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Manoj Tiwari
Librarian, K.D. Dental College & Hospital Mathura (U.P.)

Nidhi S Tiwari
HOD/Librarian, Rajiv Academy for Technology & Management Mathura (U.P.)

Dr. Ramnivas Sharma
I/C Central Library, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior (M. P.) and I/C Library, College of Agriculture, RVSKVV, Gwalior (M.P.)

Correspondence
Manoj Tiwari
Librarian, K.D. Dental College & Hospital Mathura (U.P.)

Information & communication technology in academic libraries: how they are important today?

Manoj Tiwari, Nidhi S Tiwari, Ramnivas Sharma

Abstract
Development in Information and Communication Technology (ICT) has influenced the libraries for its overall betterment. Libraries use ICT to manage communication facilities, housekeeping operations, user's services, standardization and extension of library activities. The shift from print to digital information has a high impact on all components of the academic library system in India especially the users, services and the staff. Though information is considered as an important resource, the use of ICT tools to collect and disseminate information has been in a slow pace in majority of the libraries this may be due to various factors like insufficient funds, inadequate staff trained in handling computers and software packages, administrative concerns etc. These paper overviews the basic concept of information and technology used in libraries.

Keywords: Library, Information Science, Academic Library, Information and Communication Technology (ICT).

Introduction
Information is the key factor of any kind of research and development. Information is a fundamental resource which is essential for survival in today's competitive and wired world. The information itself and way it is accessed have undergone changes owing to the developments in information and communication technology. It is a vital ingredient for socioeconomic and cultural development of any nation or individual. According to Kemp" Information is considered as the fifth need of man ranking after air, water, food and shelter". The value of information in every human endeavor cannot be overstressed. Quick and easy access to every required information is a supreme importance especially for libraries Information technology application and the techniques are being used by the libraries for information processing, storage, communication, dissemination of information, automation etc. Further, origin of internet and the development of World Wide Web revolutionized the information communication technology. Recognizing the advantages application of information technology the libraries are essential to provide the facilities to their user community.

Developments in Information Technology
Information technology (**IT**) is the application of computers and telecommunications equipment to store, retrieve, transmit and manipulate data, often in the context of a business or other enterprise. The term is commonly used as a synonym for computers and computer networks, but it also encompasses other information distribution technologies such as television and telephones. Several industries are associated with information technology, such as computer hardware, software, electronics, semiconductors, internet, telecom equipment, e-commerce and computer services. Personal computers and notebooks have evolved in the market; the conventional personal computers will remain the main computing device for providing basic services in an academic environment. According to Battin (1984), early efforts to apply computer technology to library activities took place between 1960 and early 1980s as the first generation of library computing. During this period, development of networks, the first online public access catalogue (OPAC), International protocols, evolution of Internet, etc Libraries have used microfilms, microfiches; aperture cards, etc. from 1920s to develop and manage their collections, reproduce and preserve library materials. Microform collections were the most preferred substitute for printed materials as they saved

storage space, binding costs and. also reduced chances of damage. Developments in optical storage technologies had a great impact on library field in the mid 1980s. The late 1980s saw the introduction of a number of new optical storage products, including erasable system.

Developments in Communication Technology

The progresses in communication technology and media have helped to increase access to educational resources and thereby enhance the quality of education. The use of interactive communication media has facilitated expansion of opportunities for higher education. To meet the increase in demands to access, locate and transform large amounts of data, libraries are struggling to make the best use of available telecommunications technology. A communication network provides interconnection of several computers wherein a user can communicate with any computer as local user. The system will have facilities to create, transmit and print a message or document electronically. Email or electronic mail is one of the most commonly used communication method by which a person can create and transmit messages electronically to an individual or group of individuals. In an academic institution, email is used effectively for providing better services like Current awareness service, SDI, Alert service for new books, etc. Voice mail is an advanced form of email where a person can dictate or transmit a message over telecommunication lines using modem. Facsimile transmission or Tele fax is a useful system for communicating data images over telecommunication lines enabling a user to transmit a text or graphics securely. It is used in some academic libraries for document delivery and other scholarly communications. A dedicated telephone line and fax machine is to be installed for this purpose. Video conferencing is another communication technology that uses high-speed telecommunication network to transmit audio and video allowing people to conduct meetings across the world. In an academic institution, this can be applied effectively to link several classrooms to hold debates or discuss topics with an eminent person.

Networking in libraries play a major role in information resource sharing and support activities through a network of computer and databases with the help of telecommunication. Network technology is the backbone of data communication and dissemination in academic libraries. A network can be local within an institution, i.e., local area network, LAN, or it can be national, regional or international, i.e., Wide area network or WAN. Examples of national networks are ERNET, DELNET, and INFLIBNET. International networks include UNISIST, AGRIS, etc. UGC through INFLIBNET has initiated a major project of networking university libraries all over India and recently extended to selected colleges, by providing consortia-based subscription to online journals in collaboration with ERNET. Internet is now a common term, which signifies interconnections of multiple networks (both LANs and WANs), located in different parts of the world enabled through the TCP/IP protocol. It is a powerful means of speedy dissemination and retrieval of information in text, graphics, audio or video format. It is a boon for the academic community worldwide, providing infrastructure to support digital libraries, virtual learning, research, collaboration and publications. The "Web" or World Wide Web provides a means of accessing and sharing information on the internet using hypertext transfer protocol or HTTP. The Web now enables the user to access bibliographic databases, full texts of journals, courseware and provide links to other library catalogues through Online Public Access Catalogue or OPAC. Internet has helped to integrate all library activities like email, discussion through list serves, support reference service through remote databases, avail interlibrary loan, ordering journals and books online, etc. Search engine, one of the most popular internet application widely used around the world is software used to search a database. Search engine is useful to get an idea about a subject or concept. Examples are Google, Bing, etc.

Application of Information Technology in Library

Libraries are repositories of knowledge and information and are indispensable in the information age. With the merging of information technology with library science, the nature of libraries and the scope of their services have radically changed. Organizing and disseminating information. According to Rowley (1996), information technology includes the following four major areas:

1. Methods and tools of recording knowledge like computer storage media (Magnetic: Floppy disk, hard disk, tapes and Optical Storage Devices –like CD-ROM, DVD (Digital Versatile Disk) Rewritable CDs and DVDs)
2. Methods of keeping records (Computer hardware, software, creating databases, etc.)
3. Methods of indexing documents and information (Computerized indexes, Machine readable catalogues, etc.) and
4. Methods of communicating knowledge (Electronic mail, facsimile transmission, Electronic journals, teleconferencing and data communication networks).

The library is the main information centre which can make use of the fat development IT for the benefits of mankind as a whole. The librarian's preference of IT should include all those technologies which are expected to be used in the library activities/operations and other library services for collection, processing, storage, retrieval and dissemination of recorded information, the fast developing information technologies have showered almost every areas of application including libraries. In case of libraries, these are good use in the following environments.

A) Library Management: Library management includes the following activities which will certainly be geared up by the use of these fast IT developments: Classification, Cataloguing, Indexing, Database creation, Database Indexing.

B) Library Automation: Library automation is the concept of reducing the human intervention in all the library services so that any user can receive the desired information with the maximum comfort and at the lowest cost. Major areas of the automation can be classified into two -organization of all library databases and all housekeeping operations of library.

C) Library Networking: Library networking means a group of Libraries and information Centres are interconnected for some common pattern or design for information exchange and communication with a view to improve efficiency.

D) Audio-Video Technology: It includes photography, microfilms, microfiches, audio and tapes, printing, optical disk etc.

E) Technical Communication: Technical Communication consisting of technical writing, editing, publishing, DTP systems etc.

Advantages of Information Technology

a. Easy to gather different library activities.
b. Collaboration and creation of library networks
c. Avoid repetition of efforts within a library
d. Increase the range of services offered
e. Save the time of the users
f. Increases efficiency
g. Speedy and easy access of information
h. Improves the quality of library services
i. Enhance the knowledge and experience
j. Integration within the organizations.
k. Improve the status of the library
l. Improve the communication facilities
m. More stable
n. Helps to attract the users.
o. Remote access to users
p. Round the clock access to users
q. Access to unlimited information from different sources
r. More up to date information
s. Information flexibility to the users
t. Reforming and combining of data from different sources
u. Reduce the workload of the library staff

Disadvantages of Information Technology:

a. Insufficient funds
b. Operational costs are exceeding year by year.
c. Inadequate trained staff
d. Unemployment

Classification of Information Technology Based Services

Information technology based services can organize on the basis of three main criteria.

I. Apparatus and Amenities
II. Customer Services
III. Electronic Sources

I. Apparatus and Amenities: The equipments and facilities available in the library are illuminating in the following headings.

a) Computers: Computer-based technologies have become dominant forces to shape and reshape the products and services the academic library has to offer. The success of the IT enabled services in the library is based on the efficiency of the equipment provided in the library i.e. most modern technology, not on the basis of number of equipments.

b) OPAC: An Online Public Access Catalog (OPAC) is an online database of materials held by a library or group of libraries. Users search a library catalog principally to locate books and other material physically located at a library.

c) Union Catalogue: A union catalog is a combined library catalog describing the collections of a number of libraries. Union catalogs have been created in a range of media, including book format, microform, cards and more recently, networked electronic databases. Union catalogs are useful to librarians, as they assist in locating and requesting materials from other libraries through interlibrary loan service.

d) CD-ROM: Presents a state-of-the-art review of the applications of CD-ROMs in academic libraries, embracing all aspects of library involvement and staffing implications. Concludes that CD-ROM is having a huge impact on the way academic libraries function and the services they offer to their users.

e) Scanner: In computing, an image scanner—often abbreviated to just scanner— is a device that optically scans images, printed text, handwriting, or an object, and converts it to a digital image.. Mechanically driven scanners that move the document are typically used for large-format documents, where a flatbed design would be impractical.

f) RFID: Radio frequency identification is a term used for technologies utilizing radio waves for identifying individual items automatically. The most common way is storing a serial number identifying a product and related information on a microchip attached to an antenna. RFID is used very similar to bar codes.

g) Tele text: Tele text is a television information retrieval service developed in the United Kingdom in the early 1970s. It offers a range of text-based information, typically including national, international and sporting news, weather and TV schedules. Teletext information is broadcast in the vertical blanking interval between image frames in a broadcast television signal.

h) Facsimile: A facsimile is a copy or reproduction of an old book, manuscript, map, art, or other item of historical value that is as true to the original source as possible. It differs from other forms of reproduction by attempting to replicate the source as accurately as possible in terms of scale, color, condition, and other material qualities. For books and manuscripts, this also entails a complete copy of all pages; hence an incomplete copy is a "partial facsimile".

i) Photocopy: A photocopier is a machine that makes paper copies of documents and other visual images quickly and cheaply. Most current photocopiers use a technology called xerography, a dry process using heat. Photocopying is widely used in library

j) Printing technology: In computing, a printer is a peripheral which produces a text and/or graphics of documents stored in electronic form, usually on physical print media such as paper or transparencies.

k) Barcode: A barcode reader (or barcode scanner) is an electronic device for reading printed barcodes. Like a flatbed scanner, it consists of a light source, a lens and a light sensor translating optical impulses into electrical ones. Additionally, nearly all barcode readers contain decoder circuitry analyzing the barcode's image data provided by the sensor and sending the barcode's content to the scanner's output port.

II. Customer Services

a) Document delivery services: The Document Delivery Service (DDS) delivers copies of journal articles and book chapters from participating Libraries. Fees apply for most Document Delivery Services. To fulfill the information needs of the end user through information/document supply is a document delivery service. This service is provided on No Profit - No Loss Basis and Expected to be prompt.

b) Interlibrary loan: Inter library loan means a cooperative arrangement among libraries by which one library may borrow material from another library. In other words a loan of library materials by one library to another library.

c) Indexing and abstracting services: a method which is used to retrieve information forms a table in memory or a file on a direct access store or the art of compiling an index. The preparation of abstracts, usually in a limited field, by an individual, an industrial organization of r restricted use or a commercial organization: the abstracts being published and supplied regularly to subscribers. Also the organization producing the abstracts. Such services may be either comprehensive or selective.

d) Chat services: Online chat may refer to any kind of communication over the Internet that offers an instantaneous transmission of text-based messages from sender to receiver; hence the delay for visual access to the sent message shall not hamper the flow of communications in any of the directions. Online chat may address as well point-to-point communications as well as multicast communications from one sender to many receivers.

e) CAS: The purpose of a current-awareness service is to inform the users about new acquisitions in their libraries. Public libraries in particular have used display boards and shelves to draw attention to recent additions, and many libraries produce complete or selective lists for circulation to patrons. Some libraries have adopted a practice of selective dissemination of information.

f) SDI: Selective dissemination of information (SDI) was originally a phrase related to library and information science. SDI refers to tools and resources used to keep a user informed of new resources on specified topics. Selective Dissemination of Information (SDI) was a concept first described by Hans Peter Luhn of IBM in the 1950's 28.

g) Scanned copies: A scanning service for material not available electronically, which is held by the Library. This includes articles from journals and chapters from books. Users of the service should be aware that we operate within the restrictions of the Copyright Act.

h) Bulletin board services: A Bulletin Board System, or BBS, is a computer system running software that allows users to connect and log in to the system using a terminal. Once logged in, a user can perform functions such as uploading and downloading software and data, reading news and bulletins, and exchanging messages with other users, either through electronic mail or in public message boards.

i) Electronic services and e- resources: The important fact is convincing many libraries to move towards digital e-resources, which are found to be less expensive and more useful for easy access. This is especially helpful to distant learners who have limited time to access the libraries from outside by internet access to commonly available electronic resources, mainly CD-ROM, OPACs, E-Journals, E-Books, ETD and Internet, which are replacing the print media.

j) Digital library: A digital library is a library in which collections are stored in digital formats and accessible by computers. The digital content may be stored locally, or accessed remotely via computer networks. A digital library is a type of information retrieval system.

III. Electronic Sources

a) Audiovisual materials: The Audiovisual Collection contains a wide range of audiovisual material to support the research and study needs of staff and students.

b) Internet: With the advent of digital revolution, communication has become easier and faster and decision are mad instantaneously. The internet which is the latest among the superhighways has cut down the distance and made it easier to have access to information to all people at all places and at all the times.

c) Library website: Library website helps to recognize the facilities and information sources available in the library. In most of the library website online catalogue is included. Online catalogue helps to ascertain a client whether the information is available in the library.

d) Database: A database is an organized collection of data for one or more purposes, usually in digital form. The data are typically organized to model relevant aspects of reality, in a way that supports processes requiring the information Users of the service should be aware that we operate within the restrictions of the Copyright Act.

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Conclusion

Even though librarians are facing challenges for new and emerging skills, the most important aspect of this change is to be able to adapt the existing skills, many of which are traditional librarianship skills and the ability to remain flexible in a working environment that is constantly changing. The rapidly changing environment of academic libraries needs attention of the authorities that manage LIS education in the country. Information technology competencies demanded by most of the institutions require particular emphasis in our LIS curriculum

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