

Use of Information and Communication Technology in Academic Libraries

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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. This paper overviews the basic concept of information and technology used in libraries.*

Key words : Information technology, electronic publishing, web 2.0, cloud computing

Introduction

Information is a valuable resource in all types of libraries, but the ICT tools that are important to create, collect, consolidate and communicate information are used in majority of libraries. The rapid developments in Information Communication Technologies (ICT) have given a solid foundation for revolutionary changes in the information handling capabilities of academic libraries and information centres all over the world. ICT includes acquisition, processing, storage, retrieval and dissemination of information by means of computers and communicating systems. In a dynamic and interactive academic learning environment, information communication technology also includes repro-micrographic technology, database creation and use, in addition to computer technology, digital technology, multimedia technology, network technology, telecommunication technology, barcode technology, web technology, etc. One of the most relevant outcomes of ICT is the introduction of advanced communication network or the internet, which has necessitated a major shift in the role of academic libraries from ownership model to access model, from print to electronic media, from libraries as archives to libraries as access points, and from information collection to information analysis and repackaging .The change from print to digital information has a high impact on libraries, information centres and other institutions directly involved in processing information. The ability of computers to perform high volume error-free repetitive tasks at speeds much faster than human beings, along with the emerging developments in the area of computing;

telecommunications, networking and resource sharing, has made access to information anytime, anywhere possible .

Information and communication technology in LIS

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).

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 a software used to search a database. Search engine is useful to get an idea about a subject or concept. Examples are Google, Bing, etc.

1. Wireless Network technology

Though there are a lot of developments in wireless network technology, in most academic libraries in India, cabled computer networks are more common than wireless broadband network. The emerging wireless, mobile and internet technologies may take some more time to have an effect in the University Libraries; however, a brief outline of some of the recent developments in wireless, mobile, internet and web technologies are listed below.

1. Bluetooth is an emerging wireless technology meant for broadband wireless communication between devices like digital cameras, laptops, mobile phones, Personal computers, printers, scanners, etc., within a short range.
2. 3G telecommunication or third-generation wireless communication technology is meant for wide area wireless cellular telephone network. It can process audio, graphics, video, etc., at high speed.
3. GPRS or General Packet Radio Service is a mobile technology that helps to download web pages and send text messages in cell phones quickly. It helps the users to have uninterrupted access to internet through mobile phones or computer.
4. VoIP or Voice over Internet Protocol is an internet technology to transfer digitized voice over broadband network. As communication is over internet, the cost of phone call is less than that of regular phone. VoIP can empower academic libraries to promote and expand their distance learning services, virtual reference services and other global collaboration services.
5. RFID or Radio Frequency Identification or electronic tagging is a non contact automatic wireless identification technology to track objects at a distance from a couple of inches to 20 to 30 ft away (Li, 2009). It uses microchip, which transmits a stored code to a reader, which can be fixed or hand-held. Compared to traditional barcode technology RFID has many advantages like quick access, greater storage capacity, resistance to high temperatures, water-resistance, etc. RFID implementation in University libraries will help to increase efficiency in circulation section, in better security management and can be used for stock verification.
6. Semantic Web is an intelligent web technology that allows machines to understand the meaning or "semantics" of information on the World Wide Web. World Wide Web Consortium (W3C) director Tim Berners-Lee coined the term. According to W3C, the core of semantic web is the resource description format (RDF), an XML-based mark-up language for defining metadata about web information (Semantic Web, 2010). The semantic web is a vision of

information that is understandable by computers, so that computers can process the information on the web.

7. Wi-Fi is short for “wireless fidelity”. Many libraries have introduced free Wi-Fi Internet access. The library says that patrons bringing in their own wireless-equipped laptops will have access to “the entire range of full-text databases normally accessible from the library’s own computers.

2 Electronic Publishing

Electronic publishing covers all aspects of traditional publishing, but in a digital environment, it is another major technological development facilitated by the convergence of computer and communication network. Electronic publishing means the use of electronic devices in the publication and distribution of information. The end product of electronic publishing can be print-based or non print based. In the non print form, the end products are accessed electronically through traditional medias like CDROMs, or through Internet as Electronic journal, Online databases ,E-book, or in the form of OPACs, blogs, wikis, podcasts, etc.

Digital Library is an example of E Publishing, providing access to information based on resources, including text, images, audio, video and other scholarly library materials that have been electronically converted or in electronic formats. There are many different kinds of digital libraries creating, delivering and preserving digital objects from many different formats of data.

Another example of electronic publishing is electronic journal, which is a full text journal published electronically, and can be accessed on the web. Either an electronic journal can be free or subscription based. Advantages of electronic journal are its ease of access and regular updating, ease of downloading articles, etc. Many publishers now offer electronic journals along with print version with sometimes free access to the electronic journal on subscribing to the print version.

E-books are the latest addition in the world of electronic publishing. E-books are designed to use with E book readers. Though they can save a lot of space, due to the high cost, E-books are not very popular in academic libraries.

3 Web 2.0 in Libraries

Technological innovations together with the influence of Internet and WWW have transformed the methods of communication, entertainment, teaching, and learning in the academic community and society as a whole. The developments in web applications and services are now termed as the Social Web or Read /Write Web or Web 2.0. There are different definitions for Web 2.0 .It is a user-centric web, including various web tools like Blogs, Podcast, Wikis, RSS feeds, Social networks, Social bookmarking, Mash ups, etc. The application of Web 2.0 in libraries can be termed as Library 2.0. Some of the tools that are relevant to libraries are briefly described here. An individual with regular entries, events or materials such as graphics or video usually maintains Weblogs or Blogs. It is a kind of web portal containing chronological web publication for personal or professional purposes. There are different types of blogs defined by the method in which content is written, by type of media, device like mobile phone, by type of subject, etc. Blogs are created using blogging software available on the net. E.g., Blogger (free),

Web logger (fee based). Its application in library setting is to organize a library’s activities, news, notices, reports, etc. in a chronological order. It can be used to announce new services of library and publish web pages easily without depending on hardware and HTML skills. Librarians can get current information on different subjects, .e.g., forthcoming conferences through blogs and provide this current information to users through library blogs. Using blogs library staff can directly communicate with the users.

Podcast is a pre-recorded piece of audio and sometimes video, available online. It is usually downloaded and saved for future listening. Librarians have to explore this method of content delivery as users can access different types of content from media and other service-oriented institutions. Libraries can experiment by sharing audio content and, including book reviews, interviews with authors, etc. Podcasts also enable students and teachers to share information, and teachers may create podcasts to be used as a preparation tool for students.

RSS or Really Simple Syndication is a service that transfers contents from blog or other syndicated content to an aggregator. It facilitates users to keep track of new updates on selected web sites. All blogging software create an RSS feed as back end of HTML web pages. RSS feeds is a family of web feed format used to publish frequently updated works such as blog entries, news headlines, audio, and video in a standardized format. Librarians can place RSS feeds of content on their web sites to build awareness about their new services, forthcoming books etc.

4. Cloud computing in libraries

Cloud computing offers many interesting possibilities for libraries that may help to reduce technology cost and increase capacity reliability, and performance for some type of automation activities. Cloud computing has made strong inroads into other commercial sectors and is now beginning to find more application in library science. The cloud computing pushes hardware to more abstract levels. Most of us are acquainted with fast computing power being delivered from systems that we can see and touch. Cloud computing has large potential for libraries. Libraries may put more and more content into the cloud. Using cloud computing user would be able to browse a physical shelf of books, CDs or DVDs or choose to take out an item or scan a bar code into his mobile device. All historical and rare documents would be scanned into a comprehensive, easily searchable database and would be accessible to any researcher. Many libraries already have online catalogues and share bibliographic data with OCLC. More frequent online catalogues are linked to consortium that share resources. Examples of cloud library are OCLC, worldcat etc.

ICT skills and competencies for library professionals

The dynamic environment of the library and information sector stresses the need for academic library professionals to remain flexible and adaptable to change. Effective organization of resources in the web and managing internet tools and services requires certain skills and knowledge for Library professionals, to meet the different information needs of faculty and students. They have to assist the

academic community in getting relevant information using innovative methods. For this the mere enhancement of the present skills of traditional librarian may not be enough. It might require a total transformation of the skills and the way library professionals think and act. Using the platform of Internet and WWW, University libraries have to expand their resources and services by devising strategies to attract more users to the library when the users are now inclined to access the information they need outside the walls of the library. A number of competency studies have been conducted in the field of library and information studies during the last few years in the wake of developments in information technology. Most of these studies were generally concerned with the common competencies needed by LIS professionals.

Technology competencies

As technology has saturated all levels of library's operations and services, the library professional in an academic institution has to anticipate the changing expectations of users, and be flexible in adapting and adopting new skills and levels of awareness. Listed below are some of the basic technology competencies important for an academic librarian. Knowledge about relevant developments in information technology like email, internet, and web search strategies. Skills in basic computer hardware, troubleshooting and networking Knowledge about software applications and operating systems Automation of library services and its management Familiar with web tools like blogs, social networking, RSS feeds, etc.

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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