

Application of Information and Communication Technology in University Libraries

DEV PRAKASH SINGH¹ and VINOD KUMAR SINGH²

¹Institute of Commerce and Management, Jiwaji University, Gwalior (M.P.)

E-mail: dev_prakash86@yahoo.com

²Department of Library & Information Science, University of Delhi, Delhi

E-mail: vikusi@gmail.com

(Acceptance Date 11th November, 2010)

Abstract

Information and Communication Technology (ICT) has revolutionised library and information services. Libraries are now expected to use various information technologies to provide information more expeditiously and exhaustively than before. The libraries have found it very difficult to acquire, arrange, process and disseminate information in traditional ways. Information and communication technology offers numerous possibilities to improve information management in libraries and therewith make better use of employees' knowledge. One of such options is use of intranet as internal information system of Universities, which is based on Internet protocols and services. It enables relatively inexpensive and simple storage, organization, processing, maintenance and sharing of information between the library users and library, all these tasks are essential for good information management. It could be possible easy use of libraries, very easy search of any book, research article, thesis, or any type of material in libraries because of the Information and Communication Technology. ICT presents use of various technologies such as computer, telecommunications, Internet, Intranet, application software, micrographic, reprographics, video recordings and other electronic devices for the storage, retrieval, reproduction and dissemination of information in a library environment.

Key words: Library; Information Technology; Information and Communication Technology,

1. Introduction

Technology has revolutionised library and information services. Libraries are now expected to use various information

technologies to provide information more expeditiously and exhaustively than before. After World War II, huge amount of information in the form of books and other printed materials have been produced. The libraries have found it very difficult to acquire, arrange, process and disseminate information in traditional ways. So libraries are compelled to plan, organise and communicate the huge information according to the needs of users with the help of Information Technology. Library is the product of our "cultural maturation". It has been recognized as the heart of an educational institution and a centre for research. It is said to be like a hub of a wheel whose spokes radiate out to all the departments of learning. It is a system of collection of knowledge controlled in macro or micro documents - their acquisition, organization and service for dissemination to the demand and need of the users and for its use by the present generation and posterity. Basically library is considered a trinity of documents, readers and staffs.

2. *Information and Communication Technology:*

Information and Communication Technology is a powerful tool for shrinking the distance and making the resources available at any time in any format, anywhere to the global community. It is a diverse set of technological tools and resources to create, disseminate, store and manage information. In the domain of library and information science the term ICT means use of various technologies such as computer, telecommunications, Internet, Intranet, application software, micrographic, reprographics, video recordings, and other electronic devices for the storage, retrieval, reproduction and dissemination of information

in a library environment.

2.1. *Definitions of Information and Communication Technology :*

The term ICT has been defined by various authorities variously. Some important definitions of IT or ICT are:

According to ALA Glossary, "Information technology is the application of computers and other technologies to the acquisition, processing, storage, retrieval and dissemination of information."¹

According to T. Vishwanathan, "Information technology is the scientific technological and engineering disciplines and the managerial techniques used in information handling and processing, their application, computer and the interaction with man and machines and associated social, economic and cultural matter."²

According to J. Rowley, "Information technology means the collection, storage, processing, dissemination and use of information. It is not confined to hardware and software, but acknowledges the importance of man and goals he sets for this technology, the values employed in making the choices, the assessment criterion used to decide whether he is controlling and enriched by it."³

In general ICT can be defined from the library and information science point of view as 'An application of various technologies for the acquisition, processing, storage and dissemination of information. In terms of technology point of view it includes various

technologies such as computers, telecommunications devices, reprography and printing etc.' Thus, information technology connotes as assemblage of technologies.

3. Application of ICT in Library Activities :

ICTs are applied in the following library activities:⁴

- (a) Housekeeping Activities
- (b) Information Services
- (c) Management Support Activities including Financial Management
- (d) Networking
- (e) Copying and Communications

3.1. Housekeeping Activities

3.1.1. Acquisition

Computerized acquisition helps in selection, ordering, processing books and other library material. While selecting, ordering, accessioning books, libraries will be using most of the same bibliographical details of documents, such as author, title, imprint, collation, etc. in the process computers enable libraries in making use of the same data available in different files without entering it again each time. In this way, computers help in performing some important activities in acquisition, such as pre-order searching, approval process, placement of orders, receiving and accessioning documents, invoice processing and payment arrangement, order follow-up and online enquires, preparation of reports, etc.

3.1.2. Cataloguing :

Computerized catalogue is the most efficient tool in retrieving information about the documents available in a library easily and quickly. Catalogue of holdings can be prepared easily on the computer by importing the bibliographical details of the computer. Using computers significantly reduces the time consuming activities, such as catalogues card production, catalogue maintenance, thesaurus construction, indexes-authors, keywords, etc, OPAC, etc.

3.1.3. Serial Control :

Computers help in periodicals subscription and subsequent monitoring of the receipts of the individual issues. In computerized serial management, it will be easier to detect and control the non-receipts of the periodicals issues and sending timely reminders to suppliers. It helps in maintaining record of budget sanctioned and amount expended for different subjects and categories of serials. Some important jobs performed by using computers are processing new subscriptions, processing renewal subscription, order placing and invoice processing, receiving and recording issues, claiming missing issues, maintenance of list of periodicals, serial holdings, circulation of periodicals, etc.

3.1.4. Circulation

The use of technological devices such as computers, barcodes, optical scanners, software used for circulation helps in performing these routine operations easily and fast. Computers help numerous activities in circulation, such as issue and return of documents, control on the number of books to be issued, renewal and

reservation of documents, sending reminder notices, calculation of membership records, maintenance of membership records, circulation statistics, stock verification, etc.

3.2. *Information Services :*

Use of information technology in libraries results in cost efficient and cost-effective information services. Some important information services are reference services, information search services, bibliography and indexing services, inter-library loan services, current awareness services, selective dissemination of information, document delivery services, E-mail, Internet, preparing reader's profile, file transfer, etc.

3.3. *Management Support :*

Management needs information for taking right decisions. Information facilitates decision making. Computerized library can provide information quickly by the management in numerous purposes, such as budgetary control, preparation of accounts, maintenance of records, generation of library statistics, generation of reports, preparation of staff profiles, etc.

3.4. *Networking :*

In India more than 300 universities and over 8000 colleges using the library services for their academic and research activities depend on the resources available in their libraries. Library network system will enable the universities and the higher learning institute to share and electronically transmit the information resources among them. Network refers to a series of interconnected computers,

peripherals and/or terminals, which are communicating with each other.

3.4.1. *Library Consortium :*

A consortium is said to be 'a co-operative arrangement among groups or institutions or an association or society.'⁵ To overcome the problem, library consortium, the group of libraries coming together with common interests, is emerging as a new concept that facilitates the libraries to get the benefit of wider access to electronic resources at affordable cost and at the best terms of licenses. INDEST –AICTE Consortium, CSIR Consortium, FORSA Consortium and UGC-Infonet Digital Library Consortium are the examples of library consortium.

3.5. *Coping and Communications :*

The improvement in copying techniques, especially the use of electrostatic processes, particularly xerography has helped to raise the level of library services. Improvements in communication methods, particularly the use of Telex, Fax, E-mail, and Telefacsimile have made it possible for the faster dissemination of information and the leading of materials to be speed up.

4. *Impact of ICT on Library and Information activities :*

Libraries are experiencing a significant impact of IT on information processing, sources and services. Rapid technological developments enabled libraries not only to improve the quality of existing services but also to offer a wide range of new services to users. Today, libraries have wide range of opportunities

and variety of challenges offered by the rapid development and wide application of Information Communication Technology. ICT has become integral part of all library operations and information services. This movement of using ICT in libraries has dramatically changed the ways by which data acquisition, processing and access has been carried out and the libraries have provided information services. As this technology provides librarians with new choices, new opportunities and new challenges, there has been a phenomenal progress in the use of ICT applications in library operations and information services in the developed countries of world. ICT usage in Indian libraries has also gained considerable momentum in recent years, which is going to increase at much faster rate in future. The most profound impact of the application of IT has been noticed in the area of reference service. Briefly we mention the following impacts:⁶

(i) Valuable space may be saved by storing information electronically.

(ii) More and more readers may discontinue availing for reading room facilities and switch over their private terminals or the terminals provided by the library.

(iii) With access code given to readers they can have access to computer in library for 24 hours of the day through their terminals.

(iv) Due to networking, there can be resource sharing which will avoid duplication of resources in a library resulting in promptness and efficiency of retrieval and better management of manpower.

5. Emerging Information Technologies for

Libraries :

5.1. Multimedia :

Multimedia is media and content that utilizes a combination of different content forms. Multimedia includes a combination of text, audio, still images, animation, video, and interactivity content forms. Hypertext and Hypermedia technologies are used in multimedia. Hypertext is concerned with the presentation of information in non-linear, non sequential fashion, whereas Hypermedia is the extension of hypertext that supporting linking graphics, sound and video elements in addition to text.

5.2. Barcode :

A barcode is an optical machine-readable representation of data. Originally, bar codes represented data in the widths (lines) and the spacing of parallel lines, and may be referred to as linear or 1D (1 dimensional) barcodes or symbologies. They also come in patterns of squares, dots, hexagons and other geometric patterns within images termed 2D (2 dimensional) matrix codes or symbologies.

5.3. Online Public Access Catalogue (OPAC) and Web-OPAC :

Online Public Access Catalogue (OPAC) is a computer based and supported library catalogue (bibliographic database) designed to be accessed via terminals so that library users may directly and effectively search for and retrieve bibliographic records without the assistance of a human intermediary such as the specially trained number of staff. Web OPAC allows users to interact with documents stored on computers all over the world and

makes easier access to catalogue data in the form of bibliographic records.

5.4. *Smart Card* :

A smart card, chip card, or integrated circuit card (ICC), is in any pocket-sized card with embedded integrated circuits which can process data. Memory card and microprocessor card are two broad categories of ICCs. Memory cards contain only non-volatile memory storage components and perhaps some specific security logic. Microprocessor cards contain volatile memory and microprocessor components.

5.5. *Personal Digital Assistant* :

A personal digital assistant (PDA) is a handheld computer, also known as a palmtop computer. Newer PDAs also have both colour screens and audio capabilities, enabling them to be used as mobile phones (smartphones), web browsers, or portable media players. Many PDAs can access the Internet, intranets or extranets via Wi-Fi, or Wireless Wide-Area Networks (WWANs). Many PDAs employ touch screen technology.

5.6. *Blog or Weblog* :

A blog (a contraction of the term web log) is a type of website, usually maintained by an individual with regular entries of commentary, descriptions of events, or other material such as graphics or video. Entries are commonly displayed in reverse-chronological order.

5.7. *Wiki* :

A wiki, originating from the Hawaiian

term for quick, is an open shared space for collaborative content contribution and editing. Contribution to a wiki requires no HTML or programming knowledge. Unlike protected web pages, any information added to a wiki can be changed or deleted by "anyone." Anyone with a web browser can insert new pages, include new content to existing pages, or delete existing information.

5.8. *Really Simple Syndication (RSS) Feeds*:

RSS is an XML format that stands for rich site summary or really simple syndication. It allows users to receive content from sources such as news organizations, blogs and any web page that changes its content frequently. RSS newsreaders allow you to view the pages you select all together in the same place and, by automatically retrieving updates, and stay current with new content soon after it is published without filling up your e-mail box or requiring you to check various web sites.

5.9. *Podcast* :

The word podcast originates from combining the words "iPod" and "broadcast." A podcast is an audio program distributed over the internet. Consider it like a radio show. Each show consists of a series of individual episodes that you can listen to however, whenever, and wherever you want. Similarly to blogs, the standard way of receiving podcasts is by subscribing using a podcatcher or a podcast-client such as iTunes, Juice, gPodder, Odeo and PodSpider.⁷

5.10. *Vodcast* :

A vodcast is a term used to describe

the online delivery of video on demand via Atom or RSS attachments. Libraries are using vodcasts to illustrate what the library has done and to attract the community to attend future programmes.⁸

5.11. *Web Conferencing :*

Web conferencing is used to convene group meetings or live presentations via the internet. A web conference usually features a web version of a PowerPoint presentation and web co-browsing, whereby conference participants see whatever is on the presenter's screen; voice communication, either through a traditional telephone conference, or through voice over internet protocol (VoIP); and text messaging, enabling participants without a microphone to use text chat in place of voice.⁹

5.12. *Instant Messaging :*

Instant messaging allows online communication between two or more people using typed text sent via computers in real-time. The use of instant messaging in libraries to provide a virtual reference service increases the availability of services to clients at no cost to the library offers an alternative method of communication to clients and brings the library to the community.¹⁰

5.13. *Radio Frequency Identification (RFID):*

Radio Frequency Identification (RFID) is a flexible and versatile technology that has become prominent in the areas of supply chain management and security. The technology uses radio frequency communication to transfer data between the two key components of an

RFID system, the tag and the reader.¹¹

5.14. *Expert System :*

Expert system can be defined as a computer system that embodies knowledge about a specific problem domain and can solve problems from the domain using its knowledge with a degree of expertise that is comparable to that of a human expert. Some important expert systems in the field of library science are RRA (ready reference Advisor), RAS (Ready Reference Advisory System, Yes-SIR, and N-Cube.

5.15. *Wireless Technologies :*

Wireless networks use high-frequency electromagnetic waves, either infrared (IR) or radio frequency (RF) to transmit information from one point to another without relying on any physical connections. There are a large number of different technologies that can be used in wireless library network applications. Following are some of the technologies for wireless networking:¹²

5.15.1. *Wireless Fidelity (WI-FI) :*

The term Wi-Fi often is used by the public as a synonym for wireless Internet (WLAN). It is a flexible data communication system implemented as an extension to or as an alternative for, a wired LAN. It uses a high speed, radio-frequency (RF) network access technology to transmit data. It links computers to each other or to networks for shared access and Internet based information.

5.15.2. *Worldwide Interoperability for*

Microwave Access (WI-MAX) :

Wi-MAX provides wireless transmission of data using a variety of transmission modes, from point-to-multipoint links to portable and fully mobile internet access.

5.15.3. Bluetooth :

Bluetooth is an open wireless protocol for exchanging data over short distances from fixed and mobile devices, creating personal area networks (PANs).

5.15.4. Infrared Data Association (IrDA):

IrDA is a wireless technology that uses infrared, a faster wave frequency that is closer to visible light. It is a cable replacement technology similar to Bluetooth wireless technology. It has a short transmission range, 15 feet to 5 metres.

5.15.5. High Performance Radio Local Area Network :

High Performance Radio Local Area Network type 2 (HIPERLAN/2) provides high-speed multimedia communications between different broadband core networks and mobile terminals. HIPERLAN/2 relies on cellular networking topology combined with and adhoc networking capability. It supports two basic modes of operation: centralised mode and direct mode. The centralised mode is used in the cellular networking topology where each radio cell is controlled by an access point covering a certain geographical area. The direct mode is used in the ad hoc networking topology, where a radio cell covers the whole serving area.

6. Conclusion

The concept of library is changing very due to impact of ICT. Now the libraries will not have only printed collections but also digital resources, which are not seen physically. The technology has forced the library to digitize information. The advent of internet has radically changed the form of library classification and cataloguing. To store, organize and retrieve the data on the Web, we use the terms metadata for cataloguing and facet classification for classifying the information. Fewer changes are noticed not only in the access of data, classification and cataloguing but also in issue and return, staff, building, furniture, equipment, etc. The reference service will be replaced with Virtual Reference Desk. The trend is that print collection will decrease and digital collection will take its place such as subscription of online journals and CD-ROM Databases. The libraries would also like to digitize the existing collection on selective basis where the copyright act is not involved.

RFID technology will not only help the self-issuing but also checking the theft of reading material. In addition this technology is used for stocktaking and tracing the misplaced books. Keeping in view of all this the libraries will need redefining or reengineering as they may be named as knowledge Management Centres, Cyberary, Ebrary, Virtual or Digital Library.

No doubt technology will play role in changing the shape of libraries in the time to come yet basic material will remain the same. Whatever the technology may come and find use in the library or the benefit of users to access the information as a fast mode of

communication and whatever nomenclature may be given to library, but it is hard fact that the print media will hold the vein of library for the society.

References

1. Sharma, Ajay Kumar. "Modern Information Technologies and Library & Information Services." *International Library Movement* 22.3, P.123 (2000).
2. Kaur, Rajawant. "Applications of Information Communication Technology in Libraries: A Brief Overview." *International Library Movement* 28.2, P.91 (2006).
3. Ibid.
4. Ibid. P. 95-101.
5. Rajgoli, Iqbalahmad U., Christina Birdie, and C. R. Karisiddappa. "Use of Information Resources through Consortia Mode in Indian Library and Information Centers: A Case Study of FORSA Consortium." *IASLIC Bulletin* 50.2, P.74-75 (2005).
6. Sharma, Ajay Kumar. Op. Cit. P. 130-133.
7. Kajewski, Mary Ann. "Emerging Technologies Changing our Service Delivery Models." *Electronic Library* 25.4 (2007). P.424-425. *Emerald*. <www.emeraldinsight.com/Insight/viewPDF.jsp?contentType=Article&Filename=html/Output/Published/EmeraldFullTextArticle/Pdf/2630250405.pdf> (Accessed on 17 Sep. 2010).
8. Ibid. P.426.
9. Ibid.
10. Ibid. P.427.
11. Curran, Kevin, and Martin Porter. "A Primer on Radio Frequency Identification for Libraries." *Library Hi Tech* 25.4 (2007). P. 595. *Emerald*. <<http://www.emeraldinsight.com/Insight/viewPDF.jsp?contentType=Article&Filename=html/Output/Published/EmeraldFullTextArticle/Pdf/2380250412.pdf>> (Accessed on 14 Sep. 2010).
12. Mohamed, Haneefa, K. "Application of Wireless Technologies in Libraries." *Proceedings of the Second International Caliber New Delhi, Feb. 11-13, 2004*. Ahmedabad: INFLIBNET Centre, 2004. P. 368-369. <http://202.141.12.214:80180/jspui/bitstream/1944/356/1/04cali_48.pdf>. Hindustan. 15 Jan. 2009:7> (Accessed on 17 Sep. 2010).