

A Review of Library Services with the introduction of ICT in Libraries

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ABSTRACT

The advent of Information & Communication Technology has affected all spheres of life. As information technology is becoming the important part of every organization, it is bringing great changes in the organization's structure and management and delivery practices.

ICT have transformed Library & Information services globally. This paper explores the various library services in which ICT plays an important role. The study endeavors to identify various components of ICT being used in libraries and information centers to enhance the library services. The paper highlights changing dimensions of library services and challenges libraries have to face in the implementation of ICT.

Keywords: Information Technology; ICT; library services; ICT Components.

1. INTRODUCTION

ICT incorporates a range of technologies used to support communication and information. The emergence of computer and telecommunication technologies in recent decades has had a great impact on traditional information preservation, acquisition, organization, provision, access, and retrieval. Many of these technologies have been integrated into library operations such as acquisition, cataloging, circulation, interlibrary loan, and reference services. Today's library activities are no longer confined within their physical territories. Many libraries are electronically networked and rely heavily on computer and telecommunication technologies as a means of providing library and information services. Information can be stored in various electronic forms and transmitted at high speed over electronic networks to wherever there

are computer facilities to receive it. Libraries which were considered merely a storehouse of knowledge have got a new outlook in the modern information technology era. Library organization administration and other technical processing have become easier and more quantum of work can be done in relaxed mood. The services delivered with the help of ICT are faster and more effective. ICT also survives and makes true the Laws of Library Science, "Every reader, his/her book", "Save the time of the reader", and "Library is a growing organism". ICT with its tremendous information sources, rapid transmission speed and easy access ensure the satisfaction of the user with complex demand breaks down the distance barriers and shortened the time required and ensured the right information to the right user at the right time.

2 ICT COMPONENTS FOR LIBRARIES

ICT came about as a result of the digital convergence of computer technologies and other media communication technologies. We may categorize the components of Information Technology (IT), which are frequently used in library and information center are as follows:

2.1 Computer Technology;

2.2 Communication Technology;

2.3 Reprographic, micrographic and printing technology.

A brief account of these Information and Communication Technologies is discussed below:

2.1 Computer Technologies

The dramatic development in the information transmission process in every field of human endeavor has been made by the widespread use of computer technology that can further be divided into following categories:

2.1.1 Workstations

These are expensive and powerful computers used mainly by engineers and scientists for sophisticated purposes. These include following:

2.1.1.1 Mainframe Computers

Mainframe computers are fast, large capacity computers, after the super computer, occupies a specially wired, air conditioned room is capable of great processing speeds and data storage.

2.1.1.2 Super Computers

Super Computers are high-capacity computers that are the fastest calculating device ever invented. It may have a vector processing design or massively parallel processing design.

2.1.1.3 Mini Computers

Mini computers are refrigerator-size machine that are essentially scale-down mainframes. Mini-Computers are becoming more important as serves in networks.

2.1.1.4 Personal Computers (PCs)

These are desktop, floor-standing, or portable computers that can run easy-to-use programmes such as word processing or spreadsheets.

2.1.2 Microchip Technology

A microchip is a tiny piece of silicon that contains thousands of micro-miniature electronic circuit components, mainly transistors. The microprocessor of microcomputer, which process data, is made from microchips.

2.1.3. Artificial Intelligence (AI)

Artificial Intelligence is a group of related technologies that attempts to develop machines to emulate human like qualities, such as learning, reasoning, communicating, seeing and hearing.

2.2 Software Technology

Software consists of the steep-by-steep instructions that tell the computer what to do. Many software packages for various applications in the field of library and Information services and management are commercially available. Some of the important library packages available are:

2.2.1 CDS/ISIS

This public domain package of library software developed by UNESCO is a menu driven generalized information storage and retrieval system designed especially for computerized management of structured database. The windows Version of CDS/ ISIS is called WINISIS.

2.2.2 In magic

In this study, the major functions include cataloguing, acquisitions, circulations, serials, on-line catalogue, retrieval, etc.

2.2.3 Books

This software system which supports all the major library functions including circulation control, acquisition, serial control, etc. This software is in COBOL language.

2.2.4 Minisis

This software is for use in creating, maintaining and searching library and information databases supports both text and index searches, controlled indexing terms.

2.2.5 Libsys

It is the most comprehensive library software. It supports almost all activities relating to acquisition, cataloguing, circulation, serials and articles alert.

2.3. CD-ROM Technology

CD-ROM is an acronym that stands for Compact Disk Read Only Memory. It is an optical disc of 120 diameters and a hole of 15 mm at the center with thickness

1.2 mm. Data is recorded in digital forms using laser beam. CD-ROM is used to hold prerecorded text, graphics and sound.

2.4 Communication Technologies

Communication or telecommunication technologies are used to transmit information in the form of signals between remote locations, using electrical or electromagnetic media as carries of signals. Communication technologies comprise the following:

2.4.1 Audio Technology

The outmoded AM (Amplitude Modulated) radio receivers are being replaced by the modern FM (Frequency

Modulated) receivers. The recent development of the production of Compact Discs (CDs). Audio technology can be used in library and information centers for a wide variety of purposes such as storytelling to children, imparting education, knowledge, recreation, etc.

2.4.2 *Audio visual technology*

AV technologies are those by which things can be understood by listening as well as seeing.

2.4.3 *Motion picture*

It can be used in library as one of the instruments of mass mediacommunication. It is the dynamic source of information, education and recreation.

2.4.4 *TV*

Television is one of the traditional and old information and communication technologies which were dominated by major of station in its formative period.

2.4.5 *CATV (Cable Television) System*

It is a wired communication system of high capacity that flows from a central source through a major distribution cable to neighborhood lines and finally to the line into the house.

2.4.6 *Videodisc*

Videodiscs can be used to disseminate computer programmes, digital databases, educational video programmes and a range of electronic publications.

2.4.7 *Videotext*

Videotext is a newer technology, but as in the on-line information retrieval, the information is stored in computer files and accessed through a telecommunication link.

2.4.8 *Teletext*

Teletext is a one-way service to a large number of simultaneous users, where pays of information from a central database are broadcast as part of the regular television signal.

2.4.9 *Telephone*

The telephone is one of the longest established methods of electronic information transfer especially to transfer the

voice which can be a strong means of disseminating information and keeping of what is being happened concerned organization and outside as well.

2.4.10 *Cell phone or mobile phone*

Mobile telephones are based on the cellular radiotechnology. Mobile phone provides the facility to dial connections anywhere in the world. As the user of mobile telephone moves from cell to cell the radiotelephone link switches from on central transmitter/receiver to a second while the call continues, uninterrupted.

2.4.11 *Fax (Facsimile transmission)*

It is a method of converting an image into electronicsignals that can be transmitted over a communication link and converted back into an image at the receiving end.

2.4.12 *E-mail*

E-mail is a system of exchanging message in electronic format. It is the most used tool on the internet. It has brought a revolutionary changes in communication because any type of information such as personal notes, letter, documents, publications, computer programmes, even pictures and sound can be sent to or received from anywhere of the world within a fraction of a second at a very cheap rate through electronic signals called SMTP (Simple Mail Transfer Protocol).

2.4.13 *Voice Mail*

Voice mail acts like a telephone machine that digitizes the incoming voicemail and store for retrieval later. It is an alternative system of e-mail.

2.5 **Satellite Technology**

Satellite are, in fact formed of microwave transmission in that satellites, which are positioned in space approximately 22,300 miles above the earth, represent relay stations for earth round communication.

2.6. **Internet**

Technically the Internet is a junction of a number of hardware and software resources or equipment's to contracture and to perform multiple functions. It is treated as a virtual library where world's information resources are gathered for the use of the clientele. It has broken

down the distance barrier in communication. It has greatly influenced the practice of librarianship. Access to information through Internet has changed the total scenario of librarianship. Internet stretches throughout the world, we can send a message to a friend across the ocean, talk live through video conferencing, obtain or access anything sitting at one place. Sharing real-time scientific data between two experiments, located respectively in New York & Delhi or browsing through books at the Library of Congress from a classroom in a rural community of Uttar Pradesh has become a reality.

2.7 Network Technology

The important function of network is to interconnect computers and other communication devices so that data can be transferred from one location to another instantly. Generally computer network is of following three types:

2.7.1 WAN (Wide area network)

WAN is a communication network that covers wide geographic area such as a country or state, i.e. INTERNET.

2.7.2 LAN (Local Area Network)

LAN is a communication network that covers limited geographic area such as campus or building.

2.7.3 MAN (Metropolitan Area Network)

A high Bandwidth network designed to link together sites within a city and its environs.

2.8 Reproduction Technology

2.8.1 Reprographic technology

The term reprographic is used to identify of information

processing which concerned with technologies and equipment's for the reproduction of

documents.

2.8.2 Micrographic technology

Micrographic is that field of information technology which concerns making use of microforms. Microforms is a generic term for all information carriers which use microfilm or similar optical media (including study) for the high-density recording and storage of optically

encoded information in the form of micro images of printed document, but patterns or holograms.

2.8.3 Printing technology

A printer is a device that converts computer output in to printed images. There are number of different kinds of printers used in library such as Dot Matrix Printers, Laser Printer, Inkjet, Bubble-Jet, etc.

3. LIBRARY SERVICES & ICT

3.1 Reference & Information Services: Some services such as SDI (Selective dissemination of information) or Current Awareness Services (CAS) and virtual reference desks, announcements of new acquisitions and other reader advisory services can be made easier through the internet. Users can have online interaction with the reference staff. The tools available on the internet such as table of contents journals, discussion forums assist library professionals in providing CAS services to the users. „Content Direct “by Elsevier, uncover a general commercial contents database, Ideal database of Academic Press are examples of current contents service. Ban LISForum of NSCI Bangalore, DEL LISTSERVE of DELNET are providing the latest information in the form of electronic digests.

3.2 Resource Sharing

A central union catalogue can be better managed through ICT, thus libraries can create and share bibliographic records and other information resources in digital format. No library can fulfill all the needs of its users from its collection. Resource sharing through Inter-library loan 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 resource sharing. Printed union catalogues and Computer Output on Microfiche (COM) catalogues and CDROM 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 value added services. *RedLightGreen*. (<http://www.redlightgreen.com/>) is one of the world's

largest web based union catalogues. It contains about 130 million records from 160 member libraries of *Research Libraries Group (RLG)* in USA. In India, bodies like *INFLIBNET*, *DELNET* are also developing union catalogues of books, serials and theses.

3.3 Inter Library Loan

Interlibrary loan is a technique by which one library lends material indirectly to an individual through another library. In essence, therefore, it is merely a means through which a library may broaden its lending service to include those materials which are made available by other libraries. The technique of interlibrary loan, of necessity, entails a lending operation, but regardless of where the actual work is performed—circulation, acquisitions, etc.—the principle involved is one of reference: that is, to provide the library user as completely as is possible with the material he needs. *DELNET* in India is a best example of providing interlibrary loan service to its member institutes.

3.4 Document Delivery Services

It is not possible for libraries to have everything that its clients may need. Libraries use document delivery services from other libraries and commercial organizations for copies of research papers etc not held by them. Locating a source and procuring the document requires considerable time and efforts and the process is laden with uncertainties. ICT has made the document delivery services very simple and reliable. From searching the holdings to ordering and delivery have been benefited by the use of ICT. A large number of libraries now host their up to date holdings on their website and can be searched on internet. Many library networks such as *INFLIBNET* and *DELNET* maintain union catalogue of their member's journal holdings. One such document delivery service provider *British Library Document Supply Service (BLDSC)* offers a flexible system of receiving orders and tracking.

BLDSC's email based document supply system allows registered users to send requests through a formatted email that automatically is processed by *BLDSC*'s system, which generates location of the sources. The documents can be received in print as well as electronic format. Online and web based database services such as *STN* provides link to document delivery services of their own or a third party. Some of the commercial document delivery services are *Ingenta*

(<http://www.ingenta.com/>), and *BioMedNet*, *OCLC* (www.oclc.org/) and *Science Direct* (<http://www.scienceDirect.com>). Full text of electronic journal articles that are available in electronic form may also be downloaded through links provided by aggregator or gateway services such as *Informatics's J-gate* (www.j-gate.informindia.co.in/).

Electronic journals are discussed later in this unit.

3.5 E-resources Access

A variety of library materials such as journals, books, patents, newspapers, standards, photographs, pictures, motion pictures or music are now available in electronic or digital form. From the user's point of view digital resources hold many advantages such as time and place convenience, timeliness, ability to search directly on text (as against the catalogue records), ability to link to further reading material, and ability to disseminate and share information. From the library's point of view digital format offers convenience of storage and maintenance, cost advantage, ability to target global users, etc. However, digital resources also pose human, social and technological problems, such as discomfort in reading on the screen, problems in internet access and speed, poor infrastructure, lack of sufficient skills to use the digital resources, and perceptual change resulting from right to use rather than physical possession, etc. Library users can access information of various types such as online databases, e-journals, e-books, government publications digitally through networked systems. Access may be allowed online remotely through the internet or intranets. Brief description of library materials such as journal, books, theses & dissertations, patents, course material etc. is given below:

3.5.1 E-Journals

Libraries have been exploring easy to cope with the problems of ever increasing prices of the journals, space requirements and decreasing level of usage as the journals get older. Nevertheless, libraries are required to maintain back issues of the journals, usually in bound form. Electronic Journal helps the librarians in addressing these problems to a great extent without significantly affecting the service levels. Electronic Journals can be accessed via internet from any web enabled PC. Depending on the type of subscription, one or more users can access the service simultaneously, either directly from an independent web enabled PC or in a local area network through a proxy server (IP addresses based access). Electronic journals also offer benefit of full text searching and downloading of articles. Many publishers of electronic journals offer their journals through consortia of libraries at much lower rates. *INDEST (Indian Digital Library of Engineering, Science and Technology)*, and *INFLIBNET* are two such consortia operating in India. Access to articles in electronic journals can also be made through aggregator services which offer searchable databases of contents of e-journals from several publishers, and links to journal site for full text. *Emerald*, *OCLC* and *J-Gate* are some of the example of e-journal aggregator services. The main

disadvantage of electronic journal is that libraries can not physically possess the journals.

3.5.2 E-Books

E-Book has been described as a text analogous to a book that is in digital form to be displayed on a computer screen. E-books can be read just like a paper book, using dedicated E-Book reader such as *GemStar eBook* or on a computer screen after downloading it. There are also some newer technologies developing such as electronic paper, which is much like paper, except that the text can be changed, and talking books in MP3 format. E-book offer advantages like portability, 24 hours access, text search, annotation, linking, and multimedia and self-publishing possibilities. Development of e-book is still in the infancy stage and issues like compatibility, e-book readers, availability and intellectual property rights are to be addressed before it can be implemented on large scale.

3.5.3 Electronic Theses Dissertations

Dissertations and theses produced at universities are important sources of information and knowledge for further research. A large number of universities have converted their theses and dissertation collection into digital libraries and have made it available on Internet for global access. A number of universities have also implemented Electronic Theses and Dissertation programmes, where researchers submit theses

in electronic format. Some initiatives such as *Networked Digital Library of Dissertation and Theses (NDLTD)* (www.ndltd.org) in development of web based union catalogues of ETDs submitted over 100 libraries throughout the world are worth mentioning.

3.5.4 Patents

Many patent issuing authorities now have made their complete full text patent records online. For example United States patent documents can be searched and downloaded free of cost from (www.uspto.gov/patft/index.html). Some of the commercial organizations such as *Derwent* also provide downloading of full text patent from either an online database vendor (e.g. *Dialog, STN*) or directly from their site to the subscribers

3.5.5 Course Material

A large number of web based course ware and teaching aids are being developed to facilitate flexible open learning by many universities and commercial organizations. Many academic institutions have adopted such course

material for their curricula. Libraries can provide access to course material to the learners and teacher and thus contribute to open learning. This can be done by providing links to the courseware sites through subject gateways or provide local access after downloading the material. Some of the important sites where web based course material and tools can be found are *Ask ERIC* (<http://ericir.syr.edu/>),

CAREO-Campus Alberta Repository of Educational-Objects Alexandria (<http://www.careo.org>),

3.6 Online User Awareness Programmes/ Tutorials

Libraries can use the internet or CD-ROMS to educate their users or carry out information literacy programmes. Virtual tours can be offered online making user education more convenient for all.

3.7 Web OPAC

The Library catalogue is perhaps the most important tool for locating material in the Library. Unfortunately until recently its value has been restricted by its physical form, most commonly a large card catalogue or a set of printed volumes. The advent of computers, with their ability to process large amounts of information and output in a variety of formats has finally brought the library to the customer, wherever he or she may be located, in the form of Online Public Access Catalogue (OPAC). OPAC provides access to the catalogue through a computer terminal. OPAC allows searching the entire catalogue online, conveniently and quickly, using one or more search criteria. One can, for example, search by author, title, keywords, class number or one or more of these combined together. OPAC even shows the current status of a book, whether it is loaned out, available on the shelf or lying elsewhere. Another advantage of OPAC is its ability to display catalogue records in a variety of formats such as AACR2, MARC etc, and the records can be displayed in a desired order. For example one can display records arranged (sorted) by author, title or call number. Most library management packages offer printing of bibliographies from OPAC either on a printer or on a file. An OPAC terminal should be equipped with search software, which is usually part of integrated library management systems such as *LibSys, EasyLib, NewGenLib, SOUL, Sanjay* etc. Some integrated library management packages even use OPAC for other user services like reservation, membership enquiry and registration, interlibrary loans etc.

Another convenience that OPAC offers is accessibility from a remote computer, using a local area network (LAN) or a wide area network (WAN). With modern library systems offering interface to OPAC, it is also possible to provide access from anywhere in the world via Internet. An internet enabled OPAC is called Web OPAC.

Web OPAC can be searched using any common browser, such as Microsoft Internet Explorer or Netscape Navigator. Web OPAC. Apart from searching OPAC, some libraries allow their remote users to avail certain online services like book reservations, loan requests for postal loan, loan renewals, membership application, address change, suggesting books etc. The advantage of the OPAC over manual methods is ease of use and the fact that it saves space. It provides access to the catalogues of a library on the local intranet, extranet or even the internet.

4. DIGITAL LIBRARY AND ARCHIVES

Many Libraries traditionally have been repositories of local information and heritage documents such as manuscripts, rare books, maps, photographs and paintings etc. Archives or record management is also part of LIS function, particularly in business and research organizations. In other cases such as university libraries, documents generated in-house such as dissertation and theses, research reports etc represent the intellectual strength of the institution. Libraries are developing digital repositories of such resources, and providing Internet or intranet access to these. Large public and academic libraries also provide up to date local information via internet. Digital libraries are a natural progression from electronic document sharing. The main benefit of digital library is the ability to provide 24-hour, remote access to high-demand or restricted materials for multiple concurrent users. Setting up a digital library can either be done using, “off- the – shelf” digital library products, document management products or library management products capable of digital library management; or in-house system development using open archives software. Some of the off-the-shelf products are from *Blue Angel Technologies*, *CONTENTdm*, *Crossnet Systems Ltd*, *Endeavor Information Systems* , *Epixtech*, *ESP*, *Ex Libris* ,*Fretwell-Downing Informatics*,*IBM*, *Sirsi*, and *SydneyPlus.Greenstone*(<http://www.greenstone.org>) is a leading open source digital library management software.

5. ADVANTAGES

- 5.1** ICT makes library work easier, faster, cheaper and more effective.
- 5.2** Helps to manage information overload as information retrieval is made easier in Computerized systems.
- 5.3** Remote access is enabled through networked systems
- 5.4** Computerization saves space and reduces paper.

6. BARRIERS for ICT IMPLEMENTATION

- 6.1** Lack of availability of funds
- 6.2** Lack of planning for whole or partial application of IT
- 6.3** Constant change of software and hardware
- 6.4** Erratic power supply
- 6.5** Insufficient bandwidth
- 6.6** Lack of technical IT knowledge by library staff
- 6.7** Copyright and intellectual property rights management

7. CONCLUSION

ICT has made access to the library very convenient and easy. With the invent of e-libraries, access to the library has been brought even to the most remote areas and has brought learning to the feet of everybody. Computer and related technologies has brought revolutionary changes in the whole world of information. Perhaps it is the most exciting period in the history of human race when world’s most population is shifting from “techno-illiterate” to „techno-literate”.

This revolutionary change is also true in case of libraries and information centers. Libraries and information centres hardly function today without computers and information technologies. I believe ICT in the library has brought more advantages than challenges to library services. To conclude we can say that ICT have the potential to offer libraries and librarians the tools and techniques with which they can provide effective and better services to the users and satisfy all their information needs for study, teaching and research without the barriers of time and space.

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