
- Better terms of agreement for use, archival access and preservation of subscribed electronic resources;Uncertainties in legal issues are handled with more confidenceFacilitating access in a federated manner across resources going to micro level of the resourcesNeed

for more flexible approaches to e-licenses for consortial working
- Widespread support for further digitization of resources, to be shared
- Need for further work in digital archiving

In order to succeed and function productively every consortium is mission oriented, has a definite vision and premeditated strategic goals. Each consortium strives to fulfill the objectives based on its well-defined goals. While (broadly) mission of the consortium is to lead and encourage collaborationvision is to provide strong leadership and opportunities for innovation . The objective being developing co-operative and consortial solutions to the challenges faced for enhancing access to scholarly communication across scholarly communities. The ultimate goal of the consortium is to play a pivotal role in development of a national strategy for information provision for research in higher education .

Types and Models of Library Consortia

Several types and models of library consortia are presently in vogue. Models that are prevalent in India are as follows [17]

- Open Ended-Consortia
- Closed Group Consortia
- Centrally-funded Consortia
- Shared-Budget Consortium
- National Consortium

1. Open-ended Consortia

Open-ended Consortium do not have a fixed number of libraries at its member, instead any library can join the consortium within a defined time framework. Open-ended consortia provide flexibility to the libraries to join the consortium at their need, convenience and will. The publisher may define a minimum number of libraries that are required essentially to take-off the consortium. This type of consortia are generally driven by small homogeneous group who have a need to cross-share the resources in a specific subject area. The cost of subscription per library and the benefits of sharing become evident once more libraries join the consortium. The model is self-funded as each member pays his part of the cost. This model has an opportunity to expand and widespread consortia development on a wider scale.

FORSA is an open-ended consortium where as the INDEST Consortium works on an open-ended policy for several of its resources.

2. Closed Group Consortia

The membership in a closed group consortia are defined by certain criteria and its membership remain closed to a predefined group of members who fulfil these criteria. Closed-group consortium are formed either by affiliation of its member institutions to the funding agency, for example CSIR E-Journal Consortium and DAE Consortium in India or by a strong bond of homogeneity and comradeship (IIM Consortium). Such consortia are easier to evolve and administer. The funding could come partially or fully by a central agency to which the members are organizationally affiliated to as in CSIR E-Journals Consortium or the consortium may decide to share the cost of resources subscribed through the consortium on mutually agreed terms, for example: IIM Consortium.

3. Centrally Funded Model

Source of funding often dictates the structure of a consortium. Central funding becomes the driving force for the consortium to operate. Resource sharing policies and practices can be better administered provided the funding model also envisages an efficient management and co-ordination model. The funding agency may fund incremental increase in the cost for expanding the access to e-resources with print subscriptions as the base (CSIR Consortium) wherein the member libraries continue to pay for print subscriptions. In case of INDEST Consortium, the central funding provides for electronic access to e-resources whereas member institutions pay for their print subscriptions in cases of print-based subscription models like Science Direct, Springer Link and Emerald Insight, The entire cost of the consortial purchase for UGC-Infonet, on the other hand, is borne by the Central funding. Individual member libraries are not required to make any financial contribution to content licensing.

A serious problem of this model is the long-term sustenance of central funding over a long period of time. The model may result in duplicated spending, if the members do not drop subscriptions to

print resources where e-resources fully paid by central funding act as reliable and guaranteed substitutes.]

4. Shared-budget Model

Shared-budget model is the only alternative where central funding is not forth coming. IIM, FORSA and HELINET are examples of this model but the fund management does not have a central authority.

5. National Consortium

The idea of national consortium on a model similar to CALIS in China and CONCERT in Taiwan has been discussed as the ultimate model. The INDEST Consortium, for example, has obtained national prices for a number of e-resources. Similarly, the UGC-Infonet has negotiated national licensing for the Encyclopaedia Britannica. The INDEST and UGC-INFONET Consortium can serve as a nucleus around which a national consortium can be built in India. The national consortium for institutions of higher education and research can act as a central agency to coordinate acquisition, creation and access to information in digital format. The national consortium can get financial and administrative support from various Ministries and Departments of the Government of India for subscription to core electronic resources.

In a country like India where the Govt. of India is funding ¾ of education and research, national consortium is most practical solution. A national consortium can greatly reduce duplication of efforts and provide greater purchasing power. A national consortium would be in a better position to handle archival issues. Federating the activities of all the consortia initiatives through a common forum can lead to a national consortium for certain category of e-journal purchase, and more particularly for sharing the infrastructure and service costs and facilities. Developing country-archive infrastructure is an area that fits the role of a national consortium well.

Pricing Models

Pricing models in e-environment are still in the process of experimentation and evolution. There are a number of models, which are largely a permutation and combination of two basic models, print based with electronic version model & electronic only.

model However based on these core models, there are several derivatives of these models that reflect the various flavours of pricing models. These models have been highlighted below.

- Print + Electronic Model
- Electronic Only Models
- Full-Time Equivalent Models
- Concurrent-Users Model
- Perpetual Access V/s Annual Lease
- Back-file Access
- Document Delivery and Pay-Per-View Models

Major International and National Consortia Initiatives

For over a century, Libraries all over the world have come together to form consortia, formal or informal, for diverse purposes, but primarily to share resources. Though most of them came into existence with a short-term goal or expediency of reducing costs, many have grown beyond this limited goal and functionality and moved towards full-fledged institutions offering a variety of services. Cooperative cataloguing was the primary focus of consortia during the early years of their existence, which is well reflected in OCLC's growth and popularity as the most respected library co-operative. Apart from resource sharing, library automation was one of the major impetuses for development of more formal library consortia in the sixties. Most libraries could afford to acquire expensive integrated library systems by forming or joining consortia.

There are several International and National initiatives taken world over, and we will consider here few of them from different countries

1. Initiatives at International Level

Consortia in the US come in different forms and flavors. They range from simple buying clubs to full-fledged networks. Most consortia work through networks and facilitate purchase discounts and staff training among other services. Consortia types range from single city (Kansas City Library Consortium), to single state (OhioNet), to multi states (Solinet, Nelinet, Amigos). Libraries often participate in more than one consortium. Of late consortia are also

evolving into self-sustaining enterprise by creating and adopting appropriate revenue models

The USA has around 100 large electronic consortia. Most established ones are : The Washington Research Library (WRLC) (http://www.wrlc.org); Virginia's VIVA (http://exlibris.uls.vcu.edu) , OhioLINK (http://www.ohiolink.edu) has been servicing 75 of the academic libraries, Georgia's Galileo (http://Galileo. gsu.edu/Homepage.cgi). With the development of International Coalition of Library Consortia (ICOLC) (http://www.library. yale.edu/consortia/) formally in 1998, consortia movement has taken a major step forward in organizing themselves. Though this coalition was formed and met earlier. The coalition is basically a meeting place for consortium leaders to exchange ideas and is emerging as the prime organization for setting up consortial guidelines. Comprising over 160 library consortia in North America, Europe, Australia, Asia, and Africa, the organization is dedicated to keeping its members informed about electronic information resources, pricing practices of electronic publishers and vendors, and other issues of importance to consortium directors and governing boards. The coalition also meets with the information provider community to discuss product offerings and issues of mutual concern

In the Europe, mention may be made of UK and Germany. In UK, two models are popular with regards to resource sharing for e-content – (1) Library Purchasing consortia and, (2) Access Schemes. There are many good examples of library consortia at national, regional and local levels that provide access schemes. At the national level, The Society of College, National and University Libraries (SOCNUL) (www.sconul.ac.uk/) aims to promote excellence in library services in higher education and national libraries across the UK and Ireland., Consortium of University Research Libraries (CURL) (http://www.curl.ac.uk/) with a mission is to increase the ability of research libraries to share resources for the benefit of the local, national and international research community. and UK Libraries Plus are some examples of national consortia. In UK a national framework contract is achieved for consortium so that every academic library is participant to a national site license. This is done through Joint Information Systems Committee (JISC)

(http://www.jisc.ac.uk/)and delivery of electronic journals is done through National Electronic License Initiative.

In Germany there are four major consortial models in operation. (i) Regional Consortia for higher education libraries , (ii) Regional Consortia for multi-type librariesInstitutional consortia, (iv) Multi-institutional research library consortia. Some of the library consortia in Germany are: Bibliotheksverbund Bayern (http://www.bib-bvb.de/bvb.htm)(Bavarian Library Consortium), Hessisches BibliotheksInformationsSystem (HeBIS) (http:// webcbs.rz.unifrankfurt. de/) (Hessian library information system), Hochschulbibliothekszentrum Nordrhein-Westfalen (http://www.hbz-nrw.de/ (Online Utility and Service Center for Academic Libraries in North Rhine-Westphalia), Kooperativer Bibliotheksverbund Berlin-Brandenburg (KOBV) (http:// www.kobv.de/englisch/framesets/frameset ie.htm) (Cooperative Library Network Berlin-Brandenburg), Suedwestdeutscher Bibliothek sverbund (http://titan.bsz-bw.de/)(Southwest Germany Library Consortium), DBI cortium catalogue (previous Deutsches Bibliotheksinstitut)
(http://bvba2.bib-bvb.de/V/)

There are about 18 major consortia's in Asia & among them are 4 major Indian consortia's Other consortia's are from Korea, Japan, Hong Kong, Taiwan and Thailand. Prominent among them are Korean Education & Research Information Service (KERIS) (http://www.keris.or.kr/ english/index.jsp), Consortium on Core Electronic Resources in Taiwan (CONCERT) (http://www.stic.gov.tw/ English /e_CONCERT.htm)

In China, China Academic Library & Information System (CALIS) (http://www.calis.edu.cn/)- is a highly centralized integrated consortium. The consortium serves about 700000 students spread over 27 provinces in China.

In Japan, Association of National University Libraries, Japan (ANUL) (http://wwwsoc.nii.ac.jp/anu/newindx.html) is another success story.

2. Initiatives at National Level

Several informal/formal initiatives acted as the kick starters and drivers at the national level. Consortia for shared access to

electronic databases have been talked about since late 90s. Consortium for Material Science and Aerospace Collection (COMSAC) is the first known formal consortia initiative led by the National Aerospace Laboratory (NAL) in 1998 for a few databases. This consortium aborted in its second year due to various factors. The first limited purpose and successful, consortia-like model can be traced to Tata Institute of Fundamental Research (TIFR) in 2000, which used the consortia model offered by Springer for multi-site licensing and cross sharing of content among all the libraries falling under TIFR's affiliation. Concerted efforts by a few leading libraries, publishers and vendors sustained the interests and momentum, leading to a few, open and non-formal consortia projects by the Forum for Resource Sharing in Astronomy & Astrophysics (FORSA) and the Indian Institute of Management (IIM) Libraries for e-journals from a few publishers. The Council of Scientific and Industrial Research (CSIR) and other joined the race. A few of these successful initiatives have been detailed below.

INDEST-AICTE consortium

The Indian National Digital Library in Engineering Sciences and Technology (INDEST) Consortium was set-up by the Ministry of Human Resource Development (MHRD) in year 2003 to provide access to selected electronic journals and databases to 38 institutions including IISc, IITs, NITs, IIMs and a few other centrally-funded Government institutions. The Ministry provides funds required for subscription to resources for 38 centrally-funded institutions. Besides, 63 Government or Government-aided engineering colleges and technical institutions have joined the Consortium with financial support from the AICTE. Moreover, the Consortium also welcomes other institutions to join it under its self-supported category. 462 engineering colleges and other educational institutions have joined the Consortium under its self-supported category. The total number of members in the Consortium has now gone upto 560, although it is subject to change as new members can join anytime or existing members may drop out. .The Consortium has extended its activities beyond e-resources subscription to include: Support for setting-up institutional repositories in member libraries; Promoting submission of Electronic Theses and Dissertation (ETD) in member libraries, providing technology

support to members, fostering Joint archives and storage facility, facilitating shared Digital Library Project Development, providing for common Union Catalog for Books, and the like. While the Consortium has taken off well and has become a role model for others, although it is yet to evolve a sustainable funding model and mechanism beyond MHRD funding. The consortium is operated through headquarters at IIT Delhi.

UGC-Infonet Consortium

The University Grants Commission initiated the UGC-Infonet E-journal Consortium in year 2004 in order to provide access to a large number of scholarly journals from reputed publishers, aggregators and society to universities in India. Under the Consortium, about 4,000 full-text scholarly electronic journals from 25 international publishers are made accessible to 100 universities in the first phase of its implementation. The access was extended to 150 universities in 2006. The Consortium provides current as well as archival access to core and peer-reviewed journals in different disciplines. Access would ultimately be extended to all 171 Indian universities that come under the purview on UGC. The programme would also be extended gradually to affiliated colleges. The programme is wholly funded by the UGC and monitored by INFLIBNET (Information and Library Network) Centre, Ahmedabad.

CSIR E-Journal Consortium

The Council of Scientific and Industrial Research (CSIR) constitute of 40 research laboratories in India. The CSIR E-journals Consortium was the first major and formal consortium at national level. The Consortium started with access to ScienceDirect (Elsevier Science) for all of its 40 laboratories in 2001. The extent of the CSIR E-Journals Consortium was restricted to only one publisher (Science Direct) till 2005 because of lack of commitment to funds and resources by the CSIR management and problems in getting commitment for retaining print subscription by participating Institutions. After delay of couple of years, the CSIR E-journals Consortium, in the year 2005, has entered into agreement with 11 publishers to access about 3316 international journals across all its the labs. Thus, the expansion of information base of CSIR labs/ Institutions has increased from 20 -200 print journals to 3316 e-journals for its every user. The Consortium is wholly funded by the

CSIR and is monitored by NISCAIR, a CSIR institution situated in Delhi.

MCIT Library Consortium

The Ministry of Communication and Information Technology (MCIT) Consortium caters to the information requirement of 9 institutions including NIC, CDAT and CDOT (with its offices in multiple locations). Funded by the Ministry of Communication and Information Technology (MCIT), the Consortium subscribes to 5 electronic resources including IEL Online, ACM Digital Library, Indian Standards, Science Direct and JCCC. Established in 2005, other activities of the Consortium include establishing institutional repositories, national making union catalogues, creation and maintenance of library automation software called e-Granthalaya.

DAE Consortium

The Department of Atomic Energy (DAE) Consortium caters to the information requirement of 36 institutions including BARC, TIFR and SAMEER. Funded by the, the Department of Atomic Energy (DAE), Govt. of India, the Consortium subscribes to e-resources from 4 publishers (including Science Direct, Springer, MathSciNet) for providing access to around 2,000 e-journals. Established in 2003, the Consortium is administered by the BARC, Mumbai.

Forum for Resource Sharing in Astronomy & Astrophysics (FORSA) Consortium

The FORSA is a group of different libraries from Institutions where astronomy is one of the main areas of research. The FORSA was launched in 1980 with an objective to compile union catalogue of scientific serials, annual and other irregular publications, reference tools, compile theses holding, holding of duplicate issues of journals, directory of libraries and facilities available in each member libraries. The FORSA started subscribing to e-journals on cross-sharing and cost-sharing basis. The Forum has 11 members as on now. The Forum is administered by the members libraries by rotation.

IIM Consortium

The IIM Consortium is an initiative from libraries all the six IIMs in India. The Consortium commenced its activities in 2002 with subscription to electronic resources on cross-sharing and cost-

sharing basis. Resources subscribed by the IIMs on cross-sharing basis includes journals from Wiley InterScience and Springer Journals. All IIMs are core members of the INDEST-AICTE Consortium.

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Chapter– 11

IPR INFORMATION IN DIGITAL ERA

The easy availability of electronic information resources, proliferation of personal computers with network facilities and telecommunication links, decreasing costs of primary and secondary mass storage media etc. 'Therefore, the major problem that is being faced recently by the authors, professionals and users as well is how to protect the Intellectual Property Rights (IRPs) including the copyright in the digital/virtual library environment.

Intellectual Property Right is a general term which covers copyright, patents, registered designs and trademarks. It also covers layout designs of integrated circuits, geographical indicators and anti- competitive policies in contractual licenses. Since money and efforts are involved in R&D work, any research, innovation or invention leading to a product, process, design, method, literary and artistic work etc' which may result in financial gains to its authors or creators, are generally registered under one or the other of the various heads of IPR. The authors or creators resort to legal remedies when the IPRs of their works are infringed. TRIPs (Trade Related Intellectual Properties) Agreement lays down minimum standards for the protection of intellectual property rights as well as the procedures and remedies for their enforcement. Knowledge is said to be the ruling king of 21st century. Innovation is the key for production and procuring of knowledge and conversion of knowledge into wealth.

In the today's context of Globalization, knowledge determines the progress and prosperity of nation.

As a result of the industrial revolution and the rapid development made in the field of science, technology and culture; new kinds of property apart from the traditional property came into existence.

The concept of property has undergone a sea change especially after 2nd world war.

Patents, Trademarks, Industrial design, Layout designs of integrated circuits, Trade Secretes, Copyright, Performer's right, Broadcasting rights, Neighboring rights, etc are new kinds of property which are known as IP, created by human intelligence and mental labour.

The intellectual outcomes of Human have value in economy and create wealth. Hence, protection and exploitation of IP are considered as the essential components to measure not only the growth of scientific knowledge but also the technological supremacy of a nation.

Conceptual Meaning of IP

Legal protection given to intellectual outcome of human mind is known as IPR.

The term IP includes all rights, resulting from intellectual activities in the industrial, scientific, literary or artistic fields.

Most often one thinks of property as either movable or immovable, where in the proprietor / owner uses his property as he wishes and no body else can lawfully use his property without his permission. One characteristic of these forms of property is their tangible existence, where as IP is intangible one.

It has been characterized as "information which can be incorporated in tangible objects at the same time in an unlimited number of copies at different locations anywhere in the world". The property is not in those copies but in the information reflected in those copies. Further, information may also be available in electronic forms.

Types of IP

- Different schools of thoughts have classified Intellectual property differently. One school of thought has classified Intellectual Property into two types namely, Industrial property and copyright law.
- Industrial property encompasses patents (technological information), trade marks (symbolic information) and industrial designs. Copyright law and Neighbouring rights (expressive information) cover artistic, musical and literary works.

- However, another school of thought has classified Intellectual property rights as per their use, and services in three categories such as (a) Industrial Property Right; (b) Literature Property Right and (c) Neighbouring Right.

(a) Industrial Property Right is applicable in

- Plant varieties
- Layout design of integrated circuits
- Protection of trade secrets
- Protection as per geographical origin

(b) Literature Property Right broadly includes

- Literary work
- Musical Works including any accompanying words
- Dramatic words including any accompanying music
- Pantomimes and choreographic works
- Pictorial, graphic and sculptural works
- Motion picture and other audio visual works
- Sound recording
- Architectural works

Objective of IP

- To prevent competitions from copying or imitating one's product or service.
- To avoid wasteful investment in research & development & marketing.
- To create one's own identity through trademark or brand strategy.
- To negotiate license, franchise or other IP-based contractual agreements.
- To increase the market value of the company.
- To enhance access to finance.
- To obtain access to new markets.
- To strengthen the capacity of national governments to develop strategies, policies & programmes to meet the intellectual property needs of small entrepreneurs.
- To improve the capacity of relevant public, private & civil society institution to provide IP related services.
- Intellectual property right essentially includes the products and creations of the mind.

- Intellectual property Rights safeguards creators and other producers of intellectuals goods and services by granting them certain time-limited rights i.e., intellectual property rights to control the use made of those production.

Characteristics of the IP

- Characteristics of the I P are a property created through mental labour as distinguished from physical labour.
- The mental labour which flows from the intellectual labour of the mind and exertion of genius and thought is fundamentally different from manual labour which is the mere exertion of bodily strength and Corporal application.
- In today's world, the international dimension of IP is of ever increasing importance for three compelling reasons.

(a) The composition of world trade is changing.
(b) The world commerce has become even more independent establishing a need for international co-operation.
(c) Reprographic and information storage technologies permits unauthorized coping to take place faster and move efficiently than ever, undermining the creator's work.

Chronological Development of IP

The practice of defining intellectual property started in the Italian city-states. It is found that the first patent was granted to Filipo Brunellzschi in the republic of Florena in 1421. Brunellsschi was given a three year monopoly for his invention concerning special hosting gear used on burgles. An ordinance relating to patents was enacted in a Venetian Law of 1974. From the Italian City States the practice spread to other Western European countries.

- *England* : In England during the reign of Elizebeth (1533 – 1603) one of the ministers Lord Burghley (1520 – 98) granted a series of patents with a view to encourage foreign inventors to import their inventions an work on them in England. It was intended to stimulate invention by domestic producers.

- *India :* In India the basic elements of Intellectual Property Rights were first introduced by enacting the Act on Protection of inventions in 1856. This act was based on British Patent Law of 1852, which was the origin of patent legislation in India. Since 1856 till today there is a chronological event of Amendments of Act.

Copyright

Copyright stand for the legal rights exclusively given for a define period of time to the authors or creators of intellectual works such as publication, or an artistics or a literary work for sale or any other use. Copyright provides the creators (like writers, poets composers, etc.) of literary or artistics works rights of ownership on their works, Besides providing the legal protection against unlawful reproduction and use of their works, the copyright law also recognizes the right of the authors or creators of the works to the benefits accrued by the reproduction or usage of their creative works by others. This obviates an agreement between the authors and the publishers (or users). The time span for which the law provides the copyright protection varies in different countries depending upon their regulations. It extends a total of the life time of the author and a term of 60 years after the death of the author in India, 50 years in UK and USA and 70 years in the European Union. After the expiry of the copyright period, the work falls into the public domain and then it can be used by anyone without authorization. The salient features of copyright protection are:

- It protects aesthetic creations without formalities.
- Registration is not necessary.
- It protects forms of expression of ideas only, not the ideas themselves.
- It is not concerned with the quality of the work.
- It gives protection to original works only.

Provisions of Indian Copyright Act:

Section-14 of the Indian Copyright Act, 1957 (as amended from time to time enumerates certain activities which are 'exclusive' rights for the authors of the works who can do or otherwise someone to do all or a part of those activities. These when done by unauthorized persons or without the explicit permission of the

copyright holders, amounts to a breach or infringement of copyright. These include:

- To produce the work in any material form including the storing of it an any medium by electronic means;
- To perform the work in or communicate to public;
- To issue the copies of (publish) the work to public not being in circulation,
- To produce and publish any translation of the work;
- To make any translation or adaptation of the work;
- To make any cinematography film, or a sound recording; and
- To do in relation to a translation or adaptation of the work any of the above specified acts.
- In case of a computer programme, in addition to the above mentioned provisions, the Act also means to do or authorize;

To sell or give on hire, or offer for sale or hire any copy of the computer programme, regardless of whether such copy has been sold or given on hire on earlier occasions.

Exceptions to copyright infringement:

Section 52 of the Indian Copyright Act enumerates five categories of acts which when performed do not fall under the infringement of the copyright. They are:

- Reproduction in the course of fair dealing (i.e. private use, research, criticism, review, reporting broadcast, etc.):
- Reproduction for educational purposes:
- Reproduction for official (judicial, legislative, etc). purpose.
- Reproduction where there is remote relation to the original which does not cause any loss to the copyright holder; and
- Reproduction for private entertainment.

The technological developments taking place of the world over pose a constant challenge to the copyright protection. To check the piracy of the literary or artistic works, necessary provisions have been made treating piracy of books, computer software etc. a non-boilable offense. In case of infringement the publishers or authors (or both) have to file a suit in a court of law against the infringer of copyright who can be an individual a company or an intuition.

Copyright to Electronic Information

Copyright to protect the ownership right was initially rooted in printing technology. The concept of copyright originally excluded from protection of many new communication technologies. More recently, copyright has also been applied to computer software including software encoded on microchips. From the copyright point of view, printed material has certain advantages over the electronic information:

- It is permanent and authenticated.
- Its ownership is easy to ascertain.
- It facilities easy identification of piracy of plagiarism.

However, electronic (digital) information has certain characteristics which are easy for copyright infringement:

- It is not so permanent.
- It is easily amendable to revise, modify, re-revise, re-modify witout leaving any resemblance to the original.
- Its ownership in non-ascertainable and sometimes questionable.
- Large volumes of data can be copied and stored in different media without difficulty.

The Indian law extends protection to computer programmes i.e. computer software and computer generated artistic or literary works, and treats storing of a work in any medium by electronic means as infringement of the copyright. The law has no provisions, for electronic and online books, journals and electronics information. Copyright protection is provided to computer database, treating them as literary works. Multimedia works are categorised under audio visual works for which the law provides copyright protection.

IP rights in India and their Enforcement

Copyright

- India's copyright law, laid down in the Indian copyright act, 1957 as amended by copyright amendment Act, 1994.
- The recent amendment to copyright law, which came into force in May, 1995 has brought it in line with the developments in Satellite broadcasting, computer software and digital technology. The law has made provision for the first time to protect performer's rights.

Trade Marks

- A comprehensive review of the Trade and merchandise marks act, 1958 was made for implication and harmonization of the trade mark, registration systems etc a bill to repeal and replace the 1958 Act has been passed by parliament and notified in the Gazette on 30.12.99.
- Undisclosed information is protected which is not generally known among or readily accessible to person that normally deal with the kind of information has commercial value because it is secret and has been subject to keep it secret by the person lawfully in control of information.
- This Act not only makes Trademarks law, TRIPS compatibility but also harmonizes with international systems and practices.

Geographical Indications

- A new law for the protection of Geographical indication viz the geographical indications of goods (Registration of the Protection) Act, 1999 has also been passed by the parliament on 30.12.1999 and the rules made there under notified on 08.03.2002.
- Geographical indication is a right used on goods that has a specific geographical origin and possess facilities or a reputation which are due to the place of origin.

Industrial Designs

- A new design law replacing the design Act of 1911 has been passed by the parliament in 2000 and brought into force from 11.05.2001.
- Independently created designs that are new or original shall be protected under this Act. Individual Govts. have been given due option to exclude from protection, design dictated by technical or functional considerations, as against the aesthetic consideration which constitutes the coverage of industrial designs.
- The right accruing to right holder is the right to prevent third parties not having his consent from making, selling or importing articles being or emboding a design, which is a copy or substantially a copy of the protected design, when

such acts are undertaken for commercial purpose. The duration of protection is to be not less than 10 years.

Patents

- A comprehensive review of the patents Act, 1970 was also made and a bill to amend patent Act, 1970 was introduced on 20.12.1999 and notified on 25.06.2002 to make the patent law TRIPS compatible.
- A patent is an exclusive right granted for an invention, which is a product or process that provides a new way of doing something or offers a new technical solution to a problem. It provides protection for the invention to the owner of the patent for a limited period generally 20 years.

Measures taken for improvements

- India's achievements in this field have been in the passing of TRIPS plus legislation in the field of copyright law. The 1994 amendment to the Act of 1957 provides protection to all original literary, dramatic musical and artistic works, cinematography films and sound recordings. The most recent changes are satellite broadcasting, computer software and digital technology under Indian Copyright protection.
- As per the recent study of MHRD, Govt. of India, the estimated loss due to piracy is as given below.
- Motion picture - 7.3%
- Sound Recording and musical compositions -21.5%
- Software - 292.8%
- Books - 21.0%
- Measures taken by the Dept. of education ministry of MHRD for strengthening the enforcement of the copyright and neighbouring rights include constitution of
- Copyright Enforcement Advisory Council (CEAC),
- Creation of separate cells in 23 state police headquarters,
- Encouraging setting up of collective administration societies.

- Organization of seminars and workshops to create greater awareness about copyright law among the enforcement personnel and the general public.
- It also encourages study of IPR in the educational system besides modernizing copyright office.
- The office of Patent Information System (PIS) was set up in 1980 with a view to provide scientific and technological information contained in patents documents to the users, namely scientists, researchers, universities, IITs and others for taking up further research and development.
- Accordingly, a project for modernization of PIS was taken up with the financial help of UPDP and Govt. of India and WIPO in 1992 which was completed in 1996 for up gradation and mechanization of procedures relating to collection, retrieval and dissemination of patent information by using state-of-the Art technology and trained personnel.

Role of Library and Information Professionals

- In view of IPR, the new functions of LIS professionals are:
- Create awareness among users about IPR-Patents, Copyright etc.
- Searching for worldwide tracking of technological advances in particular micro fields.
- Provide comprehensive literature search from various patents related databases; both free and commercial.
- Provide full text patents, etc for R&D work.
- English translation of Non-English projects.
- Information about various patenting agencies in the world.
- SDI service on any micro aspects of subject may be worldwide or for particular countries.
- Help in finding new licenses for new technological developed.
- Help in finding licensors of needed technologies.

In order to fulfill the above functions, it is high time for the LIS schools to organize refresher courses and workshops on issues and problems on IPR to educate the existing professionals in the Library & Information Centers of the country. Further, attempt should be taken at the national level include IPR and its problems as a part of

LIS curriculum so that the budding information professionals may not face any problem in understanding the intricacies of IPR related laws.

Another important aspect for the information professionals is the development of code of conduct while handling the information for dissemination like Medical & Legal professionals, this profession also needs some sort of professional ethics where IP related laws and their implementation should be made compulsory.

Conclusion

In the face of technological developments, the present copyright laws will not be able to prevent piracy or infringement of rights. The digital environment is to be tightened to assure the creators, prevent piracy and plagiarism, and encourage use. Also, the current notions about copyright will have to be heavily modified to suit to the electronic environment. The IPR and the copyright laws should help in enhancing and not preventing the access and usage or electronic information. The library and information science professionals should have the same kind of fair dealing arrangement as in the case of printed books. They should be able to read or browse electronic information without having to pay for it; preserve in digital format copyright material held in their collections; and fulfill inter-library document requests electronically. They should sharpen their skills in meeting these challenges and should negotiate the same type of privileges as in case of printed documents for accessing the digital (electronic) information.

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Chapter–12

DIGITAL RIGHT MANAGEMENT AND LIBRARIES

Digital rights management (DRM) refers to protecting ownership/ copyright of electronic content by restricting what actions an authorized recipient may take in regard to that content. DRM gives digital-content publishers the ability to securely distribute high-value content such as periodicals, books, photographs, educational material, video, and research and to control the use of that content, preventing unauthorized distribution.

DRM can be defined as a "framework that enables control and management of user rights and business logic, integrating DRM technologies with additional components such as rights locker, subscription management, etc. across multiple devices" (CEN/ISSS, 2003). A rights holder can use digital rights description to determine how an end-user may use their creative work. These rights get tied to the document at the moment of distribution, when in most cases the author has given up the usage rights to a publisher. Thus the usage rights are mostly owned by publishers when the scope of use is being defined. The rights owner can in technical terms implement these rights at the user's personal computer using a digital rights management system (DRMS). While the description of the rights is imperative, DRM can be split into two groups, as depicted in (Rump, 2003).

The "management" section includes the whole digital rights description and the connection of these rights to all parts of the document. The "enforcement" section is the active part of DRM: the so called digital rights enforcement (DRE). DRMS embeds a lot of functions in DRE, which actively enforces the implementation of rights as defined by the description in the management section.

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actions an authorized recipient may take in regard to that content. DRM gives digital-content publishers the ability to securely distribute high-value content such as periodicals, books, photographs, educational material, video, and research and to control the use of that content, preventing unauthorized distribution.[4]

The purpose of DRM technology is to control access to, track and limit uses of digital works. These controls are normally imbedded in the work and accompany it when it is distributed to the consumer. DRM systems are intended to operate after a user has obtained access to the work. It is in this "downstream" control over consumer use of legitimately acquired works that DRM presents serious issues for libraries and users.

DRM technology is new and evolving. Different schemes are being proposed, developed in the laboratory, and experimented with in the marketplace. In general, these technologies are intended to be flexible and to provide a wide range of options to the content provider, but not the user or licensee. Importantly, DRM technology can have profound effects on a wide range of policy issues, including intellectual property, privacy, access to government information, and security. As a consequence, it will be very important for Congress to carefully consider the impacts on many different constituencies, including libraries.

DRMs are used mainly in music, videos, computers, mobile phones, games and ebooks. In terms of ebooks, this means that readers have certain restrictions on the way they can use the ebook that they have bought:

- They cannot copy/paste content from the ebook.
- They cannot make a copy.
- They cannot print it.
- They cannot lend it.
- They cannot move it from one device (ereader, tablet, mobile phone, PC) to another (for example, from a Kindle to a Nook), or can only move it to a specified number of devices.
- They can download the ebook only a certain number of times.

- They cannot use the text to speech software to have it read aloud.
- They cannot buy ebooks in or of a particular territory.

Each publisher and online bookstore has its own set of DRMs, which may enforce all or some of these aforementioned restrictions. Although DRMs come in many different forms, they usually have four common stages:

Packaging: When DRM encryption keys are built right into the software, that is, the ebook file.

Distribution: When DRM-encrypted files are delivered to the buyers. This is usually through web server downloads, CDs/DVDs, or via files emailed to the buyers. In the case of ebooks, currently only web server downloads are available.

Licence serving: When specialised servers authenticate legitimate buyers through the internet, and allow them to access the DRM files. They can even lock the files when illegitimate users try to open or copy them.

Licence acquisition: When legitimate buyers acquire their encryption keys so they can unlock their files.

How Do DRMs Work?

This is what Adobe, manufacturers of Content Server DRM software, say:

Effective DRM technologies work by allowing distributors of electronic content to control viewing access to the content – whether printed matter, music, or images – with some form of customized encryption. Individual "keys" for viewing or listening to the content are provided to an end user who has purchased rights, which generally include limitations on copying, printing, and redistribution.

When a prospective owner of digital rights downloads a content file, DRM software checks the user's identity, contacts a financial clearinghouse to arrange payment, decrypts the file, and assigns a key – such as a password – for future access. The publisher of the content can configure access in numerous ways. For example,

a document might be viewable but not printable, or may only be used for a limited time.

There are many types of DRM systems but the three major ones that are currently being used are: Amazon, which uses an adaptation of the Mobipocket encryption; Apple's DRM, which is called FairPlay; and then there is the Adobe Content Server. Amazon and Apple use their own DRM systems, and most other retailers and distributors use Adobe's. In India, both E.C. Media and Infibeam, who developed their own ereaders, Wink and Pi respectively, also use Adobe's DRM. Flipkart, who will be launching its ebooks portal soon, will also need to have a DRM software in place. Whether they use Adobe's or develop their own proprietary DRM remains to be seen.

There are other options to DRM that are sometimes known as social DRM, which involves watermarking each ebook at the time it is bought with the identity of the buyer. These ebooks can be used across any platform, but if they are uploaded to a file-sharing website, one should be able to identify the purchaser. The idea behind this is not to restrict the use of content but to shame the customer who puts it to illegal use.

The History of DRMs

There is agreement all around that a creator of a work should get credit for it. Some creators may desire monetary compensation too. And hence, there is the need to "protect copy", which translates into digital rights management for content available on the internet. But where did DRM come from?

The idea of DRM is not a new one. It has a fairly long and chequered history, but there have been some key landmarks in the copy-protection timeline that have gone a long way in shaping the debate on DRM today.

Many of the floppy disks that we used once upon a time, for instance, were copy protected. Even when music and video CDs and DVDs came into the market, there was a limit on how many copies one could make, and CDs came with bits of information to confuse music ripping software.

Film studios were some of the first large companies to adopt DRM. When the DVD format was launched, it included an encryption called Content Scrambling System that prevented users from making digital copies of films. CSS DRM, however, was very soon broken by DeCSS, a tool developed for that purpose. Recording labels also adopted DRM to prevent copying.

In 1998, in the US, an amendment to the Digital Millennium Copyright Act criminalised the production and distribution of technology – like DeCSS – that would allow consumers to thwart technical copy-restriction methods. Essentially, it became a crime to circumvent anti-piracy measures, and to manufacture, sell or distribute code-cracking devices used to illegally copy software.

But things really came to a head in 1999, when Napster, a peer-to-peer file sharing internet service, made its debut. People were suddenly able to duplicate and share music with an almost countless number of users so that they could download numerous songs and albums for free.

Then came the Sony rootkit scandal in 2005, when Sony BMG Music Entertainment deliberately included malware on their music CDs that would report back to them if their CDs were played on computers instead of CD players. Attempting to remove the rootkit even caused many machines to fail. After much public and media criticism, Sony released a software tool to remove the rootkit and exchanged the infected CDs.

In the ebook world, in 2011, HarperCollins announced that the license for new e-book titles purchased by libraries would expire after 26 checkouts. This meant that libraries would have to purchase another copy of the book that they've already bought after it has been borrowed 26 times. Librarians weren't very happy about it.

I've only mentioned a few milestones in the history of DRMs. There are of course many, many more.

Do DRMs Really Stop Copyright Infringement?

Breaking DRMs is not that hard. As mentioned earlier, there are many DRM technologies used with ebooks, the most common being Amazon's, Adobe's and Apple's. All of these have been broken. Even

if one doesn't use DRM removal tools, it is just as easy to retype the whole book, or to use screenshots or scans to create images that can be converted into text by OCR software.

While publishers believe that DRM is necessary to stop unauthorised use, they are not convinced themselves that this will actually stop piracy. "As for copyright infringement, that is already happening," says P.M. Sukumar, CEO, HarperCollins-India. "There are people in Pakistan and China who scan the books and post it as a PDF on the internet. It's not as if by introducing ebooks you are precipitating a new problem. It's a problem that already exists." Echoing this view, Ravi Mehar, Sales Manager, Cambridge University Press, India, says, "Even if DRMs are in place, piracy will continue."

What DRM can do is prevent "accidental infringement", that is, lending a book to a friend or a family member, or creating a back-up copy for safety, or even printing a few pages for personal use. But can one really call this copyright infringement? Why would any book lover want to deliberately break copyright law after having legally purchased their ebook? They know it's not right to create many copies of the book and distribute it. Is it really illegal for them to move their ebook from one ereader to another? Is it unreasonable to create a back-up for safekeeping? These are the questions that book buyers in India will soon be asking too once they directly run into the problems that DRMs seem to bring with them.

As Gautam John points out: "The tools and technology required to consume digital content are the same tools and technologies and channels that allow people to communicate and share. It's impossible to believe one will happen in the absence of the other. And if you are going to try and build the model that depends on one side of the tools and technology to get them access to that content and deprive them of the tools and technology to share and converse about that content, it's doomed to fail."

In fact, the real reason behind piracy is the lack of convenient access to content that is desirable at a price that is reasonable. Why, then, does the emerging ebooks market in India believe that DRM will be their saviour?

Why DRMs then?

Not just publishers, but online retailers, too, believe that DRM will not stop copyright infringement. They feel that no DRM manufacturer in the world can claim that their DRM software is un-crackable, and those who are hell bent on getting digital content for free will do so, no matter what.

So, if copyright infringement already exists and DRMs are not the solution, then why are publishers and online bookstores so keen on them?

Since it is the publishers and not the retailers who decide pricing for books, stores use it as a tool to prevent customers from buying ebooks from other competing stores. They lock in the buyer to their store through their DRM software so that the buyer cannot go anywhere else. For example, someone who purchases a Kindle book, can either view the book on the Kindle or the Kindle apps developed for PCs or Macs or mobile phones. They cannot read it on Pi or Wink or Nook readers.

If a customer wants to leave Amazon and move to another retailer, they have to leave behind all the ebooks purchased from Amazon because they won't open on any ereaders that don't support the Amazon app. This means that the customer would have to re-buy all the books that they have already paid good money to get.

In India, given that Flipkart has developed its own app for the digital music on their site, one could conjecture that it will follow the same model for ebooks as well. And since Indian publishers have been insisting on various levels of DRMs for their ebooks, in all likelihood Flipkart's apps will be the only platform which would decrypt the ebook files and make them readable for ebooks downloaded from their site.

For publishers, DRM is a way to reassure authors – who are their bread and butter – that their work will not be pirated. Many publishers believe that authors will be in favour of DRMs. Sukumar says: "The author basically knows that the publisher has similar interests as the author. The author also wants to maximise sales and revenues from the commercial exploitation of the book. I don't see any conflict or problem there."

Some authors are only too happy letting publishers handle all of this so that they can get on with the business of writing. Natasha Sharma, author of Icky Yucky Mucky (Young Zubaan) says: "I would be happy to leave it to the publisher.... An opinion taken is fine, but if there's a disagreement, I don't know how much I would have the overall capability, time and bandwidth to look into it."

But there are others who feel they want to be involved in the decision about the kinds of DRMs set on their books. When asked whether she would like to have a say, Payal Dhar, author of the Shadow in Eternity (Young Zubaan) trilogy said: "Yes. I would go so far as to say that I wouldn't go with a publisher who has very strict DRMs. I'm more concerned with more people reading my books than DRM."

Some publishers, too, feel that authors should have a say. Gautam John of Pratham says: "I think the author should have a complete say because at the end of the day I believe that it has a direct bearing on how many people will get to read their content. So I certainly believe that an author should have complete control over whether their book goes out with DRM or without DRM."

Some publishers and authors are also under the impression that DRMs will lead to an increase in sales by preventing copyright infringement. But there is no evidence that shows that this would actually happen. In fact, studies that are available are mostly contradictory or from questionable sources. As mentioned earlier, DRM controls allow publishers to set all kinds of restrictions on ebook buyers, who are then forced to re-buy books if they lose them when their hard drives fail or when the number of downloads expire or when they want to move from one ebook reading device to another.

The fear that authors have of their work being stolen is very valid, and DRMs are used as a tool to allay it. But in the real world, DRMs don't work. All they do is make it harder for book lovers to read an author's work. They may make an author some extra money through the re-buying of books, but it could just as well reduce sales by frustrating buyers. Lack of DRMs will not increase piracy. What will increase it is when books start to cost more because of the

pricing models employed by publishers and online stores due these controls.

What DRMs will also do is wipe out online independent bookstores, who do not have the finance or infrastructure to have DRM technologies. Needless to say, this will increase the monopoly of the big players, and lead to further control and hike in prices.

DRMs and Copyright Law in India

The Copyright Act, 1954, was the first post-independence copyright legislation passed in India. This Act is compliant with most international conventions and treaties in the field of copyright, such as the Berne Convention, the Universal Copyright Convention and the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS). The Copyright Act was amended many times, and one of the important amendments came in 1994, which provided protection to digital technology sectors. It contained the rights of copyright holders, rentals of software, temporary back-up copies and sanctions for infringement, including the making or distribution of copies of software without proper or specific authorisation.

Till recently, international copyright law was based on the Berne Convention and the TRIPS agreement. But since 1974, most of these have been managed by the World Intellectual Property Organisation (WIPO), a UN Agency. In 2010, more amendments were proposed to the Indian Copyright Act to bring India in compliance with WIPO Internet Treaties, which require adoption of anti-circumvention provisions, that is, to legally stop people from circumventing DRMs. India has included this provision in the bill but "only to the extent considered desirable and necessary".[12]

DRM anti-circumvention provisions in the WIPO internet treaties are flexible, and allow countries great freedom in law making, something that India's new amendments take advantage of. The proposed amendment says that bypassing DRM "with the intention of infringing" copyright is illegal, but if that's not the intent, then it's all right. The Bill also does not address devices and software that make such bypassing possible, so those would remain legal.

But anti-DRM campaigners in India believe that since India is not a signatory to the WIPO treaties, there is no need for compliance with anti-circumvention provisions. They believe that any sort of DRM will allow copyright holders to restrict access to digital media or software under terms that would be permissible under current copyright law, like backing up a file. Including this provision means that copyright holders will be allowed to enforce their own copyright terms on digital media or software that they produce, terms that are not in accordance with the current Indian Copyright Act.

There has been a lot of pressure from the US government on India to sign and ratify the WIPO internet treaties. They have also put India, along with Pakistan and China, on the "intellectual property watch list" for failing to prevent copyright theft. This list is part of the annual "Special 301" report on the adequacy and effectiveness of US trading partners' protection and enforcement of intellectual property rights.

The US wants India to do what they did with their own Digital Millennium Copyright Act and make all DRM circumvention a crime. India's reluctance to do so may not be clear, but even if the Bill is passed, one hopes that there is enough scope there for Indian book buyers to not be penalised for their ridiculous desires to use their ebooks like normal printed books. [13]

Role of librarians

In future, librarians will no longer manage media, they will manage rights. Access and usage will be permitted directly by a license agreement whose rights will be described in a machine readable way by a REL and they will be restrictively controlled by a DRMS, which could be seen as the digital rights enforcement. These systems are already playing an increasing role in the relationship between libraries and publishers.

Publishers provide the biggest share of digital materials in libraries and they often demand the assignment of a DRMS as a requirement for access to high quality content. With their policy they force the libraries to offer digital content controlled by such a system. Only if libraries accept to use the DRE in form of DRMS-

control they can offer media that are relevant and up-to-date. For example, the amendment of German copyright law, legal and binding since January 01, 2008, especially affected digital document delivery. The digital form of document delivery (e.g. subito e.V. and TIBorder) depends on the type of materials from the publishing houses. When the publishers make digital works publicly available, then libraries in Germany cannot use digital delivery for those works. Within this context the delivery services negotiate license agreements, whose main condition is the use of DRMS to control the usage of digital content in a highly restrictive way.

This reaffirms librarians' reservations about DRMS and shows that DRE is not working in the current scholarly context. There are also DRMS that work without DRE. Most DRMS are constructed to enable digital content to be available for sale and to control access and usage. The commercial applications could be seen as generating lots of limitations, but there are some opportunities which libraries should taken advantage of. A large number of digital documents have related rights information. This content and their rights should be managed in an automated way, and it could be done by an electronic resource management system that does not have DRE components. ERMSs can help to handle the complicated and often-changing rules of license agreement of e-journals more automatically and more centrally.

ERMSs can provide data for an exchange between different information systems, e.g. ERMS and the library catalogue, or ERMS and the software of a metasearch engine, or ERMS and a link resolver service. The enabling principle is that the conditions of a license agreement are defined in machine readable way. The developers Digital rights description of library software are not waiting until the standardization of DRMS and RELs is completed. They have already started to develop their first ERMS. Some examples are the ERMS ExLibris' Verde, the 360 Resource Manager of Serials Solution or Millenium of the Innovative Interface Incorporate. In Germany the Central Library of Forschungszentrum Ju¨ lich develops a self-made ERMS.

Conclusion

DRM has to be examined very critically. There are a lot of criteria, which are difficult for the daily work of libraries, such as the access and usage control or the circumvention of copyright limitations like fair use. Nonetheless digital management makes it easier to conclude valid license agreements between single content users and publishers. Because libraries are reaching content users directly, publishers are starting to view libraries as competitors. They do not see that libraries are mediators who get customers that publisher never will reach with their offers.

There are also some parts of DRM that are positive for libraries. RELs make it possible to manage the huge number of rights associated with journals. Libraries can also use the machine-readable information to enhance or to develop new offers. This use is necessary if libraries are not to be lost in a world of omnipresent information. They must advocate for the transparency of rights, which means that libraries have to develop new ways of displaying rights to increase the transparency of DRM-supported documents and Open Access-content as a way to ensure legal certainty. Patrons will follow the law if they know what is and what is not allowed. This is in the interest of publishers and it can help to improve access and usage rights. Technical and legal issues such as these become more important in the work of librarians.

A machine-readable form of rights is necessary to manage a large amount of digital content. Therefore standards are needed and the standardization of DRMS and RELs should be a part of librarian's work. This standardization should to be an international cooperation. The development of a library DRMS might be a possible alternative to a publishers' one, but it would only possible in an international context. A library DRMS could offer a trusted environment for publishers. It may even allow libraries to get better access and usage conditions. Libraries should take an active part in this development, if they want to offer up-to-date collections and to remain interesting for their patrons.

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Chapter–13

E - BOOK & E – JOURNAL: PRESENT AND FUTURE ASPECT FOR LIBRARIES COLLECTION

Academic system largely relies on teaching, learning and research. Eternally, education depends on information resources. These resources are the driving forces for making an educated society. The educated society can exist only when information is stored, shared and utilized properly. In an academic Arrangement, both 'education' and 'library' are inseparable — indivisible concepts, working for the promotion and evolution of teaching, learning and research for greater use of academia. Library is a repository of resources. It is an integral part of the educational system whose primary function is to serve users (students, faculty, researchers and staff). Computers and related electronic resources have come to play a central role in education. Electronic resources are the prime ingredients and they become a common part of the suite of most academic library resources today. AACR2 Rule 9.OAl states "electronic resources consist of data (information representing numbers, text, graphics, images, maps, moving images, music, sounds, etc.), programs (instructions, etc., that process the data for use), or combinations of data and programs." (Brinkley, et al. 1999). In early 70s, most of the electronic sources were available on magnetic tapes and some of these were online (Ravichandra Rao, 2000). Various kinds of resources that are available and accessed today are intranet (locally produced e-resources), internet also called online (remotely stored e-resources) and physical media (stored data on CD-ROM, audio, video cassettes etc) based. The third one is much like the traditional paper based publications with the exception that they require computer hardware and software for theft utilization (Jodelis, 2003). Building electronic collections is largely influenced by a set of library policies and user (faculty and students) preferences in the academic environment (Clarke, 2004). The proliferation of electronic resources has had a significant

impact on the way the academic community uses, stores, and preservers information (Fleterick, 2002). These eresources are added value to the academic libraries to offer better services to users. These e-resources are accessible from many different approaches. Users are able to access e-resources either by local or remote locations (Clarke, 2004). The electronic resources empower and enrich the academic system. But, the increase in information generation at an estimated rate of 13 per cent per annum has made the task of collection, organization and retrieval of information very difficult (Subba Rao, 2001). Alternatively, the academic libraries often prefer electronic resources to substitute print collections for optimum use. Many reasons including physical space, escalation in journals' prices, digital literacy, discovery system, and skilled manpower force the academic libraries to opt for electronic resources in meeting needs of the large community of users. Scarcity of physical library space — Lee proposed an alternative attempt such as remote storage and weeding for solving the space problem in the library (Lee, 1993). Escalating journal prices — Suber and Anmachalarn indicate that, "the average price of a science journal has risen four times faster than inflation for the past two decades (Suber and Arunachalam, 2005)." Paul Gilster pointed out that, "digital literacy is the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers (Schrock, 1 999)."Cataloguing, indexing, searching, retrieving print resource are tedious and time-consuming jobs, therefore, expertise in creating an effective indexing and resources discovery system is required for search and retrieval services — Lawrence experienced that without efficient and comprehensive search services the content may not improve access greatlys (Lawrence,200 1). Manpower is the most essential component for the library system. Brinberg highlighted the handicap of new recruit is a challenge for library 1 (Brinberg, and Bearan, Eds, 1987).Professional expertise and experiences make efficient use of e-resources. Moreover, the use of electronic tools in the academic environment makes classes more efficient; lectures more compelling, informative, and varied; reading assignments more extensive, interesting, and accessible (Montgomery, and King, 2002).

Common Features of the Traditional and the Electronic Library

Thus, because there is such a strong relationship between traditional library tasks and the task of building new digital libraries, librarians have an important role to play in the new information order. There are a number of ways in which this is already happening. For example, the traditional task of intelligent collection building translates into the task of Internet resource discovery and listing. The process of stock acquisition becomes the creation of mirror and cache as electronic collections are built on local file servers and accessed over an intranet. The skill of classification has become the art of knowledge management. Preservation is now the process of backing up to long-term data archives, while information skills training remain a necessity wherever information sources are not self-evidently usable. However, there is one aspect of the interrelated tasks of traditional library classification and Knowledge management that is worth treating in greater detail. This is the role of interface design.

Benefits and Difficulties of E-Books Compared to Document

The main disadvantages for downloadable e-books to standard hardware and those remaining on the provider's web site include reading from PC screens; unattractive formats; and download times dependent on the speed of data lines (Hawkins 2000). Landoni, Wilson and Gibb (2000) and Lynch (1999) add other technological issues such as the dependency on access to unstable telecommunications networks. With books remaining on a subscription Company's web site, is the added disadvantage of restricted printing and copying limiting portability (Kirkpatrick 2000). On the other hand, an e-book is an "integration of the classical print structure with an electronic environment giving additional value added features that paper cannot provide" (Landoni, Wilson & Gibb 2000). Some of the advantages are timely and cost efficient distribution; the ability to search and interact with the text easily; and widespread accessibility through the Intemet (Lynch 1999; O'Leary 1999; Schilit 1999). With a desktop PC, the e-book is not as portable as its print counterpart, but with technological developments resulting in increasingly lightweight computers this is changing. Schilit (1999) cogently outlines benefits that dedicated hand held devices introduce to reading. In addition to

those already mentioned, these include: mobile access to large amounts of information; organizing e.g. by annotating; filtering by generating personalized queries; and support for different modes of reading. Some of these advantages can be obtained, when using e-books with other types of hardware, through the use of special reader software. Even with these potentially attractive functions, the quality of the display, and hence legibility of the content, in both dedicated- device dependent and independent cases is a critical issue (Chaiken et al 1998; Damton 1999; Hawkins 2000; Kristl 2000; Landoni & (uibb 2000; Lynch 1999; Terry 1999). Ardito (2000) notes that "displays are improving, but the development of a device that delivers the brightness and resolution of a printed page may be a long time coming." However, Chaiken et al (1998) found that readers were satisfied with the quality of the display of their prototype appliance. These authors consider that the price of suitable high-resolution displays will determine the economic viability of the device. They also note other factors needed to make reading appliances successflul including: the weight, orientation and packaging; well-designed user interfaces; and support for both passive and active reading. Landoni, Wilson and Gibb (2000), studying computer screen-based electronic books, were in agreement with the issue of costs to the user being a limiting factor. They also stress that "the quality aspect is crucial because of cognitive issues related to the ability of the reader to use, appreciate and prefer books in electronic format to paper ones." Overall, there are differing opinions as to the degree reading devices and computer screen-based electronic books stack up against their print counterparts. Hawkins (2000) indicates that current e-book readers are generally lightweight, convenient to carry and easy to use, whereas Ardito (2000) includes the size and weight of portable reading devices amongst the disadvantages. Sottong (1999) outlines technical specifications and comparisons with printed paper indicating that current technology is incapable of producing readable, cheap electronic books. User studies are needed to resolve these issues.

Benefits

1. Access of e-books anytime and anywhere.
2. Do not require much space for storage.

3. E-books will be accessed quickly.
4. These are cheaper than Books.
5. Automatic check in, no last, no damaged and no reshelving.
6. Particular Topic can be easily search in ebooks by keyword only.
7. E-books can be accessible worldwide easily through the internet.
8. E-books are Kinder to trees.
9. E-books can be read on screen or parts of your e-book can be printed off and read.
10. The users can change the font size and even add hand written notes in e-books.
11. Modem youth take interest in e-books and help children develop a love of reading.
12. E-book provided Multimedia information full-text searching, citation formatting, reference linking, and portability.
13. E-books are portable easily.
14. Progress towards creation of a Virtual Library.
15. Circulation & Photocopying activity reduced.
16. Even add hand written notes.
17. Authors and Editors can create discussion lists or particulars topic & data.

Difficulties

1. Maintenance is costly.
2. Machine dependent and other infrastructure dependent.
3. Effect on eyes.
4. Direct reading from computer if difficult.
5. Do not access
6. Speed of internet.
7. Less permanent.
8. Lack of Standardization.
9. Lack of support from administration.
10. Trend technical staff

E - Journals

Electronic resources have changed the modes of collection development, management and user behaviour because of various pricing models, licensing policy and features like simultaneous access, searching, browsing, linking etc. Many libraries are

subscribing and building digital collection for wider accessibility, utility and availability to fulfill diverse informational needs of the users.

Information technology, internet, web publishing etc. have changed the paradigm from conventional to electronic printing which produces plenty of electronic publications. The documents that are in electronic format are said to be electronic resources. The term electronic resources came into usage in 1980's when first electronic journal came into existence. Now a day's, number of electronic publications are available in various files and formats. These publications can be accessed on payment or free of cost. Due to various features electronic resources gained recognition and popularity within very short span of time. E-resources include e-books, e-journals, e-databases, e-thesis, dissertations and internet resources. Out of these, e-journals gained enormous popularity because of its flexibility and convenience. Electronic journals are available in specialized fields and have all the characteristics of print journals like cover page, contents, vol. no. issue, editors, reviews etc. They are treated as vehicle for the scientific communication and research. Most of the search engines cover the title page of the various publishers' e-journals. E-Journals can be subscribed by academic institutions, corporate and public libraries, pay-per-view etc. Some of the aggregators/service providers offer single window access for the various e-journals.

What is an Electronic Journal?

An electronic journal should perhaps meet the AACR2 definition of a serial [a publication in any medium issued in successive parts bearing numerical or chronological designations and intended to be continued indefinitely], but in practice, it is not easy to determine if a publication is an electronic journal and libraries may define the term differently. Some of the varieties of publications to be considered include:

- an electronic version of a print journal;
- a journal published only in electronic format;
- a self-published item that does not meet the standard journal definition;
- a publisher's web site for a print journal giving extracts in electronic form as 'teasers';

- coverage of full text articles in aggregator or abstracting-and-indexing databases;
- edited compilations of listserv postings;
- Articles offered on a pay-per-view basis (is this an electronic journal or document delivery?).

Type of e-journals

On the basis of accessibility, format, availability etc. electronic journals can be categorized as following:

- **Electronic only –** complete article of any journal along with summary or abstract, available only online having no print counter part, is known as electronic journals.
- **Electronic version of print-** when journals are provided in both forms i.e. electronic as well as print. These journals are known as electronic version of print.

Origin of e-journal

The first peer reviewed journals were *Philosophical Transactions of the Royal Society* and *Journal de Scavants,* both first published in 1665. First electronic journals, developed in the 1980s, were e-mailed to the subscribers and made available through FTP in strictly plain text format. The pioneering time for electronic journals was 1990-95, mainly dominated by non-profit making groups interested in exploiting the technology for its own sake. The commercial publishers joined in around 1996 and dominated, mainly with the direct electronic copies of their print journals. With the advent of the web along with the development of the scanning technology, adobe portable document format(PDF) and protocol, established journals first begin to appear as electronic product on the web in 1995 by John Hopkins University Press and few journals offered by OCLC's Electronic Collection Online (ECO). JSTOR journals also became publicly available that year. Since 1997, the e-journal scenario had been moving ahead with exponential growth and achieved enormous popularity and recognition as presently electronic journals are available from major publishers, on variety of subjects and at various pricing structures beneficial to the publishers as well as libraries.

Features

E-journals have various features like searching, linking, browsing, archiving, perpetual access etc. Few salient features are listed below:

Accessibility

Access to e-journals depends on internet connectivity (Bandwidth) of the institute and licensing. E-journals can be accessed through username password, IP Address or Both.

Use of E-journals

Usage of e-journals depends on licensing agreement of the library authority. Mostly the licensing policy allows access, copying, downloading, printing and interlibrary loan facility to their users.

Online E-journals

Few e-journals are available in electronic format only and do not have any print version of it . Usually, these are created in the electronic or converted from file formats to HTML, SGML, post script, XML , PDF etc. and made available in online format only.

Fast Communication

E-journals are considered as a fast mode of communication channel compared to print version as it does not require process of printing and postal services. Thus, e-journals are used for the speedy communication of outcomes of the research. Library and the users can access e-journals immediately after hosting it on the web server.

Searching

Searching is one of the prominent features of the e-journals which facilitate simple and advanced searching of current or archived issues of e-journals which saves time of the users and helps them in quickly locating the desired information.

Browsing

Browsing is another significant feature of the e-journals which facilitates in various ways like title, author, subject, volume, issue etc. Users not familiar with searching can use browsing facility for accessing e-journals.

Linking

It is an important feature of e-journals which helps in linking internal (index, content, section, paragraph, text, etc.) as well as external web pages or digital objects.

Registration and customization-

Registration and customisation allows users to create their profile and select journals of their interest and change the interface to feel their own. After customization user can receive automatic updates of the content pages of the selected journals from the publishers by e-mail.

E-mail alert

Registration of a specific journal allows users to receive e-mail alert of the contents updated in the journals which helps in knowledge updating.

Online Documentation

Now a day few service providers/ vendors/ aggregators offer online help and documentation facility for search interfaces and other features of e-journals.

Availability

E-journals are accessible at any time from any where. It never gets out of print or misplaced from the shelves.

Perpetual Access: - e-resources offer perpetual access to subscribed journals even after discontinuation of its subscription. Journals subscribed for definite period are available for perpetual access.

Major Publishers/Aggregators/vendors

The following URLs of publishers, aggregators, venders and service providers are checked, verified and listed as on 28/03/211.

- Elsevier Science Direct - http://www.sciencedirect.com/
- Kluwer Online - http://www.kluwerlawonline.com/
- SpringerLink - http://www.springerlink.com/
- Wiley Online Library - http://onlinelibrary.wiley.com/
- JSTOR - http://www.jstor.org/
- Project Muse - http://muse.jhu.edu/
- HighWire Press - http://highwire.stanford.edu/
- Ingenta - http://www.ingentaconnect.com/

- BioMedNet - http://www.biomednet.com/
- EBSCOhost Electronic Journals Service - http://ejournals.ebsco.com/
- SwetsWise - https://www.swetswise.com/
- Ovid - http://www.ovid.com/site/index.jsp
- Electronic Collections Online [OCLC]-http://www.oclc.org/electroniccollections/

Challenges

Economic issues

Economic issues have come up from the rise in subscription prices of print as well as electronic journals. Few publishers offer electronic journals along with the print journals with or without extra charges. One library can not fulfill diverse needs of all the users and subscribe all the journals on any particular subject. Subscription depends on pricing models and criteria like pay per view, institutional, print + online, online only consortium etc. The consortium pricing model offers many e-journals in low cost but its pricing depends on users of the concerned institutions. It can pose a big challenge if an institute has to pay as per available users without having proper infrastructure and its usage.

High operational Costs

Electronic resources have higher operational cost compared to print resources as it includes cost of the website linking, OPAC linking, search interface, web server, bandwidth, access points (Node), specific software, management of e-resources , troubleshooting , assistance etc. Apart form these libraries have to purchase certain service forms for common search interface offered by service providers e.g. ABC service by EBESCO, JCCC by informatics etc. It enhances operational cost of the e-resources and results in increase of cost .

Acquisition and licensing

Acquisition and licensing of the e-resources is a complex process as it includes selection, negotiation, trail, licensing, various file and format, usage statistics etc. Licensing imposes few restrictions in reference to e-resources regarding its usage, archiving, downloading, campus access, inter library loan etc.. If a library fails

to comply with these restrictions , the access automatically gets denied.

Searching and linking full text

Searching and linking are other important features of e-resources. No single source is available for all the journals of a particular subject. Service providers offer various products which facilitate full text linking but not the searching like web feat, JCCC, ABC list from EBESCO etc. As there are bibliographical database which offer link to particular digital objects.

Administrative

For subscribing e-journals the administrative cooperation is very important as it has to offer support in infrastructure development and providing funds for subscription of the journals.

User education and Support

E-resources require organisation of users' education and awareness programmes with a motive to make them familiar with electronic resources, access and legal usage etc. Support should be readily available for troubleshooting as it enhances the usage of e-resources.

User Statistics

User statistics is one of the major problems in the digital environment as few publishers, vendors, and aggregators offer user statistics in their own formats which may not be of adequate help in the comparison of e-resources. Majority of service providers do not offer user statistics and one has to depend on the publisher/aggregator/vendor, if we don't have any system to collect the usage detail of the library.

Advantages of electronic journals

Saves time

E-journals are treated as fastest mode of communication.. It is available on the internet, within fraction of seconds and can be uploaded on the server. The users and library need not to wait for postal services for having journals within the library and users can access desired information by searching it from anywhere and at any time. Thus, e-journals save time of the library as well as users.

Ease of access

E-journals offer convenience, flexibility, quick Access, retrieval, downloading and printing of the relevant issue, multiple access, support of different types of search techniques and accessible from any network .

Faster medium of communication:

Most significant advantage of E-journal is its speed of communication having all the details of print journals e.g. title page, editor, reviewers, vol. number, issue number, ISSN, etc. If the article is uploaded on the publishers' server it can be read, commented on by the readers and amended at the same time .

Saves storage space

Space saving is another significant advantage compared to space required for the print journals , as in case of e-journals you can store lots of articles in electronic format .

Attractive presentation

Electronic journals include various types of digital objects (text, audio, and video) which make it attractive and impressive to the human mind.

Non panic

It is of vital importance that librarian needs not to worry about damage, postal delay, misplacing or theft etc.

Limitation of electronic journals

1. Inadequate Infrastructure, journal titles and back files.
2. Users are more comfortable with print than computer monitor**.**
3. Coverage is incomplete in comparison to print version.
4. Authentication of the issues is a big problem.
5. Long term preservation is not sure.
6. Information literacy is another major problem.
7. Complicacy of subscription and licensing of the e-journal.
8. Scrolling is another problem, as computer cannot display complete pages.

Conclusion

Teaching, learning and research are the main concern of higher education system. Library is a supporting organ though; it is an integral part of the higher education system whose primary function

is not only to obtain resources but also to serve the academic community timely. Building electronic resources is a significant that enriches the academic library system largely. For many reasons, the academic libraries often prefer electronic resources alternatively to substitute print collections for the optimum use. The purpose of study is mainly to insinuate the condition of electronic resources at academic libraries in India. The survey findings show that the libraries have richer e-resources, have long a way to build their e-resources due to various probable reasons including planning, initiation and expertise behind the development of electronic resources among the academic libraries. Moreover, distribution of e-resources subscribed by the Ministry of Human Resource Department (MHRD) for academic libraries through ITDEST (Indian Digital Library in Engineering Science and Technology) Consortium is not equally shared.

E-journals have certain advantages over the print version. Number of E-journals is available free or subscription base which can be accessed from anywhere any time. These journals may also be clubbed together in a single device. We spend plenty of time in going through print- journals while e-journals are highly convenient. E-journals are being used as a vehicle of scientific communication thereby sifting the paradigm of publications.

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Chapter – 14

E- GOVERNANCE AND LIBRARIES

Information and communication technologies comprising, computers, optical fibers, communication satellites and internet are increasingly being used in collecting, storing and processing of information ,generation of knowledge and is being realized to improve the efficiency and economy of every human endeavor. The government sector is also applying their ICT Mechanism to provide seamless access and secure and authentic flow of information related to governance. It seeks to support social, economic and political development, reduces social exclusion and contributes to the well being of the citizens.

In the past few decades, governments have come to be responsible for organizing and regulating not only the traditional activities of defence.Law and order and justice but also social welfare and human resource development. Governments are the single largest takers of people's earnings and the provider of a variety of services to citizens, including dispensing information and welfare. It is therefore natural that ICTs are increasingly used to improve government services. This activity is called e-govemance just as commerce; education and advocacy have come to be called e-commerce-education and eadvocacy.

E-govemance is the latest trend in the governance process all over the world. The purpose of implementing e-govemance is not only for achieving the goals of good governance, but also for efficiency, transparency and accountability of the government system. It includes new styles of leadership, new ways of accessing education, new ways of listening to citizens and new ways of organizing and delivering information and services.

Definition of E-Governance

E-govemance is an emerging trend to re-invent the way the government work and a new model of governance would be based upon the transactions in virtual space, digital economy and dealing with knowledge oriented societies. [2]

In simple words, it is the application of ICTs to governmental functioning to accomplish simple, accountable, speedy, responsive and transparent administration in government. [3] But, B-governance doesn't mean mere computerization of all government office operations or government web-sites on the internet. With the new tools, a networked society's government must completely rethink and re-engineer itself. It is complete transformation of the existing style. Although conventionally the prefix 'e' suggests that an activity is electronic but 'e' also denotes efficiency, effectiveness, empowerment, economic and social development and enhanced services. [4]

E-Governance is the public sector's use of information and communication technologies with the aim of improving service delivery, encouraging citizens in the decision making process and making government accountable, transparent and effective (unesco,2010)

E-govemance is the application of ICTs to government fUnctioning to accomplish simple, accountable, speedy, responsive and transparent administration and government (Raghavan & Nair,2004).Thus e-govemance is much more than just preparing some websites. It ranges from the use of internet for the dissemination of plain web based information at its simplest level to services and online transactions on the one hand and utilizing IT in the democratic process itself (Prabhu,2004).

The e-governance role and benefits can be surnmarized as:

- Delivery of information and services electronically and making government information widely available to citizens.
- E-administration .The use of ICTs to modernize the state ,the creation of data repositories for Management Information Systems computerization of records etc.
- E-Services .The emphasis here is to bring the state closer to the citizens. Examples include provision of online services.E-adminstartion and e-services together constitute what is generally termed e-governance.
- E-governance. The use of IT to improve the ability of government to address the needs of society .It includes the publishing of policy and programs related information to

transact with citizens. It extends beyond provision of online services and the covers the use of IT for strategic planning and reaching development goals of the government.

- E-Demoeracy .The use of IT to facilitate the ability of all sections of society to participate in the governance of the state. The remit is much broader here with a stated emphasis on transparency, accountability and participation. Examples could include online disclosure olicies, online grievance redress forums and ereferendum.

Objective of E-Governance

The objective of e-governance, as stated by the Honorable President Dr.A.P.J.Abdul Kalam,(at the Inaugural address at the International Conference in E-governance at 11T ,Delhi 11 December 2003),is "A transparent smart e-governance with seamless access ,secure and authentic flow of information crossing the inter-departmental barriers and providing a fair and unbiased service to the citizen." This objective is to be realized through an IT driven system of governance that works better, has quality, reliability, convenience, costs less and is capable of serving the citizens on a wider scale which has not been witnessed earlier.

Delivering E-Governance

The tools used for e- governance are the internet, internet and information kiosks, which helps in collecting, collating, storing and disseminating information and promotes collaboration and interaction between the government and the communities. Governments establish online presence and provide information accordingly Governance through Internet can create the desire impact only if the government machinery is computerized, therefore e-govemance is executed by connecting government departments and the common man via network terminals. This requires computerization of all departments, establishments of WAN and installation of nodes connected to WAN at various places through which the websites can be accessed by any terminal.

Indian Initiatives

India several state governments have initiated projects to make the information available through electronic media. Under e-governance significant work has been done in the departments of

Excise and Taxation, licensing and registering automation, registration of births and deaths and police. (India12004). There are many projects launched by the government of India and every state government has put if at the top of their agenda. Both NGO's and government have taken many initiatives to take if and ICTs to the masses of India. Gyandoot,Dristee,e-sewa,Bhoomi,echaupaletc are some remarkable examples of egovernance initiatives in India.

Development of Good Governance

Good Governance and its basic determinants have been defined by various scholars, international agencies and reports. In 1989, the World Bank in its documents on sub-Saharan Africa mentioned four key dimensions of good governance: (i) public sector management, (ii) accountability, (iii) legal framework for development and (iv)information and transparency. Further, the World Bank in its document, Governance and development (1992) defmed governance as "the manner in which power is exercised in the management of a country's economic and social resources for development." [5]

Organisation for Economic Cooperation and Development (OECD)

The concept of governance denotes the use of political authority and exercise of control in a society in relation to the management of its resources for social and economic development.

Commission on Global Governance

The commission, in 1995, considered governance as the totality of management of affairs by individuals and the public and private institution affecting them. It is a continuing process though conflicting or diverse interest may be accommodated and cooperative action may be taken. This is made possible through fonnal institutions and informal arrangements of the people and their institutions. [6]

United Nation Development Programme (UNDP)

Governance is viewed as the exercise of economic, political and administrative authority to manage a country's affairs at all levels. It comprises mechanisms, processes and institutions, through which citizens and groups can articulate their interests, exercise their legal

rights, meet their obligations, and mediate their differences (United Nations Development Programme, 1997). [7]

United Nations Educational, Scientific and Cultural Organisation (UNESCO)

Unesco laid emphasis on making citizen contribute to the positive social and economic development of society. It defines governance as, a political process that encompasses the whole society and contributes to the making of citizens and active continuously to the social contract that binds them together. Their sense of political efficacy is one of the indictors of democratic government. The UNESCO working document on Higher Education in the 2 l' Century: Vision and Action, observed the advent of the communication society that has many consequences for the world of work: decision- making is increasingly becoming remote from the areas of production.. IT makes different types of remote consultation (stock exchange, business, health indicators, list of potential customers, list of sub-contractors, price indexes, etc.) possible. Money no larger circulates in paper, but in virtual form; book keeping is becoming increasingly delocalized; areas of production, distribution and research are becoming increasingly separate geographically but increasingly linked by new technology. IT has enabled more and more individuals to have simultaneous access to information, thus, shrinking the world into a global village. IT is also a vehicle for the internationalization of culture and a tool for defending cultural identity; a major challenge to which higher education cannot remain indifferent. [8]

Report on Human Development in South Asia

This report, more than any other, focuses on human governance. It defmes human governance as good governance dedicated to secure human development. It requires effective participation of people in state, civil society, and private sector activities that are conclusive to human development. Human governance must lead to broad based economic growth and social development which in turn would bring about greater human development. Governance must be seen by the people as operating in their interests only-transparent and accountable to all its constituents, and conclusive to building a society in which all believe they are treated fairly and decently. [9]

In its simple dictionary meaning, good governance refers to the well-being of people. The oxford dictionary defines governance as the act or manner of governing, or the way of control. Today, good governance has entered that development lexicon, where the focus has. shifted from 'maximizing the quality of development founding to maximizing of development outcomes and effectives of public services delivery.' (Mid term appraisal 0f9th Five Year Plan.)

DIMENSIONS OF F-GOVERNANCE

This multinational activity includes e-society, e-democracy, e-republic, e-business e-administration, etc. It encompasses a wide range of activities, and integrates people and information technology for meeting governmental goals.

E-Governance Model

The present model of e-governance doesn't aim to reduce the role of government in the life of citizens but to serve them more timely and efficiently. Now it is the government, which tries to adopt itself to the life of a citizen particularly the under privileged as against the traditional model, which is just the opposite of it. The emphasis is to make the user in charge of affairs and in command of situation. The government's role is to be limited as facilitator only. [10]

Right to Information

According to Cheria A. [11] poverty and inequality are maintained by the political, economical, social, patriarchal and religious systems. Unless all are addressed condignly, poverty can't be eradiated. Stratification and inequality being legitimized as a key of religion, democracy can only be created from the secular space. In carrying out rights to restoration and inclusion activities there can't be various strategies such as capacity and perspective building through training, workshop and seminars, organizing and mobilizing people and federations, networking on common issue, lobbying and advocacy for pro-poor policy changes, documentation and dissemination of information communication and fund raising. Obviously Govt. needs to develop a positive programme to ensure the value of information and facilitate use of such information by the public to renew, modif' and change the lifestyle. Pathak [12] describes, the informed citizens are better equipped to take

advantage of opportunities, access services, exercise their rights, negotiate effectively and hold state and non state accountable. Right to Information (RTI) should be made a fundamental right as soon as possible, so that provision of information is not considered a favour but a right of the public.

Elements in E-Governance

There are four elements of e-governance information, technology, process and people. All technology, process and people of information system are critical to e-governance. If any of the four components of the system is found to be missing, e-governance cannot work.

NKC'S Recommendations on Egovernance for better Service Delivery etc.

Knowledge services have the potential to simplify many differences at which citizens interact with the State. Traditionally, these points of interaction have been vulnerable to unscrupulous activities and rent-seeking. Technology provides us with an opportunity to ensure accountability, transparency and efficiency in government services. E-governance is one of the ways in which citizens can be empowered to increase transparency of government functioning, leading to greater efficiency and productivity. [15]

E-governance has the potential to ensure speedy delivery, productivity and efficiency of services, making them citizens-centric and ensuring that the right of people is served.

The benefits of E-governance include:

- Reducing the cost and improving the reach and quality of public services;
- Reducing transaction costs and transaction time;
- Empowering citizens and increasing transparency of government function;
- Re-engineering of process for greater efficiency and productivity. [16]

The commission report reiterates that E-governance is more about an opportunity for administrative reforms than merely about electronic and information technology and infrastructure. The recommendation on F- governance broadly relate to processes and

standards, infrastructure and organization. They highlight the new to:

Re-engineer government processes for first, to change our basis governance pattern for simplicity, transparency, productivity and efficiency.

Select 10to20 important service that makes a critical difference, simply they offer them as web- based services.

Develop common standards and deploy a common platform or infrastructure for F- governance.

Begin all new national programmes (like Bharat Nirman, Rural Employment Guarantee Scheme, etc.) with well-engineered E-governance implementation and web interface. [17]

Role of E-Governance

Network technology has made virtual reality possible, wherein a person can work and stop sitting at home; moreover, in all information processing systems, communication and interaction are facilitated. The application of ICT has been found to be highly useful in governance, which is known as e-governance, or electronic governance. E-governance plays an important role.

1. Increase efficiency by automation, computerization and networking.
2. Supports effective decentralization decision-making by providing an efficient information flow.
3. Increase accountability of the public services to agencies to citizens.
4. Improves resource management.
5. Offers the various departments and agencies involved in public service provision the facility of effective communication between each other and effective interface with the citizens.
6. Increase the accessibility of individual citizens to information and services and allows them to influence government operations.
7. Provides comprehensive database which helps policy makers to design, formulate and evaluate policies.

8. Facilities the strategic planning process which help or organization to clearly lay down the objectives, goals, programmes and projects.
9. Enables reduction of paperwork with the use of e-mail and data interchange
10. Enables marketization by supplying information on related to the market and enhances public service.

Role of Libraries

Public libraries are called public universities as they play a vital role in informing and educating the public during and after their formal education. By doing so they guard against the tyranny of ignorance, the Achilles heel of democracy. [181 Libraries in a free society always perform the fundamental function of keeping the public well informed which is a pre-condition of e-governance. For quite a long time government have used libraries to inform people of their work and policies. Libraries are essential to the free flow of ideas and to maintaining, increasing and spreading knowledge. As repositories of books and other printed materials they are key to promote reading and writing.

Libraries can play an important role in the promotion of e-governance.

1. Already established libraries, especially public libraries can be used as information centers or public kiosks in the absence of basic infrastructure. Intemet connections and other equipment can be provided to them on subsidy bases and the public should be allowed to use them by becoming members of these libraries as is done in several advanced countries like U.S.A, Canada, etc. [19]
2. These libraries can work as depositary libraries for all types of government information from where the public can access and monitor the work of its elected officials and policy makers. [20]
3. Libraries can also help to bridge divide in the digital contents by providing special services to the general public. [21]
4. Libraries ensure to freedom to speech, the freedom to read and freedom to view. When the people are better informed, they are more likely to participate in the political process, thus keeping

an eye on their elected representative and making them more accountable.

5. Local and state government need access to information from comparable jurisdiction in order to do their effectively and efficiently. [22]
6. In the field of information literacy, library professional can play a pivotal role. Besides acting as facilitators and tutors, they can also act as inspirators and help along with teaching community to spread the culture of information literacy. [23]
7. In the worlds of James Madison "Knowledge will forever govern ignorance and that people who mean to be their own governors must arm themselves with the power that knowledge gives. A popular government without popular information or means of accruing is it but a prologue to a force or tragedy perhaps both." [24.]
8. The main thrust in this area should go to the rural public library. A village or a village cluster with an adequate population should have a community library which will also serve as an information centre. Resources have a community library which will also serve as an information centre. Resources of different agencies engaged in the work of public health, adult education, self- government and such others may be pooled to build up this composite centre. [25]
9. The Seventh Plan Working Report of the Planning Commission states that "No community, institution or organization is considered complete without a good library services .The gradual spread of the concept of democracy of socialist pattem of society, the extension of education, the intensification of research activities, the rapid increase in the production of recorded knowledge both in print and non-print forms, and vast innovations in information and communication technology have led to the expansion of libraries, information centers and systems as well as development of their services."
10. According to the Library Association, Britain, "Community Information Services assist individuals and groups with daily problem solving and with participation in the democratic process. The services concentrate on the needs of those who do

not have ready access to other sources of assistance and on the most important problems that people have to face, problems to do with their hoes, their jobs and their rights."[26]

The scheme for the Improvement of Library Service came in to force in 1952. In 1952, the Government of India initiated the Community Development Programme in which social education was assigned an important role. Gradually, the pattern of the social education programme took a clear shape and libraries, including circulating libraries, occupied an integral place in this programme. The community development programme thus gave a fillip to rural libraries.

There are two major roles that public libraries play in the delivery of e-government. The first, information access, involves working in partnership with other areas of the organization or the other tiers of government to deliver and distribute information personally, seamlessly, wherever and whenever it is desired. The second, bridging the digital divide, is achieved by providing access to information, developing training programmes in the community, ensuring that all people(including the disabled) have to access to information, and by understanding the impact of new technologies in the life of people.

public libraries are popular, accessible, have traditionally in life-long learning, having a national brand, have skills in managing information and are good value for money. It can said libraries are our street comer universities (new library, the people's network). They should be leaders in the provision of e-govemment

Rural Development Services Via

The E-Governance

Services provided at the villager's doorstep via the e-govemance route can presumably cut out the inherent social biases. A computer generating the printout of a land record for a peasant cannot possibly deny service on account of social prejudices or n expectation of a brick. Schemes successfully in some states in India have failed in others and he attributes the failure to a host of factors such as the absence of standards and infrastructure, the lack of local language interfaces, the resistance of civil servants to change, the absence of a political will to reform, and the institutional incapacity

to absorb change. But beyond such factors, people with a shared background are still needed to operationalise e-government systems designed to replace inefficient manual systems, and there might be no social imperative for the technological change, both causes ultimately resulting in similar effects. Villagers are not enamored of electronic delivery.[27]

India really is a land of contrast. We still have a huge section of the society living in the dire poverty, utter ignorance and illiteracy. The important task for e-governance is to remain in touch with the concerned authorities in village, Talukas Districts and even in the Metropolis.

ICT has touched all facets of the life of a common man. Richard Heeks and David Mundy [28] have defmed IT as computing and telecommunications technologies that provide automatic means of handling information.

Richard Heeks [29] points out that govemrnance is both, the present and the future of developing countries like India, which still have a long way to go. Currently, more than half of India's villages look lack telephone connectivity, let alone internet access. The 26 million phone lines (mostly business-owned) and 2 million internet subscriber that do exist nationwide are concentrated in urban areas, while rural areas are left out of the loop.

ICT has made services amenable to people living in cities and villages. The gyandoot programme in Madhya Pradesh, the e-Seva network in Andhra Pradesh, FRIENDS (Fast, Reliable, Instant, Efficient, Network for Disbursement of Service) in kerala, the Saukaryam project in Vishakapatnam, the Gramsat project in Orrisa, e-Gram Suvidha in five districts Chhattarpur, Bhopal, Dhar, Madla and Damoh of Madhya Pradesh, Lokvani Sitapur, Uttar Pradesh, Lok Mitra in Himachal Pradesh are efforts to foster connectivity, accessibility to services and information to people.

Painter and Goodwin [30], who urges that while a regulations approach wood lead to the conclusion that: the local state and local governance cannot be fully understood outside their roles (positive and negative) in the ebb and flow of regulation.... neither can they be fully understood within them. The institutions and practices of local government have their own histories and pattern of development.

Explaining their changing character thus requires a theory of governance, a theory of the State and empirical... research, as well as a theory their impact on (economic regulation).

Conclusion

Libraries in India will have to address some of the outlined Issues for enhancing their role in e- governance. In many developing countries public information agencies utilize modem ICTs for setting up information kiosks.Telecentres,CICs and digital villages, without involving the libraries and library professionals. It is necessary that the policy makers and e-governance models recognize the role of libraries, especially the public and rural libraries in e-governance and bridging the digital drive in India. When policy decisions are drafted relating to e-governance, librarians should be a part of the committee to reflect the opinions of the library community.

Libraries should create a high quality online presence of e-governance projects for the community and can support citizen's access to local e-government and e-governance services. Libraries should play the role of selecting and adding content and providing, links to relevant e -governance websites and sources.

- New ICT broadband should be placed into all branchlibraries along with PCs installation in library buildings and using wireless technologies for mobile libraries to act as e-govemance kiosks.
- Library acts should be enacted in every state having features to work with close coordination of e-governance projects.
- Help from NGO,should be taken to develop rural public library system and community information system.
- The libraries should apply technologies like Gist and language software by which transliteration from Englist into other language can be made.This will enable access of information in the language most comfortable to the local user.

E-governance is a step towards reform in government and administration. These reforms focus on bringing improvements in the service delivery, dissemination of information, transparency, public and private partnership, efficiency and accountability. There is an urgent need for sustainable development. In developing

countries like India, it is not easy to fulfill all the pre-conditions. But it is does not mean we should not go ahead with e-governance. For the successful working of democracy, the empowerment of its citizen is a pre-condition, which can only be achieved by making the people fully informed and aware. F-governance is also seen as a multidimensional concept an IT driven methodology that improves efficiency in administration brings about transparency and leads to the reduction of costs in running the government. There are three main domains of e-governance: improving governmental processes (e-administration); connecting citizens (e-citizens and e-services); and building external interaction (e-society).

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Chapter - 15

LIBRARY AND INFORMATION NETWORKING IN INDIA

Development of computer and communication technologies during 1990's provided necessary impetus of networking efforts among the libraries in various countries. The libraries in India also followed the same path.

The networking of libraries and information centres is the only means of satisfying the rising demands of the library users in the recent years due to the following factors :

- rising cost of library materials,
- information explosion,
- shrinking budgets of the libraries and information centres,
- use of sophisticated information technologies to handle the information,
- development of electronic media,
- increased awareness of library users towards the use of information technologies,
- facilities for accessing the information sources irrespective of geographical barriers,
- increased desire to share resources at the national and international level.

Meaning and Scope

A network is a system of interconnecting group of people or things. The National Commission on Libraries and information Science (NCLIS), USA defines networks as two or more libraries and/or other organizations engaged in a common pattern of information exchange, through communications, for some functional purpose. A network usually consists of a formal arrangement whereby materials, information and services provided by a variety of types of libraries and/or other organizations are made available to all potential users. Libraries maybe in different

jurisdictions but agree to serve one another on the same basis as each serves its own constituents. Computers and telecommunications may be among the tools used for facilitating communications among them. [NCLIS in its National Programme Document, 1975].

The UNISIST II Main Working document (1980) defines it as a set of interrelated information systems associated with communication facilities, which are operating through more or less formal agreements and institutional arrangements, in order to jointly implement information hardling operation, with a view to pooling their resources and to offer better services to users. They generally follow identical or compatible procedures.

The term network is also associated with computer and communication technologies. The communication links can be established among two or more computers instead or libraries/information centres on shared basis, whether they are located at the same region or wide apart. This is termed as the computer-communication network or simply network in the recent literature. The process of connecting computers through communication links for the purpose of sharing resources on mutual cooperation basis is known as the computer networking or simply the networking.

However, it is difficult to differentiate a library/information centre network from a computer communication network at present. Most of the libraries and information centres exchange the documents, data and information services among themselves in a networking situation only through their computer communication channels. therefore the concept of networking embraces not only the network of libraries and information centres, but also the hardware-software equipments, resources and the personnel comprising them.

Network Features

The library networks have the following features in common:

i) The network consists of at least two or more participating libraries or information centres.
ii) Each participating library has a need for exchange of information to cater to the specific needs of the users.

iii) Each participating library has the minimum facilities for the computers, other hardware and software arrangements and telecommunication links like telephone connections.
iv) As far as practicable each participating library tries to organize its materials, information resources and services according to a set of uniform rules so that exchange and communication process becomes easier.
v) The libraries possess users or user groups of special interest to bring about cooperation in those fields on priority basis. These user demands/needs on priority directs the libraries to come under the notion of mutual sharing.
vi) For an effective mutual cooperation – the libraries sign the Memorandum of Understanding (MOU) and work according to a set of common protocols or agreements.
vii) As far as practicable the libraries try to follow identical or compatible techniques or procedures for handling of resources or information suitable to all participating libraries within the network.

Network Structure

The structure of a network can be studied in terms of elements, configurations and levels.

Elements

The basic elements of a library, network consists of i) the participating libraries and information centres known as the nodes or processing centres, ii) the communication link or the paths of communication among these nodes for exchange of information, known as arcs and iii) the interface mechanism for the transie—or exchange of data. The participating libraries can be of homogeneous in nature i.e.

- public libraries,
- university and college libraries,
- research and technical libraries,
- libraries attached to
    - government organizations,
    - R & D bodies,
    - research laboratories / institutions,
    - business and corporations etc,

or can be of heterogeneous in nature i.e. a mixture of any types of libraries mentioned above.

Configuration

The pattern that results when nodes and arcs are connected is known as the network configuration, four types of network configuration can be identified :

(i) star type,
(ii) distributed type,
(iii) ring type and
(iv) *hierarchical type of configuration*.

The *Star structure* is totally centralised network. Activities or services provided by this network are controlled by the central node. Out of the participant libraries, one can be considered as the central node which can hold all the resources with other member libraries merely making use of these.

Communication routes do not exist between the outer nodes in star configuration. All communications are controlled by the central node.

The *Distributed configuration* is completely a decentralised network. Each node in this configuration has the option of communicating with every other node in the network. There is no rank or order imposed on the participating libraries. Each on e gets the equal opportunity to getting involved in the network. The resources and services are used on the basis of equal sharing.

The *Ring configuration* is like the Distributed network in which there is no central processing node, no rank order and each node participates in the network on equal share basis. But the difference here lies in the direction of the path of communication or processing order. Once a request enters the network at a particular node and further processing of the request is necessary, the request can only be processed through a prescribed path within the network.

The *Hierarchical configuration* exists among the library members in which the rank or status of a particular member is considered more than the other members. The higher and the lower members form a system in which the request of a lower member is sent to the next higher member in the system for processing. The libraries which are of the higher level are less in number in

comparison to those at the lower level, shoulder more responsibility and have better access to information resources.

Levels

Based on the status and location of the participating libraries, the network can be of three levels :

- State level networks : all or selected libraries within a particular state forming the network.
- National network : all or selected libraries within a particular country forming the network.
- International network : all or selected libraries from more than one country co-operating each other to share information according to an international protocol or agreement.

When computer are used as network components, the network levels are considered from a different angel. Based on the geographical positions of the participating computers within the network, three levels can be identified.

Local Area Networks (LANs), in which the computers are located within the same building or within a distance range less then one kilometer from each other.

Wide Area Networks (WANs), in which the computers are distributed wide apart, without being restricted by a distance. They can be distributed all over the country or even all over the globe. Sometimes interconnections of many LANs into a network is also considered as a WAN.

Metropolitan Area Network (MAN), in which a WAN is restricted only to a metropolitan area. Even several LANs within a metropolitan area can be interconnected to form a MAN.

Benefits of Library Networking

Since networking is based on the principle of mutual sharing, the libraries get manifold benefits by participating in library and information networking. Some of the important benefits are summarized below :

i) Networking improves resource utilisation and service level to users at the individual libraries.

ii) National and international databases can be accessed only through networking of resource centres, otherwise

it is difficult for individual libraries to process them for their own use.

iii) Interlibrary loan and document delivery services are possible by sharing the resources of participating libraries.

iv) It facilitates exchange of duplicate publications.

v) Electronic access to information, use of electronic databases and related hardware-software equipments are possible on mutual co-operations basis by the individual libraries, which the individual libraries can not afford to arrange and organize on their own.

vi) Use of standards, uniform guidelines, for library operations and services are made to make the libraries compatible for participating in the network.

vii) co-ordination among libraries and information centres at the regional, national and international level for exchange of information and documents is possible only through networking of such libraries.

viii) Library activities like co-operative collection development, cooperative cataloguing, services like CAS and SDI etc become easier to implement through networking.

ix) Networking helps in motivating the staff in boosting their morale and in involving them for co-operation and sharing of resources with others.

Trends In Library Network Development In India

Collection of a library could broadly be classified into two groups – one satisfying the core interests of the institution to which the library belongs, and the other serving peripheral interests. Faced with financial crunch, while a library could restrict acquisition of materials in the peripheral areas, it tries its best not to shed anything from its core acquisition list. Therefore, in a collective development situation, it is logical for a library to look up to other institutions for meeting its peripheral interest. Even from the core list, a library could possible drop an item provided access to the same is ensured by another library in the neighborhood.

Another situation why the library needs to share the collection of other libraries is the rising demand of the users. With stagnated budgetary level, it is getting increasingly difficult for a library to satisfy the needs of the users. Library users of today are more educated than they were before in asking for services or articulating their information needs.

The third situation is that the recent activities concerning library automation, inter-library cooperation, generation of new services and the like demand time and energy of the library professionals. One way to handle this problem would be to relieve the professionals from some of their routine activities like book processing, cataloguing and classification through shared efforts so that they could attend to the new services.

Besides these there are other objectives why a countrywide network of libraries should exists particularly in the developing countries like India. The objectives are summarised broadly as follow :

- to provide access to a wider base of information resources.
- to facilities linkages with various national and international networks, web sites, etc.,
- to rationalise acquisition and to optimize utilization of information resources,
- to promote and support adoption of standards in library operations,
- to improve the efficiency of house keeping operations,
- to generate new services and to improve the efficiency of existing ones,
- to develop forums of interaction amongst information professionals and users and therby, helping them seeking solutions to common problems.

Supporting Factors for Networks

Some of the factors are responsible for the promotion and support of the library network development in India. These factors are briefly summarized below :

- increased awareness of the need for resource sharing,
- resource crunch,
- increased computer installation or access facilities in library environment,

- enhancement of computer literacy among library professionals,
- improvement in computer communication facilities within and across geographical regions and availability of general data networks like NICNET (Planning Commission), INDONET (CMC Ltd.) ERNET (Department of Electronics), I-NET (Department of telecommunications), SIRNET (INSDOC for CSIR) and Internet access facilities.
- creation of facilities for e-mail by the existing networks.

Directions of Networks

The library network development in India has taken three broad directions, namely :

i) Development of Metropolitan Area Networks (MAN) in cities like Mumbai (BONET), Kolkata (CALIBNET), Delhi (DELNET), Chennai (MALIBNET), Punek (PUNENET), Ahemedabad (ADINET), Mysore (MYLIBNET) and proposed ones at Hyderabad (HYLIBNET) and Bangalore (BALNET).

ii) Development of countrywide networks like INFLIBNET (for university, libraries) and the proposed one for the defense laboratories.

iii) Development of sectoral facilities like BTISNET (Biotechnology Information System Network) and the proposed ones for oil and natural gas, management science and environment. The sectoral networks by nature are to be country-wide.

Recognising that substantive information delivery through inter-library cooperation may work well with neighbourhood cooperation principle, NISSAT undertook the development of Metropolitan Area Networks to a great extent.

Models of Development

The path of development taken by the network varies. Broadly, the following three routes are discernible :

Model I

Individual libraries are automated and then linked through a computer communication network e.g. CALIBNET and INFLIBNET.

Ultimately, such networks would produce an on-line Public Access Catalogue (OPAC) system.

Model II

To start with libraries are networked through e-mail services while individual libraries may proceed with their own retrospective conversion activities, e.g. DELNET and MYLIBNET.

The network of mode II eventually would graduate to model IO, that is, individual library holdings would be consolidated to produce on OPAC. This trend is already observable in the case of DELNET.

Model III

Libraries are provided with e-mail access to INTERNET and facilities for switching the users through a central machine to log on to machines in participating institutions, e.g. PUNENET.

It is difficult to decide as to which model out of the three is superior. Since e-mail service is more widely used than to a voice-grade phone or telex, one may argue that the model which works on e-mail as the basis would prove to be better than the others. However, many of the libraries in India today are deprived of this service facility. The model which requires the libraries to be automated first, also need elaborate hardware software – manpower system from the beginning. Only few libraries are able to arrange for these facilities in India.

Subject Coverage

Most of the networks were initially designed to cover only science and technology. INFLIBNET is an exception because it is to cover university libraries which are usually multidisciplinary. DELNET also has some participants from social sciences and humanities. However, with the growth of multi-disciplinary activities, the boundaries between sciences, social sciences and humanities are fast disappearing. It is expected that in future the networks will not make differentiation between subjects.

Participation

By and large, the existing and planned network include participants from academic and research institutions, autonomous bodies and constitutents of registered societies, except from small

departures being made in BONET and MALIBNET in which few participants belong to research and development units of large private industries. Even BONET excepts participation from booksellers.

Enlisting Participation

The strategy for enlisting participation varies from one network to another. Few examples are-cited below :

i) Creation of requisite intrastructure first and then making open invitatio fro participation e.g. DELNET. In due course, the network grows by enlisting more and more participants.

ii) Selecting a set of institutions at the design stage itself and requesting for their participation e.g. CALIBNET and INFLIBNET. If the participation cost is to be borne by the participant, then the network may face problems of non-participation or passive – participation. If the entire cost is to be borne by the network promoters, the entire financial burden may have to carry out by the promotors which is detrimental to the growth of the network.

iii) Levying one time admission and/or annual fees for participation, e.g. BONET and MALIBNET. The annual membership varies from network to network. Few examples are given below :

- Rs. 30,000/- per year depending on the size of the library, e.g. BONET.
- One time payment ranging from Rs. 5000 to Rs. 5,00,000 towards corpus fund plus a prescribed annual subscription e.g. MALIBNET.
- Rs. 10,000/- per year as participation fee after the initial free operation, e.g. DELNET.

Hardware and Software

The networks use both DOS and UNIX based system. The DOS based systems are easily affordable by the participating libraries whereas the UNIX machines cost much higher. Among the library software, the CDS/ISIS is very popular, distributed free of cost on demand initially but now a nominal charge of Rs. 1500/- is levied as handling charges.

A CDS/ISIS based total library automation package called SANJAY notionally priced at Rs.15,000/- was released in October, 1993. Similarly, a co-product called TRISHNA has been developed utilising the GIST card technology to handle Indian Language materials. Because of the large skill base of more than 3000 library professionals, the CDS/ISIS and its co-products are likely to dominate the library information handling in single user environment in India until a suitable alternative in that price range comes to the market. Since librarians in India are initiated to computer applications through CDS/ISIS and the database development usually starts with CDS/ISIS, all library automation packages should be able to import/export CDS/ISIS generated databases. Besides several products on dBASE, FoxPro and on flat file concept are used by the Indian libraries.

In a multi-user environment, the prominent ones are the MAITRAYEEI (LIBERATOR) and LIBSYS, DESIDOC armed with the experience of COBOL – based, DELMS software is now collaborating with the INFLIBNET for the INFLIBNET for the development of new package. besides, various other products with catchy names like LIBRIS, LIBRA, ARCHIVE and GRANTHALAYA are also in the market. Of these, LIBSYS has the highest installed base.

The well known software MINISIS (distributed free of cost directly by IDRC canada) started early in India, even earlier than CDS/ISIS. However, as yet it does not have an appreciable market presence because it required a specific hardware system and its marketing policy was not very clear. If properly priced, the software may take the market by storm with its micro-version which has recently been released NISSAT with its-success experience of CDS/ISIS, would collaborate with the MINISIS Resource centre at the SNDT Women's University for its distribution, co-product development, trouble shooting and training. Similarly, the market position will change drastically when the UNIX and WINDOWS version of CDS/ISIS and its co-products are ready for use.

Network Connection

So far as the network connection is concerned, the progress is not yet satisfactory. The communication system provided by the Indian Telecom on the trunk routes though works to some extent upto satisfaction, its performance within the city is quite

discouraging. Many libraries even do not have phone connection which is a serious problem for network development. However, there are other alternatives. ERNET is now used by many of the networks. NICNET has spread upto the district headquarters and is a network based on satellite communication. The new introduction is the public data communication network – I-NET by the Department of Telecommunication . If these facilities are developed in the right direction; at least there is a hope of the development of the good library network in the country. Another solution could be to depend heavily on other data networks like the BTISNET does on NICNET or NISSAT on ERNET. This saves a lot of money, time and effort.

Development Costs

A variety of strategies have been adopted for the network implementation. Therefore the components of cost to be borne by the sponsorer/promoter and the participating institutions in each case differ. Broadly there are three models of financial participation such as :

Model I

The network sponsorers/promoters bear the total cost of hardware, software, communication etc. for each network node and also terminal nodes, e.g. INFLIBNET.

- total cost is to be borne by a single agency.
- participating institutions always depend on the promoter for almost every thing i.e. fund, equipment, infrastructure.
- the promotors have to keep on vigilance for smooth running of the network.

The advantages of this model are :

- honogeneity in hardware – software components among all the institutions,
- smooth running of the network,
- all the institutions get equal opportunity to participate in the network, since there is no fear of financial stringencies.

Model II

The network sponsorers/promoters bear the cost of general infrastructure development, while the participating institutions

bear the full cost of terminal infrastructure and utilization, e.g. CALIBNET, PUNENET, DELENET and BONET

The disadvantages of this model are :

- participating institutins find it difficult to arrange financing of their own hardware – software systems.
- once an institutions is able to manage the infrastructure, it demands more on the network services,
- the services of the participating institution are to be always made upto the expectation, which is not possible always,
- incompatibility of hardware-software formats exists across the network.

The advantages of this model are :

- sharing of responsibilities among the promoters and participating institutions,
- promoters and participating institutions get involved in equal basis for the life of the network,
- absence of river-taker syndrome helps for long-range sustenance of the network.

Model III

The network organiser collects admission/membership fees as corpurs fund to pay for required infrastructural development, e.g. MALIBNET.

The disadvantages of this model are :

- the participating institutions may cease to pay the membership fees any time,
- the corpus fund may dwindle out effecting the life of the network.

The advantages of this model are :

- ideal approach since institutions participate actively due to payment of membership fees,
- the admission/membership fees can be adjusted depending upon the nature of participation, nature of services expected etc.

Network Coordination

For effective coordination of networks, NISSAT envisaged formation of registered societies, so that these societies could frame their own rules appropriate to local conditions and network development needs. So far ADINET, CALIBNET, DELNET,

INFLIBNET, MALIBNET and MYLIBNET have been registered as societies. However, there is some difference. The AIDNET is strongly linked with INFLIBNET, DELNET with NIC, MALIBNT with INSDOC and MYLIBNET with CFTRI. Such linkages help in deriving a lot of equipment, manpower and overhead support from the host institutions. In contrast, the CALIBNET and INFLIBNET societies are to ten fro themselves in all activities and pay for every bit of infrastructure they create or utilize.

The BONET and PUNENET could be viewed more or less as institutional projects. While BONET is with the NCST, PUNENET is managed by a consortium of three institutions namely Bio-informatic Centre at Pune University, C-DAC and NCL.

It has been observed that,

- The model of MALIBNET and MYLIBNET in which a society is intrinsically linked to an institution works best.
- The model of CALIBNET in which the society is not anchored to an institution, is difficult to manage.
- The third model in which the responsibility of the network rests with an institution, is not effective in catalyzing and sustaining a cooperative movement.
- When the responsibility of network development rests with a group of computer and communication technologies as in the case of BONET and PUNENET, the physical network gets developed no doubt, but the librarians community are sidelined.
- On the other hand, when the responsibility is given to a librarians group, e.g. DELNET, the network authority may try to dominate on participating institutions and foster a giver-taker relationship. The librarian community may also not extend the much-needed cooperation to a fellow librarians group interested in developing the network, e.g. CALIBNET.

Important Library and Information Networks In India

Initially the computer communication networks were commonly used for business and commercial applications, but the libraries quickly realised the importance and use of these network technologies in resource sharing among them. Library and information networks in India can be conveniently divided into three groups, such as

General data networks

Metropolitan area library networks
Countrywide library networks
Besides these, few other networks have developed or proposed on the sectorial basis covering the areas like biotechnology, environment, oil and natural gas etc.

General Data Networks

Information organizations, institutions, research, organizations, commercial bodies and government departments have made considerable effort to network their computer services, data bases and other resources for cooperating each other across the country. These networks art not limited geographically and are meant to use by any potential user within the network environment. These general data networks in India have really provided boost to other library networks in the country. Important data networks are :

i) NICNET (Planning Commission)
ii) INDONET (CMC Ltd.)
iii) ERNET (Department of Electronics)
iv) SIRNET (Council of Scientific and Industrial Research)
v) I-NET (Department of Telecommunications)

Brief description about each one is given below.

NICNET

NICNET is a satellite based computer communication network of the National Informatics Centre (NIC) under Planning Commission. National Informatics Centre (NIC) was established in 1977 under the Department of Electronics with a long term objective of setting up a computer-based information network for decision support to the government ministries and departments and for the development of databases relating to government's plans and programmes. Later (in 1988) it was transferred to the Planning Commission.

NIC Net i.e. NICNET is a widely connected network in India and has its node in every district headquarter in all the states and union territories with the central node or hub at Delhi. From any node one can request for and exchange information through e-mail. Due to satellite-based communication channel, it is possible from any remote corners of the country to be connected to NICNET without recourse to telephone lines.

NICNET has the largest number of Internet users in the country. It is connected to over 200 networks in 160 countries throughout the world. NICNET is providing special connectivity for academic and research institutions through its project 'Research and Education Network of NIC (RENNIC).

Although NICNET is primarily meant for use by government departments, it is quite useful for library and information community. Users from libraries, research organizations, institutions etc can access national and international databases through NICNET especially in the areas of biotechnology, medical sciences and related fields. The main activities of NICNET are summerized below :

i) NIC in collaboration with ICMR has established in 1986 a centre called the ICMR-NIC centre for acquisition, storage, retrieval and dissemination of information from international databases.

ii) The establishment of Indian MEDLARS Centre (IMC) of the NIC in 1988 has helped to access the MEDLARS databases such as the MEDLINE, TOXLINE, POPLINE etc. In addition to the MEDLINE database, IMC provides dial-up access to CD-ROM databases of the US National Library of Medicine, Biological Abstracts and the Science Citation Index.

iii) NIC has collaborated with other institutions and organizations to develop databases and provide services to the users. Some of them are :

- Computerized on-line patent information system in collaboration with International Patent Documentation Centre (INPADOC).
- National Calamities Relief Management System (NCRMS), a standardised distributed database for hazard management.
- Database on industry and trade with the cooperation of Federation of Indian Chamber of commerce and Industry (FICCI).

Since NICNET is a highly developed network based on satellite technology, the libraries should be able to take the opportunity to use its benefits wherever possible.

INDONET

INDONET is a commercial distributed computer network of CMC Ltd., Hyderabad established in early 1980's and now became one of the widely distributed data network in the country in the field of business and commerce. During these years it has undergone a major technology up gradation due to the development of the computer communication technologies. Its services are available in over 13 major cities across the country, which are summarized below :

i) Recently it has introduced an X400 CCITT based e-mail services 'cmcMail' for the benefit of the user community.

ii) It offer computer-to-computer data interchange facility. The files canbe transferred across geographically spread locations with ease and speed.

iii) It hosts tailor made applications relating to database development. It allows the offices in the branches to update the corporate databases as and when required.

iv) With the help of an international gateway commissioned at Mumbai in cooperation with VSNL, it facilitates access to international computer networks in the areas of trade/business, stock exchange and scientific and technical databases.

v) Besides access to international database services, it provides database services of its own Few examples are
   - CMIE (Centre for Monitoring Indian Economy), a database on financial performance of over 2000 organizations in India.
   - NICRYS, a scientific database on crystallography.

vi) It provides hardware maintenance services to over 700 machine installations in India.

vii) Besides these, it provides other services like consultancy services, remote computing, software export etc.

INDONET has plans to upgrade it network service significantly to reach and bring it to international standard Internet protocol in cooperation with Acossworld Communications, Inc. The services offered by the INDONET can be used effectively by the library and information community but the cost of the services are rather

higher when compared to alternative services available in the country.

ERNET

Education and Research Network (ERNET) was initiated in 1986 by the Department of Electronics (DOE) with the funding support from the Government of India and United Nations Development Program (UNDP) involving 8 premier institutions as participating agencies. The institutions are :

- National Centere fro Software Technology (NCST), Mumbai
- Indian Institute of Science (IISc), Bangalore
- Indian Institutes of Technologies (IITs) at Delhi, Mumbai, Kanpur, Kharagpur and Chennai.
- Department of Electronics (DOE), New Delhi.

The development objective of ERNET is to enhance national capabilities in the areas of design, development, research, education and training on state-of-art concepts of computer networking and related emerging technologies. Its immediate objectives are :

- to progressively set up a nationwide computer network for the academic and research community starting with the eight participating agencies;
- to undertake design, development and advanced research in the emerging concepts of networking and related technologies ;
- to carryout continuing education, training and consultancy programmes to generate critical manpower needed by the industry and users in this filed.

In order to implement the overall objectives. ERNET under the Department of Electronics (DOE) has registered itself as a Society, called ERNET India with the following objectives :

- to provide state-or-the art communication infrastructure and services to academic and research institutions, governments organizations, NGOs, private sector, R&D organizatins and various other non-commercial organizations.
- to carry out research and development activities,
- to provide training and consultancy services,
- to carry out content development works.

The various services that are provided by ERNET include :

- E-mail
- file transfer
- remote log-in
- database access
- Internet and World Wide Web

These services are utilised by over 80,000 users from 700 organizations representing a cross section of universities, academic institutions, R&D labs, etc, international connectivity is achieved through gateways at New Delhi, Mumbai, Bangalore and Kolkata. USIS (User Services Information Services) helpdesk has been established to support the ERNET users in their daily work with the offered services. ERNET also supports library networks like DELNE, BONET and INFLIBNET.

ERNET's future plans include strengthening of infrastructure, Improving the contents and establishing an Internet Content Generation (ICG) Centre, and carrying out research and development works in the following areas :

- High–speed networking
- Network management,
- ATM,
- digital libraries,
- electronic publishing and multimedia,
- product development and technology transfer,
- development of low-cost PC LAN card, and
- library automation software.

ERNET has made a significant contribution to the emergence of networking in the country. If practically brought the Internet to India and has built up national capabilities in the area of networking, especially in protocol software engineering. Over the years, it has become a trendsetter in the field of networking in India.

I-NET

I-NET is a network of Department of Telecommunications (DOT). It is different from NICNET or ERNET in the sense that it does not provide the E-mail service. Like other DOT facilities, exchange of data can be made through PSTN or STD. Initially the project set up exchanges in eight major cities viz. Mumbai, Delhi, Kolkata, Chennai, Bangalore, Hyderabad, Pune and Ahemedabad,

but later many other cities were included in the project. In the cities where I-Net exchanges are located, connection to the network can be made through leased lines and in places where the exchanges are not located the connection to the network can be made via STD lines. The charges for the connections are made not by distance or time but by the volume of data transmitted across the network. Since I-Net is connected to INFLIBNET and ERNET, an I-Net account for a library shall enable it to access the INFLIBNET services and databases, as will as to ERNET services with very low connection charges. Through I-NET one can access Internet via the Gateway Internet Access Service (GIAS) of VSNL.

SIRNET

Scientific and Industrial Research Network (SIRNET), a network in collaboration between INSDOC (now, NISCAIR) and CSIR, aims to interconnect all the CSIR laboratories and R&D institution of India. The main objective of SIRNET is to connect the vast S&T information resources available in CSIR laboratories and other research organizations and inculcate the habit of resource sharing among them. It also aims to establish the link between the national and the international resources so that information resources so that information messages can be exchanged globally at a reduced cost.

It has network management centres at Delhi, Bangalore, Kolkata and Chennai. The services of SIRNET include the following :

- e-mail services,
- file transfer,
- document transfer,
- access to indigenous databases of INSDOC (now, NISCAIR),
- access to international gateways and Internet (via ERNET).

Since NICNET and ERNET are the most popular and widely used networks in the country, they proved to be a better alternatives to SIRNET to research workers engaged in the laboratories, institutions and other organizations in the country. SIRNET has still to develop to a great extent to make its services fee significant among the scientific community in India.

Metropolitan Area Library Networks

In India, the library networking efforts using computer communication technologies started during the late 1980's and by the end of 1990's several metropolitan area networks have already been established. The motivation and support provided by the National Information System for Science and Technology (NISSAT), Department of Scientific Industrial Research (DSIR), National Informatics Centre (NIC), and the University Grants Commission (UGC) towards the development of networks in the country are noteworthy.

Important metropolitan area library networks are :

i) Developing Library Network (DELNET), 1988
ii) Calcutta Library Network (CALIBNET), 1993
iii) Madras Library Network (MALIBNET), 1993
iv) Bombay Library Network (BONET), 1992
v) Pune Library Network (PUNENET), 1992
vi) Ahemedabad Library Network (ADINET), 1995
vii) Mysore Library Network (MYLIBNET), 1994

Brief description about each of them are given below.

DELNET

Developing Library Network (DELNET) (formerly, Delhi Library Network) under the sponsorship of NISSAT started as a project in 1988 in the India International Centre and later officially registered as a society in 1992. In 1993, it received financial assistance and support from NIC. The main objectives of DELNET are the following (Kaul, 1992, 1999) :

i) To promote sharing of resources among the libraries by developing a network of libraries, by collecting, storing and dissemination of information and by offering computerised services to the users.
ii) To offer guidance to the member libraries on cataloguing, database services, circulation, acquisition, serials control, online services, selection of hardware and software, etc;
iii) To coordinate efforts for suitable collection development and reduce unnecessary duplication wherever possible;

iv) To establish a referral centre, to monitor are/or facilitate catalogue search and maintain central online union catalogue of books, serials and non-book materials of all the participating libraries;

v) To facilitate and promote delivery of documents manually and mechanically;

vi) To develop a specialist bibliographic database of books, serials and non-book materials;

vii) To develop a database of projects, specialists and institutions;

viii) To possess and maintain electronic and mechanical equipment for fast communication of information and delivery of electronic mail;

ix) To co-ordinate with other regional, national and international networks for exchange of information and documents; and

x) To undertake, facilitate and provide for the publication of newsletters, and/or journals devoted to networking and sharing of resources.

In order to fulfill the objectives, DELNET has made considerable efforts of strengthen its infrastructure, hardware-software components and the manpower.

DELNET has developed the following softwares for use by the member libraries and others :

i) DELSIS : An integrated software package developed on BASISplus to undertake cataloguing, union cataloguing functions and library networks. All the on-line databases of DELNET are functional on DELSIS. It can be used both for MARC and CCF records.

ii) DELSEARCH : An off-line remote database access system through e-mail. It is developed on UNIX platform.

iii) DELWINDOWS : A tool for creating and retrieving bibliographic databases ad catalogues. It provides options for creating biblographic records either using CCF or the MARC format.

iv) DELDOS : A software for database creation in MARC format and its retrieval on the DOS platform.

DELNET offers various services to its member libraries. They are summerised below :

i) Online and offline access to databases.
ii) Interlibrary loan services online.
iii) Internet access and e-mail services,
iv) DEL-LISTSERV (Internet mailing list) : provides on-line information on IFLA, Library & Information science jobs, net-happenings and medical clippings,
v) Training programmes, workshops, seminars and lectures,
vi) Retro-conversion facilities,
vii) Resource sharing facilities among member libraries.

DELNET has emerged as the first operational library network in India and has become one of the best models for metropolitan library networking in the country. It incorporates all types of libraries as members and offers services to users in all disciplines. It hopes to develop as a network with national or even international character in near future.

CALIBNET

Calcutta Library Network (CALIBNET) was established in 1993 under the sponsorship of NISSAT and the management control by CMC Ltd. In 1994it was registered as a society and functioned independently. Its main objective was to serve the collective interest of Kolkata's institutional libraries by means of computer based library automation and networking, aimed at optimum utilisation ofbibliographic resources of these libraries by a mechanism of resource sharing and electronic access. It also aimed to bring about inter-library co-operation and document delivery amongst the libraries of Kolkata.

To realise these objectives CALIBNET offers two routes :

Route I : The Network Route

It is based on the notion of total automation of library operations and management functions and their interconnection through telecom lines. For automation of member libraries, CALIBNET recommends to use its own application software 'MAITRAYEE', location of books and serials can be done through OPAC. Individual libraries can be hooked to the network, for answering queries, transfer of files, exchange of messages etc

through e-mail. The Network Service Centre (NSC) acts as the central hub to provide online search of international databases as well as its own databases on CD-ROM.

Route II : The e-mail Route

CALIBNET supports a e-mail based library network ub at NSC called CALIBLINK. This route offers instantaneous communication between networked libraries-aimed at mutual sharing of information resources and also with the world-wide e-mail addresses.

The libraries of the premier institutions of Kolkata in the field of science and technology as well as universities are the participating members of CALIBENT. The resources and the services offered by CALIBNET are the following :

i) MAITRAYEE – a application software for library automation which CALIBENT recommends for using in the libraries.

ii) CALIBLINK – a network of libraries developed for resource sharing and exchange of information (mainly through e-mail via its ERNET link).

iii) CALIBNET High-tech resources – provides access to international databases, online access to INTERNET and DIALOG services. CD-ROM access on its own resources.

iv) Document Delivery – provides full text document delivery services i) by processing from international sources like Britsh Library Document Supply Sources. UNCOVER, ASTINFO and many other international vendors and ii)k by ordering over e-mail network from other national sources.

v) VALIBNET's Con File – The service helps the libraries to process foreign materials of their choice. It provides ful-text of any selected articles and even patents on demand. A document ordering service. CALIBORDER, meets requests for copies of original publications.

vi) Retro9 File – This service offers search output on any specific topic from INTERNET, DIALOG and CD-ROM facilities.

vii) Besides these, CALIBNET offers many other services like assistance on resource sharing and planned acquisition;

retrospective conversion on demand; training programs on library automation, information technology and resource sharing; and consultancy.

CALIBNET opens a vast panorama of global information for rapid retrieval. All its success depends upon how seriously its member libraries participate in the network. They have to extract the benefits out of its potentiality, which it certainly promises.

MALIBNET

Madras Library Network (MALIBNET) started its functions in 1993 immediately after it registered itself as a society in the same year. It was partially funded by NISSAT and supported by INSDOC as the executive agency. Heads of some major academic and research institution, universities and industries in and around Chennai also extended their support at the beginning. The main objectives of the *MALIBNET are the following :*

i) To bring about cooperative working amongst the libraries and information centres in the city of Chennai in particular and in the state of Tamil Nadu in general;
ii) To develop a network of libraries and information centre within its jurisdiction;
iii) To bring about resource sharing among the libraries and promote dissemination of information;
iv) To establish appropriate linkages with other regional, national and international information resources and centres: and
v) To organise conferences, lectures, workshops and seminars in the areas of interest.

MALIBNET acquires information from more than 50 resource libraries of Chennai. Those libraries belong mostly to the academic and research institutions, organisations, government departments in the fields of science and technology. All its member institutions act as the resource centres for MALIBNET. It has a Central Network Service Centre (NSC) installed at INSDOC Regional Centre and all member institutions are linked with the network host system through telephone links. The resources and the services offered by MALIBNET are the following

i) Database services – MALIBNET provides access to its own databases in addition to the databases developed by INSDOC its databases include,
   - Directory of Database of Current Journals
   - Content Database of Current Journals
   - National Union Catalogue of Scientific Serials in India-Madras Region (NUCSSI)
   - Automotive Engineering Database
     The databases of INSDOC which are available for online access to members of MALIBNET include.
   - Medicinal and Aromatic Plants Abstracts (MAPA)
   - Polymer Science Abstracts
   - NUCSSI for madras * Bangalore region
   - Indian Serials Contents on Multimedia (SCOMM)
   - Indian Patent Database

ii) It provides free e-mail services to all its members.

iii) MALIBNET Card – MALIBNET cards are issued to all members free of cost and at a cost for others for accessing all the resource libraries of MALLIBNET.

iv) It provides a monthly service of Content Abstracts and Photocopy services (CAPS) to members.

v) It provides journal articles from member libraries on request under its Express Document Procurement and Delivery programme.

vi) Member libraries can avail all the services rendered by INSDOC through MALIBNET. These services include,
   - Patent Watch Service
   - Internet Information Service
   - E-mail Service
   - CAPS Service
   - Document Copy Supply
   - Specialised database creation and
   - Training & consultancy

By utilising the expertise of INSDOC, MALIBNET has reached an operational stage even without any formal financial assistance from the government and hopes to become a model for an ideal Metropolitan Area Library Network in future.

BONET

Bombay Library Network (BONET) was established in 1993 under the sponsorship of NISSAT with an aim to promoting networking and cooperation among libraries in Mumbai. Initially the focus was on inter-library activities rather than computerisation of individual libraries. however, it intended to provide training related to library computerisation and networking and speed up computerisation of libraries in Mumbai. The participating libraries are expected to undertake computerisation work independently, whereas BONET shall provide the communication line through telephone for networking purposes. To benefit from on-line services, the member libraries can use the existing leased line. It provides access to its centralised catalogues and e-mail services to its members. Other services of BONET are the following :

- training to selected staff of participating libraries,
- on-line catalogue of books, periodicals of the region,
- inter-library lending of books and periodicals,
- document delivery services,
- on-line access to international databases,
- e-mail services,
- access to CD-ROM databases,
- creation of a library software named *Soochi* and its use in training and demonstration.

BONET expects to build a low cost library information system which can possibly be used as a model for future expansion of this service even outside Mumbai, but lots of things are yet to be achieved to come upto this expectation.

PUNENET

Pune Library Network (PUNENET) was established in 1992 under the sponsorship of NISSAT with on overall objective of a) better utilization of funds through sharing of resources by creation of commonly usable databases and communication between libraries, and b) automating the functions of individual libraries at the local level for effective and efficient services to the areas. The network aimed to provide the following services to the users :

- Union catalogues,
- CAS and SDI Services,

- Authority data, Library automation – acquisition and fund accounting, serials control, books and journals maintenance, circulation,
- Creation and maintenance of bibliographic databases,
- Inter-library user services,
- Document delivery services,
- Access to national and international databases,
- E-mail services.

Though PUNENET is based on the concept of resource sharing via networking at the regional and national level, not much progress has been made in this regard.

ADINET

Ahemedabad Library Network (ADINET) was established in 1995 under the sponsorship of NISSAT which aimed to bring about cooperative mode of working amongst more than 150 libraries and information centres in and around Ahemedabad. Its other objectives are i) helping library users and individuals in getting access to information of their interest, ii) coordinating the efforts for suitable collection development to reduce unnecessary duplication of subscriptions and iii) providing e-mail facilities to the members for exchange of information with others within the city and outside.

To achieve these objectives, it has undertaken many activities such as,

i) Centralized database – it has made efforts to create a centralised database i.e. a union catalogue to holdings of libraries in Ahemedabad.
ii) Institute Master – a database of the libraries of Ahemedabad.
iii) Journal Master – a database containing bibliographic information about serial/journal holdings in the libraries of Ahemedabad.
iv) Book master – a union catalogue of books in the libraries of Ahemedabad.

ADINET offers the following resources and services to its members :

- on-line information search from the union catalogue database,
- inter-library loan services,

- CAS and SDI services,
- e-mail services,
- bulleting board services,
- promotion of automation activities to its member libraries and others,
- training and consultancy

In a very short span of time, ADINET has been able to develop itself into a good metropolitan library network. It has successfully overcome some initial problems and now hopes to become a truely useful network.

MYLIBNET

Mysore Library Network (MYLIBNET) was established in 1994 under the joint sponsorship in Mysore Library Consortium and NISSAT and registered itself as a society in the same year. The main objectives of MYLIBNET was to establish a network of libraries in and around Mysore for resource sharing purposes and to promote computerisation of the functions of its member libraries. The central hub of the network is attached of CFTRI, Mysore. MYLIBNET offers the following resources and services to its members :

- e-mail services,
- retrospective conversion,
- training courses on computer application, automation, CD-ROM and on-line technologies and internet applications,
- databasek creation,
- OPAC services,
- document delivery service,
- access to international databases,
- Internet access

MYLIBNET has emerged as a operational library network within a very short time. Of course, to become a successful metropolitan library network it has to increase its number of participating libraries and to see their active participation in the network.

Countrywide Library Networks

The networking activities in India were concentrated in designing and developing the Metropolitan Area Library networks. The results can be noticed from the establishment of several metropolitan area networks. It is however, quite difficult to develop and implement a countrywide library network in a vast country like India. so far the only one notable achievement is the establishment INFLIBNET, a countrywide network of libraries and information centres in academic and research institutions. Brief description about the INFLIBNET is provided below.

INFLIBNET

The Information and Library Network (INFLIBNET) was first conceived in the year 1988 and later implemented as a programme of University Grants Commission (UGC) in April 1991. In 1996, it got registered as a society. Its headquarter is located at Gujarat University Campus, Ahemedabad. It is now an idependent autonomous Inter-University Centre under UGC, to co-ordinate and implement the nation-wide high speed network using state-of-the-art technologies connecting all the university libraries and information centres in the country. It promotes scholarly communication among the academician and researchers in the country.

Objectives of INFLIBNET

The main objectives of INFLIBNET are given below :

- To evolve a national network, interconnecting various libraries and information centres in universities, deemed to be universities, colleges, UGC information Centres, Institutions of national importance and R&D Institutions etc. in the country for efficient sharing of information resources available with them and to improve capability of information handling and services;
- To provide access to document collections of member libraries through on-line union catalogues;
- To provide access to international sources and databases by establishing gateways for on-line accessing;
- To provide document delivery services;

- To develop mechanisms for resources sharing, inter-library loan services and optimum use of library collections;
- To implement comuterisation of library operations and services in order to bring a uniform standard among them;
- To facilitate information exchange among the libraries and their users through e-mail and internet access facilities;
- To create database of projects, institutions and specialist for providing online information service;
- To provide training and consultancy services in the fields of library computerisation and networking;
- To evolve standards and uniform guidelines in techniques, methods, procedures, hardware and software services in order to facilitate pooling, sharing exchange of resources and services.

Activities of INFLIBNET

In order to implement and achieve its objectives, INFLIBNET has undertaken many activities. These activities are summerised below:

Library automation

INFLIBNET has undertaken the automation of University Libraries are its major activity. INFLIBNET centre through University Grants Commission has been providing grants (initial and recurring) to several universities for automation and data conversion work. So far more than 140 Universities in the country have been provided with such grants.

i) Software development

INFLIBNET centre has developed a library management software i.e. Software for University Libraries (SOUL) to undertake automation of library operations of the participating libraries. The software works in client/server mode in Windows environment using MS-SQL server as back and tool. It also supports the multilingual database creation and web access.

ii) Human Resource Development

INFLIBNET centre undertakes training programmes (4 weeks duration) and workshop (one week duration) on the areas of library automation and networking to develop the required manpower to handle the automation and networking activities in the university libraries.

iii) Development of Union Databases

The INFLIBNET centre is engaged in creating several union databases which can be accessed online using Internet through the INFLIBNET web page. The databases includes :

- Books Database : Holdings of the participant libraries; It includes more than 6.5 lakh of records.
- Theses : Doctoral : theses submitted to various Indian universities. It includes more than 1.35 lakh of bibliographic records.
- Serials Holding Database : Serial holdings of various universities.
- Experts Database : It includes information about senior level faculty members, in different subjects, working in Indian universities. So far more than 6700 records have been entered into the database.
- Research projects : Details about the research projects carried out in India. So far more than 5000 records have been entered into the database.
- Secondary serials and CD-ROM : Details of secondary (Abstracting/Indexing) serials and bibliographical databases in CD-ROM subscribed by different universities.

iv) Standards in record creation

INFLIBNET has brought out a document entitled '*INFLIBENT standards and guidelines for Data Capturing*' prepared by a task force of experts based on Common Communication Format (CCF), 1992 edition and recommends the participating libraries to adopt it to maintain consistency and quality in database creation.

v) University Home page

INFLIBNET centre provides information regarding courses conducted, eligibility, fee structure, facilities available etc of different universities through their home pages. Web pages of 25 universities are available on the INFLIBNET web server and hyper links to home pages of more than 100 universities have been established so far.

vi) CALIBER – A National Convention

INFLIBNET organises a national connection, CALIBER (Convention for Automation of Libraries of Education and Research Institutes) each year among the university library personnel, computer professionals and others interested in library automation and networking. The convention is being held each year in different parts of the country in collaboration with the universities, institutions. Its proceedings are published.

vii) Information Services

INFLIBNET provides the following information services to facilitate free flow of information to the end users :

- Access to union databases on Internet through its web site;
- Bibliographical information services based on the databases in CD-ROM in the areas of social sciences and humanities;
- COPSAT (the Contents of Periodicals in Science and Technology) Service in collaboration with NCSI, Bangalore, COPSABS (the Contents of Periodicals in Social and Behavioral Sciences) Services is a monthly content service covering the core journals is social sciences.
- First Search Service from OCLC to the faculty members of the universities.

Most of the services mentioned above are rendered either free of cost or at a very nominal cost to the research workers at the universities.

viii) Document Delivery Service

INFLIBNET centre has set up Document Delivery Centres at some specified libraries at the university level to provide

the full text of serial articles available in their collection by the financial assistance from UGC.

ix) Retrospective Conversion

INFLIBNET has undertaken major projects of retrospective conversion of library catalogues in some major university libraries of the country to convert their catalogues into machine readable forms by the financial assistance from UGC.

x) UGC NET

INFLIBNET envisages a Wide Area Network, UGC NET to link more than 150 universities and other institutions in India to facilitate inter university communication easy access to internet and INFLIBENT Databases by research workers at the university level.

The magnitude of work involved in implementing INFLIBNET covering such a vast geographical area and large number of libraries is great. The cooperation of participating libraries is required to make it fully operational. It hopes to play a greater role in modernisation of libraries and information services by using computer and communication technologies and to provide the fruits of information technology to the academic and research community of India.

Conclusion

Participation in networking has become essential for the libraries and information centres all over the world in order to cater to the specific needs of the users. The library networks in the USA and UK have taken the lead and become the models for other countries to follow. In order to promote essential functions like resource sharing, creation of tools like union catalogues, rationalisation of acquisitions and maintenance of international standards for creation of records uniformly, the libraries have to enroll themselves in networks depending upon their needs.

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Chapter–16

NATIONAL AND INTERNATIONAL INFORMATION SYSTEMS AND PROGRAMMES

The establishment of several national organizations have contributed towards coordination, promotion and development of library and information services. These organizations include governmental bodies as well as voluntary professional organizations and belong to various categories that include advisory, service-oriented, commercial, grant-giving or catalytic. This also includes some non-governmental organizations, organizations with international scope, national organizations with international scope and organs of national/international professional societies.

With the advancement of modern technologies especially computer and telecommunication technologies, the role of these organizations has become very useful as presently resource sharing, cooperation, consortia, networking, etc. play a very important role for bringing information closer to users and solve problems of information handling and services.

In this lesson, we bring you an account of some well-established national information organizations that includes prominent national documentation/information centers, information systems, professional organizations with international standing, some national systems with wider orientation and some special organizations offering information services in various specific subject areas.

Major national information systems and programmes launched by our Government in the field of Science & Technology, Social Sciences and Humanities are being discussed below.

Information Systems and Programmes in Science and Technology

Major information systems in science and technology discussed here include:

- National Information System for Science and Technology (NISSAT)
- Technology Information Facilitation Programme (TIFP)
- Biotechnology Information System (BTIS)
- Environmental Information System (ENVIS)
- INFLIBNET: Information and Library Network
- National Informatics Centre (NIC)
- National Institute of Science Communication and Information Resources (NISCAIR)
- INDEST Consortium
- Defense Scientific and Information Documentation Centre (DESIDOC)
- Indian MEDLARS Centre (IMC)

Brief overview of each of the systems/programmes listed above is given below.

National Information System for Science and Technology (NISSAT)

Launched by DSIR, in 1977, with the objective of coordinating and linking a large no. of S & T organisations, systems and facilities under an overall coordinating agency.

NISSAT was instrumental in:

- Development of national information services
- Introduction of modern information techniques
- Setting up of national level 13 Information Centres in various scientific fields
- National Access to International Databases
- Setting up of value added Patent Information Systems
- ICT based activities
- Manpower development in information science and technology
- IT applications –CDS/ISIS and IDMS package
- Promotion of use of standards
- R & D in Science and Technology

NISSAT programme ceased since March 2002 as most of the National Information Centres located in various Scientific institutions and supported by NISSAT are functioning efficiently by support from their parent organisation. DSIR has since launched a

new programme "Technology Information Facilitation Programme" keeping in view the importance of digital information resources.

Technology Information Facilitation Programme (TIFP)

Technology Information Facilitation Programme (TIFP) is one of the components of Technology Promotion, Development and Utilization (TPDU) Programme of the Department of Scientific and Industrial Research (DSIR). The broad objective of the programme is to generate endogenous capacities for the development and utilization of digital information resources and provide inputs to S&T research and industrial development.

TIFP is, therefore, being implemented as a co-operative and collaborative venture and built around the existing infrastructure, wherever possible. The strategy would be to:

- Concentrate on creation of Indian S&T content
- Avoid duplication of efforts
- Ensure minimum overlapping
- Promote maximum utilization of existing facilities
- Utilize the internet technology

Biotechnology Information System (BTIS)

Under the aegis of Department of Biotechnology (DBT), Ministry of S & T, GOI, established a BTIS in 1987 to act as a National Bioinformatics Network for

- Disseminating information resources to research scientists
- Development of bioinformatics tools for biotechnology and molecular biology applications
- Undertaking advanced research in frontier areas of Biotechnology
- Developing human resources
- Creating a suitable platform for technology development
- Promoting international cooperation with major related organisations of the world.

Environmental Information System (ENVIS)

Setup in 1982 by GOI under the Ministry of Environment and Forests (formerly Department of Environment), ENVIS is a decentralized system with a network 78 special centres (related to subject of Environment) that collects, stores, retrieves and

disseminates information to help decision making in environmental management and planning.

ENVIS due to its comprehensive network has been designed as the National Focal Point (NFP) for INFOTERRA, a global environmental information network of the United Nations Environment Programme (UNEP). In order to strengthen the information activities of the NFP, ENVIS was designated as the Regional Service Centre (RSC) of INFOTERRA of UNEP in 1985 for the South Asia Sub-Region countries.

INFLIBNET: Information and Library Network

INFLIBNET: Information and Library Network Centre is an autonomous Inter-University Centre (IUC) of University Grants Commission (UGC) involved in creating infrastructure for sharing information among academic and Research and Development Institutions. Its activities involve:

- Creation of Union Catalogues
- SOUL- a user friendly, window-based software for university libraries
- Information services – document delivery, bibliographic information, database of CD-ROMs
- Creation of databases – experts and projects
- Journals E-consortia
- Sponsoring and conducting of seminars and workshops

National Informatics Centre (NIC)

National Informatics Centre (NIC) of the Department of Information Technology is providing network backbone and e-Governance support to Central Government, State Governments, UT Administrations, Districts and other Government bodies. It offers a wide range of ICT services including Nationwide Communication Network for decentralised planning, improvement in Government services and wider transparency of national and local Governments.

NIC assists in implementing Information Technology Projects, in close collaboration with Central and State Governments, in the areas of (a) Centrally sponsored schemes and Central sector schemes, (b) State sector and State sponsored projects, and (c) District Administration sponsored projects. NIC endeavours to

ensure that the latest technology in all areas of IT is available to its users.

National Informatics Center is the nodal Information Technology organization for informatics development and networking in Government and Government related Organizations . NICNET facility has been established in all Central Government departments, 35 States/UTs and about 600 District centers to facilitate informatics development for decision support and information exchange. A high speed NICNET National info-Highway, an incremental overlay over the existing network has also been setup with modern highs speed networks to take advantage of Internet technology in India.

NISCAIR (erstwhile INSDOC)

National Institute of Science Communication and Information Resources (NISCAIR) came into existence in September 2002 following the merger of INSDOC and NISCOM, has the chief objective of dissemination of scientific and technological information through various information products and services. To meet these objectives, the following services/activities are organized by the Institute:

- Publication of 17 primary and 2 secondary scientific/research journals
- Publication of CSIR News and CSIR Samachar
- Raw Materials Herbarium and Museum
- Popular Science Magazines
- Popular Science Books
- Information Services
- Developing and Maintaining specialized databases
- Electronic Publishing
- Human Resource Development
- Information Resources
- Sales and Marketing
- Consultancy Services

Besides various publications and information services, three major national level projects for the S & T community handled by NISCAIR are:

- Traditional Knowledge Digital Library (TKDL)

- National Science Digital Library (NSDL)
- CSIR e-Journal Consortium

National Science Library

Set up in 1964, National Science Library (NSL) of NISCAIR aims to acquire all important S&T publications published in the country and strengthening its resource base for foreign periodicals by acquiring the journals on CD-ROM or other electronic form as far as possible. NSL has a rich collection of over 1,90,000 books including reference books, reports and standards. The library has one of the finest collections in the field of information science and technology, reference material/secondary sources, conference/seminar/symposia proceedings in S&T, foreign language dictionaries and medicinal & aromatic plants. It also subscribes to almost all worthwhile Indian S&T periodical publications and receives over 5,100 Indian and foreign periodicals. Of these nearly 3500 periodicals are in electronic form including 1,133 full text journals.

Membership of NSL is open to any Indian institution and it offers various services that include Reader's Services, Technical Query Service, Copying Service and Inter Library Loan Service.

Indest Consortium

Setup by the Ministry of Human Resource Development (MHRD), Indian National Digital Library in Engineering Sciences and Technology (INDEST) Consortium, provides access to full-text e-journals. The Ministry provides funds required for subscription to electronic resources for 38 institutions including IISc, IITs, NITs, IIMs and a few other centrally-funded Government institutions through the consortium headquarters set-up at the IIT Delhi. Besides, the Government or Government –aided engineering colleges and technical departments in universities have joined the Consortium with financial support from the AICTE.

The benefit of consortia-based subscription to electronic resources is not confined to 38 major technological institutions in the country but is also extended to all AICTE-accredited and UGC-affiliated institutions. Currently over 400 engineering colleges and institutions have joined with consortium. INDEST Consortium

provides access to nearly 5000 full text e-journals from over 1000 publishers.

Defence Scientific and Information Documentation Centre (DESIDOC)

DESIDOC, functioning under the Defence Science Laboratory (DSL), DRDO provides S & T information to the DRDO Headquarters and its various other labs located all over India.

The centre offers library services, information services, technical services, database development, training, multimedia laboratory facilities and publications to the scientists of DRDO.

Indian Medlars Centre (IMC)

A Centre jointly setup by NIC and ICMR to cater to the information needs of medical community of India, IndMED is a Bibliographic database of over 200 prominent Indian biomedical journals. This Database is designed to provide medical professionals/researchers/students and the medical library professionals quick and easy access to Indian literature.

Other facilities available with the centre include a Union catalogue, CD-ROM Databases, full-text search (some journals), training facilities to biomedical professionals and search facilities.

Information Systems and Programmes In Social Sciences

Major initiatives in social sciences have been by the Indian Council of Social Science Research (ICSSR) and its related bodies. These include:

- Indian Council of Social Science Research (ICSSR)
- UGC-Inter University Centre for International Studies
- UGC-Inter University Centre for Humanities and Social Sciences
- Indo-American Centre of International Studies (IACIS)

Indian Council of Social Science Research (ICSSR)

ICSSR was established in 1969 by MHRD, as an autonomous body to promote social science research in our country. The Council has 27 Research Centres and 6 Regional Centres all over the country. The Council offers grants to institutions and individuals, offers fellowships, arranges training in research and provides guidance in research, and supports library and documentation

centres for providing information services in social sciences. There are a large number of books and journals published by the Council.

Some of the programmes/activities/centres of ICSSR are:

- National Social Science Documentation Centre (NASSDOC)
- INDO-DUTCH Programme on Alternatives in Development (IDPAD)
- Documentation Centre for ASIAN Studies (DOCAS)

National Social Science Documentation Centre (NASSDOC)

National Social Science Documentation Centre (NASSDOC), was established in 1969 as a Division of ICSSR with the objective to provide library and information support services to researchers in social sciences; those working in academic institutions, autonomous research organisations, policy making, planning and research units of government departments, business and industry etc. NASSDOC provides guidance to libraries of ICSSR Regional Centres and ICSSR maintained Research Institutes

NASSDOC Services

NASSDOC has a vast collection of unpublished doctoral dissertations, reports of research projects, acquires a wide range of Indian and foreign social science journals including back volumes of all the journals and prepares printed and digital databases. Based on the rich resources and available collection, NASSDOC offers the following library and information services to researchers in social sciences:

- Library and reference services
- Literature search service from available databases both printed and digital including online databases
- Bibliography compilation on request
- Document delivery service by procuring books and journals on inter-library or by photocopying the documents
- Acquisition of published bibliographies, directories and reference sources in social sciences and distribution to institutions and libraries

NASSDOC Databases/Publications

One of the major activities of NASSDOC is creation of databases and locating tools. The products of NASSDOC include library databases, directories, Indian Social Science Periodicals Literature (INSSPEL), Union Catalogues, Bibliographies and journals. Some of the Databases/Publications are:

- Database of Research Project Reports
- Database of Ph.D. Dissertations
- Directory of Social Science Libraries and Information Centres in India
- Directory of Social Science Research and Training Institutes in India
- Union Catalogue of Social Science Periodicals and Serials in India
- Union Catalogue of CD-ROM Databases in SS libraries in India
- Bibliography on India in 2000 A.D.

INDO-DUTCH Programme on Alternatives in Development (IDPAD)

IDPAD is a collaborative programme of ICSSR and the Netherlands Foundation for the Advancement of Tropical Research, The Hague, since 1981. It was launched in response to the intense debate on developmental and North-South issues in the 1970s with the goal of charting a new course in policy oriented academic research. Some of the most eminent social scientists and policy-makers of India and the Netherlands were founders of this programmes.

IDPAD was launched as a phased programme, with 5 phases and the last phase that commenced in 2002 having come to end recently this year with a focus on:

- Research Projects
- Seminars and Workshops
- Exchange of Scholars
- Publications and Dissemination
- Access to Information

Exchange of scholars has also been an important component of this programme.

UGC-Inter University Centre for International Studies

The UGC has established this Inter-University Centres (IUCs) at Osmania University Campus, Hyderabad by taking over the facilities available at the Indo-American Cenre for International Studies. The Centre is for centrally providing state-of-the-art equipment & facilities for the benefit of researchers working in different universities.

The IUC is instrumental in providing dynamic and vibrant platform for academicians from India, SAARC region, Central Asian and other countries. The main objective of the IUC is to address contemporary development issues with multi disciplinary approach in various areas of social sciences and humanities especially with regard to education, commerce, economics, world trade, conflict management, diplomacy, human rights, art, literature and allied areas.

UGC- Inter University Centre for Humanities and Social Sciences

This is one of the four National Facility Centres of UGC, located at Indian Institute of Advanced Studies, Shimla. The main objectives of the Centre are to invite teachers form universities and colleges to the institute as associate of the IUC, organise "Research Seminars" for researchers and young teachers in University and Colleges and to organize "Study weeks" for discussing important problems of National and international interest.

Indo-American Centre of International Studies (IACIS)

One of the largest research centres on American Studies in Asia or Africa, the IACIS is situated in Hyderabad. The chief feature of the centre is its unique library collection of books, periodicals, A/V materials, micro documents and other materials on American literature, history, politics, economics, geography, religion, philosophy, law, international relations, foreign policy, etc.

UGC has taken over the physical and academic infrastructure of this centre and has established UGC-IUC Centre for International Studies in the field of humanities and social sciences.

Information Systems and Programmes in Humanities

In India several organizations have come up to promote and support research activities in the field of humanities. Libraries and

information centres attached to these organizations help researchers and users in their work. Some of these centres are:

- Indira Gandhi National Centre for Arts (IGNCA), New Delhi
- Indian Council for Cultural Relations (ICCR), New Delhi
- Indian Council for Historical Research (ICHR), New Delhi
- National Museum, New Delhi
- National Archives of India, New Delhi
- National Mission for Manuscripts, New Delhi

Brief details of the above mentioned organizations are given in the subsequent sections.

Indira Gandhi National Centre for Arts (IGNCA), New Delhi

The Indira Gandhi National Centre for the Arts, established in 1985 in memory of Smt. Indira Gandhi, is visualised as a centre encompassing the study and experience of all the arts. The chief aims of the Centre are:

- to serve as a major resource centre for the arts, especially written, oral and visual source materials;
- to undertake research and publication programmes of reference works, glossaries, dictionaries and encyclopaedia concerning the arts and the humanities;
- to establish a tribal and folk arts division with a core collection for conducting systematic scientific studies and for live presentations.
- One of the programmes of this centre, in collaboration with UNDP, is to utilize multimedia computer technology to create a wide variety of software packages that communicate cultural information. Multimedia technology allows the user to interact and explore the subject in a non-linear mode by combining audio, text, graphics, animation and video on a computer.

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The Centre comprises of 5 divisions:

- Kala Nidhi – collects primary and secondary materials on Humanities
- Kala Kosa – concerned with research and publication activities of IGNCA

- Janpada Sampada – complements Kala Kosa with regard to eco-cultural, socio-economic context, life-style studies, multimedia presentation and events, etc.
- Kala Dashan – deals with exhibitions, lectures, conferences in areas of art and culture
- Sutra Dhara - Administrative Division and International Dialogue Unit.

Indian Council for Cultural Relations (ICCR), New Delhi

Founded in 1950, the Council was established by Shri Maulana Abul Kalam Azad for strengthening the ties of cultural cooperation and exchange between India and other countries. The chief objectives of the Council include participation in the formation of policies and programmes related to India's cultural relations and to promote cultural exchange with other countries and people.

The chief activities of the Council are exchange of visits of scholars, academicians, artist, performing artists; collaboration with foreign cultural centres in India; and providing scholarships to foreign students in India for study and research.

The publishing activity of the Council is very high with publications in English, Hindi, in some foreign languages covering various subjects that include culture, arts, history, philosophy and literature.

The personal collection of books and manuscripts bequeathed by Shri Maulana Abul Kalam Azad, the Founder President of the Council, forms the core of the ICCR Library. A catalogue of the manuscripts and personal books of Shri Maulana Azad has been printed in book form in three languages- Arabic, Urdu and Persian. The Library is largely used by scholars who are researching on Indian Art, Culture, History, Literature and International Relations. Over the decades the library has grown and presently has more than 55000 volumes.

ICCR offers six Library Fellowships annually to facilitate research in various languages or cultural fields by Indian scholars under 35 years of age.

Indian Council for Historical Research (ICHR), New Delhi

Established in 1972, by the Government of India as an autonomous body, the ICHR aims to promote and support historical

research in the country. Besides achieving the chief goal of an inter-disciplinary approach in historical perspectives, the Council also funds seminars/conference/workshops related to history.

The publications brought out by the Council are in areas that include Indian history and allied areas, Reference books and History of Asia and neighboring countries.

To assist the scholars in various regions of the country, the Council has two Regional Centres:

- ICHR North-Eastern Regional Centre, Guwahati
- ICHR Southern Regional Centre, Bangalore

The library cum documenation centre of the council caters to information needs of the research scholars. The two journals published by ICHR are: The Indian Historical Review (English) and Itihas (Hindi)

National Museum, New Delhi

The National Museum of India under the Ministry of Culture, located in New Delhi has presently in its possession over 2,00,000 works of exquisite art, both of Indian and Foreign origin covering more than 5,000 years of our cultural heritage. Its rich holdings of various creative traditions and disciplines which represents a unity amidst diversity, an unmatched blend of the past with the present and strong perspective for the future, brings history to life.

Apart from the collections of Pre-historic Archaeology, Archaeology, Jewellery, Paintings, Decorative arts, Manuscripts, Central Asian Antiquities, Arms and Armour, etc., the Museum has separate branches of publication, Hindi, Public Relations, Education, Library, Exhibition cell, Display, Modelling, Photography, Security and Administration.

A well equipped conservation laboratory not only provides restoration to all the organic and inorganic art objects but also training facilities to students and deserving professionals, including restoration of oil-paintings in India.

The National Museum Institute of History of Art, Conservation and Museology came into existence in 1983 and now is Deemed to be a University provides various Courses with its campus at National Museum (New Delhi).

Since its inception, it has been bringing out various publications for the people from all walks of life. There are books for children, for common visitors and for the scholars interested in the study of art, architecture, painting, sculptures, history, religion, culture etc. controlled by a Keeper.

Exhibition Cell of the National Museum organises International and National Exhibitions in India and Abroad.

The National Museum has a wide Reference Library which is equipped with variety of books, Periodicals, Journals etc.

National Archives of India, New Delhi

The National Archives of India is the repository of the non-current records of the Government of India and is holding them in trust for the use of administrators and scholars. It is an Attached Office of the Department of Culture under Ministry of Tourism & Culture. The chief vision of the NAI is to maintain the cultural heritage of the country. It was set up in March 1891 in Calcutta (Kolkata) as the Imperial Record Department and subsequent to the transfer of the National Capital from Calcutta to New Delhi in 1911 it was shifted to its present building in 1926.

The various categories of records held by the National Archives are – Public Records, Oriental Records, Manuscripts and Private papers. NAI preserves and documents the collection for use by the scholars, provides training in various aspects of Archival Science at professional level and provides assistance to state archives, museums, libraries and voluntary organisations for preservation and maintaining or rare manuscripts books in their custody.

The National Archives ensures longevity of documents in its custody through various conservation and photo-duplication processes. The Department has invented a unique process of repairing and rejuvenating documents.

Apart from the vast bulk of Public Records and Private Papers, the National Archives has a rich and ever growing collection in its Library. This has some of the oldest and rare publications on a variety of subjects, besides contemporary published material.

A computerization and digitalization programme for an "Automated Retrieval System" with the help of tailor made software known as "Archival Information Management System (AIMS)", has been

launched for computerization of records. The collection already digitized is available on line for use in Research Room by Research Scholars/Archivists/users of archives.

Department of Culture - Networking of Five Major Libraries

The Department of Culture has initiated action for networking of five major Libraries of India, these are:

- Central Secretariat Library (CSL), New Delhi
- National Museum Library (NML), New Delhi
- National Gallery of Modern Art (NGMA) Library, New Delhi
- National Archives of India (NAI) Library
- Archaeological Survey of India (ASI) Library, New Delhi.

This Network has the following objectives:

(i) Availability of Library Catalogue Details on Computers.
(ii) Intra Library accessibility of records.
(iii) Internet/Intranet access for libraries, and
(iv) Remote log-in to internal database/network.

National Mission for Manuscripts, New Delhi

The National Mission for Manuscripts was launched in February 2003 by the Ministry of Culture, Government of India, to save this most valuable but less visible of our cultural inheritances.

IGNCA is the National Nodal Agency for the implementation of the Mission, and will house the National Manuscripts Library. The National Manuscripts Library is envisaged as the central repository for microfilms and digital copies of all Indian manuscripts. The Library is expected to provide manuscript services to the scholars for accessing any information and obtaining microfilm/digital copies. The Mission would collaborate with other national institutions and the several partner institutions in the country.

The Mission's objectives with regard to the manuscripts located all over the country are:

- Survey and Locate
- Catalogue and Compile
- Conserve and Preserve
- Promote Access
- Promote Scholarship

- Public Outreach

The Mission's main aim is to create an electronic database of manuscripts. The database contains information of various kinds on India's manuscripts-titles, themes, authors, commentaries, scripts, languages, conservation status and much more. The database all contains information on existing catalogues. The Mission endeavors to provide complete and valid information about each manuscript.

International Information Systems and Programmes

A large number of international organizations are engaged in the development of library and information services, these also include global information systems devoted to collection, processing and dissemination of information in various countries. This new development has been harnessed further by the very concept of decentralized input of information from the member countries of a participating system, where centralized processing of information is possible through computers, while decentralized dissemination of information is again possible at the users' end.

Intrenational Information Organisations

Some of the international information systems and programmes include INIS, AGRIS, INFOTERRA, UNESCO's Science and Technology Policy Programme, APIN, MEDLARS, CAS, INSPEC and BIOSIS.

In all these systems, the input to the system is made available by the Member Country from where information originates, leading to reliability, timeliness and comprehensibility. The input thus collected nationally is entered in prescribed standardized format, usually a machine readable format to ensure compatibility.

The inputs from all member countries thus are passed onto the centralized agency which processes the information and eventually distributes usable output in machine readable form or in printed form back to the member states for use by end users. This approach commenced with INIS and has found to be working well with majority of global information systems.

Let us know some details of each one of these systems.

Inis-International Nuclear Information System

INIS, sponsored by the International Atomic Energy Agency, Vienna started functioning in 1970. It is a cooperative, decentralized computerized abstracting and indexing system providing worldwide coverage of the literature on the peaceful uses of nuclear energy. It processes and merges input provided by its members and redistributes the information in machine readable form as well as in print form. INIS is the right place for those who need information on the peaceful applications of nuclear science and technology.

INIS processes most of the world's scientific and technical literature that falls within its subject scope. INIS maintains a bibliographic database which presently covers over 2.5 million abstracted and indexed records and a comprehensive collection of over 600,000 of full texts of INIS scope publications which are not easily available through the commercial channels, thus making it the world's most comprehensive and leading information source on the peaceful applications of nuclear science and technology.

INIS Products and Services

- INIS Database
- INIS Non-conventional literature (NCL)
- INIS Reference Services
- INIS Web Services
- Alert services
- Document Delivery service

INIS in India

India has been actively participating in INIS from the very beginning. The Library and Information Services Division of the Bhabha Atomic Research Centre, Trombay, is the National Centre responsible for INIS activities in India. The Centre has been quite successful in collecting information on the subject, sending the same to the centralized processing unit and the receiving and passing on the output the users in the country.

Contact details in India:

INIS Liaison Officer, Head, Scientific Information Resource Division, Bhabha Atomic Research Centre ((BARC), Trombay, Bombay 400085.

AGRIS - The International Information System for the Agricultural Sciences and Technology

AGRIS was started in 1974 by the *Food and Agriculture Organization (FAO)* of the United Nations. AGRIS became fully operational in 1975 with the first issue of *AGRINDEX* and was modeled on the INIS pattern to facilitate information exchange and to bring together the world literature dealing with all aspects of agriculture. Presently, FAO's another programme, Current Agricultural Research Information System (CARIS) and AGRIS are operating collectively.

AGRIS is a cooperative system in which participating Member Countries input references to the literature produced within their country irrespective of the language and, in return, draw on the information provided by the other participants. Presently about 250 national, international and intergovernmental centres are participating in the AGRIS/CARIS programme.

AGRIS Information activities

- WebAGRIS - Covers the current and ongoing agricultural information projects in AGRIS and CARIS and is considered as networking for AGRIS
- AGRIS AP - AGRIS Application Profile (AP) provides the Guidelines for Description of Information Objects for the AGRIS
- Electronic Discussion Forum - This is the discussion group workspace for the exchange of ideas on using the AGRIS AP, WebAGRIS
- AGROVOC - AGROVOC is the multilingual international agricultural thesaurus

AGRIS Information Products

- *AGRIS and CARIS on CD* – this includes the bibliographic References,
- CARIS Project Data, the AGROVOC thesaurus and the FAO Catalogue.
- *AGRIS Manuals* – several manual of AGRIS are available for immediate downloading for use by the resource centres.
- *AGRIS and CARIS - FTP site* - makes available AGRIS and CARIS data

- *FAO Documentation* – Food and Agricultural Organisation documents starting from 1980 to 2000 are available with complete text from the document repository of AGRIS.

AGRIS in INDIA

India has been actively participating in AGRIS from the very beginning. The participating AGRIS/CARIS institution from India is the Agricultural Research Information Centre, Indian Council of Agricultural Research, New Delhi. On an average, 3500 bibliographic entries are submitted to AGRIS database as Indian input every year.

The Agricultural Research Information Centre, every month, receives from FAO updated machine-readable AGRIS outputs. Retrieval is then provided to agricultural scientists requiring information in the country. A computerized SDC services is also made available to agricultural researchers of India.

Contact details in India:

AGRIS Liaison Officer, National AGRIS Centre, Agricultural Research Information Centre, Indian Council of Agricultural Research, Krishi Anusandhan Bhavan, Pusa Road, New Delhi 110 012.

INFOTERRA

INFOTERRA is an information network of the United Nations Environment Programme (UNEP) established for facilitating global environmental information exchange. The prgrammes is functionally successful because of an efficient system that operates through national foca l points designated by various governments that are members of the United Nations.

The INFOTERRA national focal point in each member state is mostly a national information centre dealing with environmental science and usually is located in the ministry or a government agency responsible for activities concerned with environmental protection. The primary function of each centre is to provide a national environmental information service.

The users seeking information on the areas related to environment can contact the INFOTERRA network through the following:

- UNEP World Wide Web (WWW) site (http://www.unep.org)

- INFOTERRA list server; and
- INFOTERRA Secretariat

UNEP-INFOTERRA Products and Services

- *INFOTERRA Technical services – includes* Query response service, Availability of environmental literature, Bibliographies on Environmental topics, Directories of Environmental Information Sources, Access to INFOTERRA Internet Services and UNEP-INFOTERRA Publications
- *Training Manuals, Environmental Source Books and promotional material*
- *ENVOC Multilingual Thesaurus of Environmental Terms*
- *INFOTERRA-ISIS (International System of Information Sources)*
- *Sources of Information on Environment and Development available on CD-ROM and the Internet*
- *National Focal Point Fact Sheet Database*
- *Query-Response Service*
- *List servers - INFOTERRA in the Electronic Universe*
- *UNEP-INFOTERRA International Directory*

INFOTERRA in India

India, being a member of the United Nations has been actively participating in the INFOTERRA Programme. ENVIS, the Environmental Information System, due to its comprehensive network has been designed as the National Focal Point (NFP) for INFOTERRA from India. In order to strengthen the information activities of the NFP, ENVIS was designated as the Regional Service Centre (RSC) of INFOTERRA of UNEP in 1985 for the South Asia Sub-Region countries.

The ENVIS has built up a reasonably good information base in the form of publications, reports, reprints, bibliographies, abstracts, data bases etc., as well as numerical data i.e. statistics relating to environment. The services of ENVIS include answering queries, referral services, abstracting services and documentation and information dissemination of environmental related information.

The contact point for India is UNEP INFOTERRA National Focal Point Manager, Senior Adviser and Director (ENVIS), Ministry of

Environment and Forests, Paryavaran Bhavan, CGO Complex, Lodi Road, New Delhi 110003, India. WWW: http://envfor.nic.in/envis

Unesco's Science and Technology Policy Programme

The Division of S & T Policies of UNESCO had established SPINES Pilot programme which was superseded by the Science and Technology Policies Information Exchange Programme (PIPS) in 1984. It was established to facilitate exchange, at the national and international levels, the documents and factual data that have a direct bearing on the formulation and monitoring of national science and technology policies. The PIPS programme contributed to development of compatible information services dealing with science and technology in UNESCO Member Countries.

This programme is now referred to as UNESCO Science and Technology Policy Programme and is part of UNESCO's Thematic Area- Natural Sciences and under this is Science Policy.

As part of Science Policy resolution, assistance is given to countries in formulating policies, strategies, plan and legislations for the development of their scientific and technological capabilities.

Role of UNESCO

UNESCO plays a major role as a promoter of international co-operation by carrying out Science and Technology Policy activities in member states leading to reforms and innovations in scientific pursuits. For this, UNESCO carries out programmes at regional and international levels, develops analytical work in co-operation with other international organisations, supports regional S&T Policy networks and also serves as a clearing-house.

UNESCO's role thus covers the following domains:

- Governance of S&T and its Implications in UNESCO Member States
- Evolving Policy Guidance
- Encouraging Capacity Building in its Member States
- Prospective thinking and developing scientific temper amongst individuals

APIN- Asia Pacific Information Network

In 1983, UNESCO had launched the ASTINFO (Regional Network for Exchange of Information and Experience in Science and Technology in Asia and Pacific), a co-operative programme of UNESCO/PGI which aimed to promote the exchange of information and experience in science and technology among countries in the Asia/Pacific region.

ASTINFO assisted Member States in acquiring/ developing the necessary policies, methodologies, guidance, and expert advice to generate, store, process, retrieve, exchange, use and share information in Science and Technology. UNESCO launched another network, called Asia-pacific Information Network in Social Science (APINESS) in 1986 with the collaboration of Association of Asian Social Research Councils.

Since the year 2000, UNESCO had revised its various activities and programmes and as a result the ASTINFO and APINESS programmes have been included in the APIN (Asia Pacific Information Network) of UNESCO.

APIN is a network formed by a merger of the Regional Network for the Exchange of Information and Experiences (ASTINFO), the Regional Informatics Network for Southeast Asia and the Pacific (RINSEAP) and the Regional Informatics Network for South and Central Asia (RINSCA).

APIN programme of UNESCO is linked with UNESCO's Information for All Programme (IFAP) and promotes ICT literacy and application, information and knowledge networking, sharing of information resources, and use of international standards and best practices in communication, information and informatics .

MEDLARS- MEDICAL LITERATURE ANALYSIS

MEDLARS was established in 1964 as a computerized storage and retrieval system at the US's National Library of Medicine (NLM) to provide for bibliographic access to the NLM's large biomedical literature collection. It became operational with the first computer-produced issue of *Index Medicus w*hich is a monthly subject/author index guide to articles in 4000 journals related to field of medicine for the last over 125 years.

MEDLARS and its other databases provide information on monographs (books), audiovisual materials, and on various specialized subjects as toxicology, environmental health, and molecular biology. All the information is available through MEDLINE and PubMed.

MEDLINE is the National Library of Medicine's premier bibliographic database covering the fields of medicine, nursing, dentistry, veterinary medicine, the health care system, and the preclinical sciences. Access to MEDLINE is though PubMed and the NLM Gateway.

PubMed, a service of the National Library of Medicine, includes over 15 million citations for biomedical articles back to the 1950's. These citations are from MEDLINE and additional life science journals. PubMed includes links to many sites providing full text articles and other related resources.

NLM also has a large number of other databases and other electronic resources which can accessed online. These include TOXLINE, NLM Catalog, MedilinePlus, ClinicalTrials.gov, DIRLINE, Genetics Home Reference, etc.

Indian MEDLARS Centre

A Centre jointly setup by NIC and ICMR to cater to the information needs of medical community of India. Indian contribution in the areas of biomedical research and health care has been significant and conforming to international standards. However, only a small fraction of it is available for reference through international bibliographic databases.

The ICMR-NIC Centre for Biomedical Information (Indian MEDLARS Centre or IMC) has designed and developed a bibliographic database of peer reviewed Indian biomedical literature. This database covers prominent Indian journals. These have been selected from more than 200 journals. More journals are being added to the list every year. The Centre is covering the journals from 1985 onwards in this database.

CAS – Chemical Abstracts Service

Established in 1907, the Chemical Abstracts Service (CAS) is a non-profit organization of the American Chemical Society (ACS), located in Columbus, Ohio. CAS is committed to dissemination of

Chemistry related information derived from the scientific and technical literature and patents world wide. CAS monitors publications in 50 languages from about 150 countries of the world and employs advanced computer based systems for processing, storing, searching and disseminating relevant scientific, technical and industry information. A key feature of CAS is the computerized Chemical Registry that identifies Chemical substances by structure and assigns each one a unique number. This is used in CAS products to link the structure with related names, bibliographic references and other information on the substances.

Presently, CAS being the world's leader in providing scientists online and web access to chemistry-related research data, is also the largest and most comprehensive producer of databases of chemical information.

Every year, CAS indexes and abstracts articles and patents from approximately 9,000 scientific journals, conference proceedings, and other documents relevant to chemistry, life sciences and many other related subject areas. Thus, every year, on an average, CAS scientists provide abstracts and indexing for over 800,000 journal articles, patents, and other research materials and also assign CAS Registry Numbers and substance records for more than 15 million substances.

CAS provides a number of print and computer-based information products and services, including Chemical Abstracts, its principal publication, computer readable bibliographic and registry databases, and the CAS Online Service.

Chemical Abstracts (CA) is a weekly abstracting journal covering abstracts from both journal articles and patents. It is available in print, microform, and CD-ROM and CA has been alerting its subscribers about the most recent published breakthroughs in science since the beginning of the 20th century.

STN International is designed to meet the information needs of knowledge managers, information professionals and research scientists. STN connects scientists, engineers and others requiring technical information to the world's most complete and authoritative 200 databases covering chemistry, life sciences, engineering, patents, business, etc.

STN on the Web is a full-featured service designed for searchers who are familiar with using a command language to search online databases. CAS offers a variety of ways to help users for searching information from STN which ranges from hands-on training to self learning training materials and documentation.

STN Easy is Web access to 100 of the most essential STN databases with the users having no need to learn command language. Here easy and advanced Patent Lookup and CAS Registry Number searches are available.

SciFinder- A Desktop tool that allows users to explore research topics, browse scientific journals and stay current with the scientific literature.

SciFinder Scholar is one of the leading services of CAS in providing the most accurate and comprehensive chemical and related scientific information.

CAS Registry - CAS is the largest substance identification system in existence and when a chemical substance, newly encountered in the literature, is processed by CAS, its molecular structure diagram, systematic chemical name, molecular formula, and other identifying information are added to the Registry and it is assigned a unique CAS Registry Number. Registry now contains records for more than 25 million organic and inorganic substances and more than 56 million sequences.

CAS Product Finder- The service, offered online on the CAS website, allows a user to select the option that most closely describes a situation and find out which CAS/STN electronic product is best for the particular user category.

INSPEC

INSPEC, started in 1967, by the Institution of Electrical Engineers (IEE), United Kingdom is presently one of the leading bibliographic information services available in English-language. It provides access to the world's scientific and technical literature in physics, electrical engineering, electronics, communications, control engineering, computers and computing, and information technology.

INSPEC is based on the *Science Abstracts* service which has been available from the IEE since 1898. The major effort in this respect

is preparation of the INSPEC database, since 1969, which provides all the services from INSPEC. The back files of *Science Abstracts* are also available from 1898 to 1968 to which electronic access is facilitated from the INSPEC Archive.

INSPEC assists engineers, scientists and others in their research, to locate relevant journal articles, conference papers and other documents. In addition, the database may be used for:

- Current Awareness
- New Product Information
- Technological Forecasting
- Competitive Intelligence
- Patent-Related Searching

INSPEC Database contains over 3850 scientific and technical journals and some 2200 conference proceedings, as well as numerous books, reports and dissertations, which are scanned each year by Inspec staff for relevant articles to abstract and index for inclusion in the Database.

INSPEC information is available in a wide range of products:

- Electronic format – INSPEC online, INSPEC Archives, INSPEC Ondisc, INSPEC Web
- Current awareness services including online products
- 3 Abstract journals- Physics Abstracts (PA), Electrical & Electronics Abstracts (EEA) and Computer & Control Abstracts (CCA)
- User aids – INSPEC Thesaurus, INSPEC Classification
- Related products and services – Institution's Search Service, Document delivery service, Electronic Materials Information Service

BIOSIS

BIOSIS, managed by Thompson, is a not-for-profit making organization serving the life science community by providing researchers, students, and librarians with references to research published and found in journal articles, conference proceedings, meetings, patents, book chapters and other sources of information.

BIOSIS databases are the most complete resource for finding life sciences information quickly and efficiently. Documents are selected from thousands of sources worldwide, indexed and abstracted into

citations which describe their content, and maintain databases for searching citations — adding more than 600,000 new entries each year.

BIOSIS Products are:

- BIOSIS Previews
- Zoological Records
- Biological Abstracts
- Biological Abstracts/RRM (Reports, Reviews, Meetings)
- Abstracts of Entomology
- Abstracts of Mycology
- BIOSIS Serial Sources
- BIOSIS Search Guide

International Information Organisations

Amongst the various active information organizations, contribution of UNESCO, IFLA, ICSU, ICSTI, CODATA and Thompson's citation indexing efforts has been tremendous.

UNESCO- United Nations Educational, Scientific and Cultural Organisation

Established in 1946, UNESCO is a specialized agency of the United Nations Systems concerned with information matters. The objectives of UNESCO at the time of its established were: encouraging international intellectual cooperation, speeding up development through operational assistance to Member States, and promoting peace, human rights and international understanding.

UNESCO's earliest activities include chiefly to help Member States rebuild their libraries destroyed during World War II. UNESCO's efforts to assist its Member States in the development of their documentation, library and archival services initially indicated five trends:

- Principles and Structure of Documentation, Library and Archives Services
- Internationalization of Documentation, Library and Archives Services
- Professional Training
- Book Promotion
- The Future

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UNESCO's Current Library Activities

The changing role of libraries and information centres and the development of modern information technologies, especially the INTERNET, has created a new environment which necessitated providing new dimensions to the role of traditional libraries. With this in view, UNESCO established the Communication and Information Sector (CI) in 1990.

Networks of UNESCO

- MEDLIB –Internet-based virtual library network
- APIN – Asia and Pacific Information Network
- RINAF - Regional Information Society Network for Africa
- JOURNET - Global Network for Education in Journalism
- UNAL - UNESCO Network of Associated Libraries
- INFOYOUTH - International information and data exchange network on youth
- ACCESS-net - Association of Computer Centres for Exploiting Sustainable Synergy
- HeritageNet - The electronic network of cultural institutions in Central Asia
- INFORLAC - Information Society Programme for Latin America and the Caribbean
- ORBICOM – International Network that links communications leaders
- UNESCO Chairs/UNITWIN - The International Network of UNESCO Chairs in Communications

Intergovernmental programmes

UNESCO currently has 2 Intergovernmental Programmes in the field of communication and Information which replace all the previous programmes carried out by UNESCO till the year 2000. These programmes are:

- Information for All Programme (IFAP)
- International Programme for the Development of Communication (IPDC)

Information for All Programme (IFAP)

The IFAP provides a framework for international co-operation and international and regional partnerships. It supports the development of common strategies, methods and tools for building

a just and free information society and for narrowing the gap between the information rich and the information poor.

The Information for All Programme is a key element in the fulfillment of UNESCO's mandate to contribute to "education for all", to the "free exchange of ideas and knowledge" and to "increase the means of communication between peoples".

International Programme for the Development of Communication (IPDC)

The IPDC promotes free and pluralistic media in developing countries and the countries in transition. Through media development IPDC helps strengthen communicative & analytical skills of the people and their participation in democratic governance. The priority is given to the projects promoting press freedom and media pluralism, development of community media, enhancing professional capacity and building partnerships for media improvements.

The media, newspapers, radio or television, are ways of informing people and prompting them to interact. Free and pluralistic media results in good and honest governments and make development investments fruitful. They are essential for the construction of democratic societies as they are crucial for economic growth and nurturing the democratic process. Media pluralism alone can guarantee every community the opportunity to express its concerns without exclusion or discrimination.

UNISIST- World Science Information System

A new phase in UNESCO's work in library, documentation and information field was marked in 1973 with launching of UNISIST programme. UNISIST was conceptual framework and not an operating system by itself with emphasis on scientific and technological information. UNISIST was planned as a continuing, flexible programme to coordinate existing trends towards cooperation and to act as a catalyst for the necessary development in scientific information. The ultimate goal was the establishment of a flexible and loosely connected network of information systems and services based on voluntary cooperation.

In October 1971, the working documents of the UNISIST Intergovernmental Conference known as the UNISIST Study Report

stated the broad principles on which this World Science Information System was to be based. Three major inter-governmental conferences, namely, UNISIST I, NATIS and UNISIST II (1971, 1974, 1979) identified a number of programmes and made a number of recommendations for their implementation.

According to the UNISIST Study Report Report, "UNISIST stands for the unimpeded exchange of published scientific information and data among scientists of the world, promotion of compatibility, cooperative agreements, cooperative development and maintenance of technical standards to facilitate the interchange development of trained manpower, reduction of administrative and legal barriers to the flow of scientific information and assistance to countries that seek access to present and future information services."

PGI- General Information Programme

In 1976, the General Information Programme (PGI) was created by merging UNISIST with a programme concerned with the development of documentation, libraries and archives. The five sub-programmes that made up PGI were:

- Tool for processing and transfer of information
- Development of Databases
- Regional and International Cooperative Schemes
- National Information Policies and Infrastructures
- Developing an Information Workforce

PGI is presently covered by the APIN programme of UNESCO.

IFLA- International Federation of Library Associations and Institutions

The IFLA, presently in The Hague, was founded in 1927 in Edinburgh, Scotland with the aim of promoting international contacts among library associations and librarians. It is a non-governmental professional organization and is presently the leading international body representing the interest of library and information services and their users besides being the global voice of library and information profession.

IFLA promotes international cooperation, discussion and research in all fields of library activity as it offers a professional forum for library associations, libraries and librarians whatever the

type of library or the expertise they have. It also considers all aspects of library work to be within its province and tries to extend its membership to all countries. IFLA aspires to speak with authority as the global voice of the library profession. The aims – universality, comprehensiveness and representative status give direction to IFLA's structure as well its professional programmes.

IFLA Core Activities

- ALP- Action for Development through Libraries Programme
- CLM - Committee on Copyright and other Legal Matters
- FAIFE - Committee on Free Access to Information and Freedom of Expression
- ICABS - IFLA-CDNL Alliance for Bibliographic Standards
- PAC - Preservation and Conservation
- UNIMARC – IFLA UNIMARC

IFLA Divisions and Sections

- General Research Libraries
- Libraries serving the general public
- Special libraries
- Collection and services
- Bibliographic control
- Management and technology
- Education and research and
- Regional activities

The work of the 8 Sections is carried out through 48 Divisions of IFLA. IFLA also has set up 5 Discussion Groups. These are:

- Agricultural Libraries Discussion Group
- LIS Education in Developing Countries
- New Professionals
- Public Libraries & Democratic Process
- Quality Issues in Libraries

IFLANET

IFLA's network was initiated in 1993 by the Universal Dataflow and Telecommunications (UDT) Core Programme and hosted by the National Library of Canada. IFLANET and its services have been designed for improving communication within IFLA and its various organs and to provide a virtual presence for the organization all the time, that is, all 7 days of the week and 24 hours of the day. This is

required as the organization, on the whole, meets only once an year at its General Conference. IFLANET handles general administration, frames policy on centralization and independent web sites, provides procedures and guidelines for preparing document for submission and assists in creation of IFLA-sponsored mailing lists. Currently, IFLANET is administered by the IFLA HQ and hosted by the Institut de l'Information Scientifique et Technique (INIST), France.

FID- International Federation for Information and Documentation

FID, an international organization that was founded during the late 19th century (1895) and has contributed enormously for the cause of our profession for over a hundred year. The activities of FID, however, have ceased since the year 2002 due to paucity of funds. But the organization still exists in name. As FID had played a major role in various activities related to libraries and information centres, a brief account of how it came into existence and its major activities till the time its offices were shut down is required.

FID's aim had been to promote, through international cooperation, research and development of documentation, information science and information management in all fields of science, technology, social sciences and the humanities.

By grouping together, at an international level, organizations and individuals concerned with the problems of information science and documentation, FID provided a world forum for the exchange of ideas and experiences and the opportunity for interested organizations and individuals to coordinate their efforts.

FID's Professional Activities

- Target group – Modern Information Professional and User
- Professional Programme
  - Business, Finance and Industrial Information
  - Information Policy
  - Information Science
  - Applied Information Technology
  - Information Processing and Products
  - Information Management
- Activities and Functions
  - Conferences and Seminars
  - Publications

- Projects
- Education and Training
- Library Networks
- Consultancy

Besides the various professional activities already listed, in order to carry out the various programmes, FID had appointed Council Advisory Groups, Regional Commissions, FID Committees and Special Interest Groups. These were to take care of library, documentation and information activities in various regions of the world, different subject areas and all related subjects/areas of interests to the profession.

It is to be reiterated here that the FID/UDC Committee served for a long time for development of the Universal Decimal Classification and it was later on upgraded as the Universal Decimal Classification Consortium which has been working independently since then. Although FID is no longer operational, the UDC is still active. Information professionals world over are hopeful that FID may become operational in the near future if some sponsor/funding agency comes forward to revive it for the benefit of the information community.

ICSU- International Council for Science

ICSU – International Council for Science, a non-governmental organization, was started in 1931 as International Council of Scientific Union for the benefit of mankind. It was set up to act as a focus for exchange of ideas, the communication of scientific information and the development of standards in methodology, nomenclature and units. Another chief objective of ICSU was to encourage international scientific activity for the benefit of mankind.

ICSU, for achieving its goal of encouraging links between science and society, maintains working partnerships with various international organizations, especially the United Nations organizations. ICSU also awards annual grants to support projects proposed by its members. This is carried out with financial support received from UNESCO.

ICSU also publishes ICSU Yearbook and a quarterly ICSU Bulletin.

ICSTI-International Council for Scientific and Technical Information

The ICSU Abstracting Board (ICSU-AB) was created in 1952 as an international forum for the scientific and technical abstracting and indexing services so as to improve the flow of information between scientists and technologists throughout the world. ICSU-AB has been replaced by ICSTI – International Council for Scientific and Technical Information since June 1984 and has about 50 organisations as members.

ICSU's ICSTI offers a unique forum for interaction between organizations that create, disseminate and use scientific and technical information. ICSTI's mission benefits scientific and technical disciplines and gives member organizations the benefit of a truly global community.

ICSTI aims to provide leadership in promoting recognition of the value of scientific and technical information to the world's economic, research, scholarly and social progress, ensures access to and delivery of information for all constituencies in business, industry, academic community, government and the public through the exchange of information and the sharing of experience among international peers, and to be a forum for interaction among all participants in information flow.

CODATA- Committee On Data for Science and Technology

CODATA, the Committee on Data for Science and Technology, is an interdisciplinary Scientific Committee of the International Council for Science (ICSU). It was established in 1972 as an interdisciplinary Scientific Committee of the International Council for Science (ICSU) to promote and encourage, on a world-wide basis, the compilation, evaluation and dissemination of reliable numerical data of importance to science and technology.

The aim of CODATA is to improve the quality, reliability, management and accessibility of data of importance to all fields of science and technology. CODATA is, therefore, a resource that provides scientists and engineers with access to international data activities for increased awareness, direct cooperation and new knowledge. Currently, it has 23 countries as members, and 24 National Member Delegates and Committees

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ISI- Institute for Scientific Information

The ISI, set up in 1960, has been servicing the scientific, academic and business communities as an information provider. It provides direct and easy access to the bibliographic data, cited references and abstracts contained in the world's most important scientific, technical and scholarly publications by a large, most current and multidisciplinary database. The organization anticipated the needs and expectations of researchers and librarians, institutions and organizations worldwide.

ISI has been taken over by Thompson Scientific, a segment of Thomson Corporation is now referred to as Thompson ISI. The goal of ISI is to increase the impact of research by providing researchers integrated information solutions delivered by the most innovative technologies.

A recent development of ISI is the *ISI Web of Knowledge* which is the single environment from which researchers can access, analyze, and manage information. *ISI Web of Knowledge* enables users to locate high quality information with help from evaluation tools and bibliographic management products. It also provides innovative search tools for cross-content and web document searching, and is equipped with a sophisticated linking gateway as the *ISI Web of Knowledge* content is multidisciplinary, and supports

research conducted at academic, corporate, government, and not-for-profit organizations worldwide.

ISI is well known for:

- The term impact factor. Based upon citation analysis and quantifiable statistical data, it provides a systematic, objective way to determine the relative importance of journals within their subject categories.
- Citation Indexes- ISI facilitates access to multidisciplinary research information from nearly 8,500 authoritative, high-impact journals covered by its following world famous only one of its kind, the citation indexes:
  - Arts and Humanities Citation Index
  - Science Citation Index Expanded
  - Social Science Citation Index
- Current Awareness- ISI Current Contents Connect enables efficient current awareness service from contents of over 7,600 journals, 2,000 books and conference proceedings and also provides links to over 3,600 ISI-evaluated websites.
- ISI Links- Web of Science also offers fast, extensive linking facility as well as access to additional research contents by web-accessible resources and the ISI Web of Knowledge enables users to search them through a single interface. The type of links provided by ISI are: Intra-content links, Inter-content links, Customer holdings, SFX context-sensitive links and Publishers' full text. For further details on ISI Links, ISI web site can be searched.

Conclusion

Information is a vital resource for users and for information specialists. The national organizations, international organizations and professional bodies are engaged in providing services and products which help in closing the information gap. Another problem is that the Western nations have always been information rich and the developing countries are information poor. The modern technologies, especially the computer and the telecommunication technologies have bridges to a great extent the information gap within the framework of international organizations that have come

forward to help close this wide gap by their programmes and activities.

There are many national and international organizations, systems and centres contributing towards promotion, coordination and development of library and information services for assisting the users. In this unit, we have covered global information systems.

The growing demand for information and increasing use of present facilities and services indicates the need and importance of such national, international and special information organizations within our information infrastructure.

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