

Applications of Information Communication Technologies in Academic Libraries

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Abstract

In the modern digital era the application of Information and Communication Technology (ICT) in academic libraries has great impact not only in the management of libraries but providing efficient library services to the users. Most of the modern libraries in academic institutions are functioning in an Automated Networked Digital Environment providing digital resources and services. The present study surveys the latest ICT applications being used in the academic library system to transform walled libraries into libraries without wall. The Open Source Library Management Software, Online e-Resources, Library Web Portal, Institutional Repositories, Cloud Computing applications, RFID applications, and Social Media applications have transformed the academic libraries into a digital virtual libraries accessible to users round the clock just a click away. These ICT applications have great impact with the users prospective and to a large extent meet the changing needs of users with fast changing ICT.

Keywords: ICT, Academic Libraries, Institutional Repositories, Cloud Computing, Digital Libraries, E-resources, Library Automation, Social Media, Virtual Library.

1. Introduction

Information Communication Technology (ICT) in the context of Library and Information Science the ICT refers to the acquisition, storage, processing and transmission of information with the help of modern technologies like use of computers, software and networking, etc. The academic libraries serve to various types of academic institutions like Schools, Colleges, Universities and Deemed Universities. The libraries may be categorised as School Libraries, College Libraries or University Libraries depending upon the parent institution to which they belong. These Libraries procure resources and render services according to the mission and mandate of the parent institution. The basic nature of all the academic libraries is to fulfil the teaching research and other information needs of the faculty, students and staff of the academic institution in support of academic, research and other related activities. Developments of ICT technologies have changed the services of academic libraries. Due to this libraries are accepting the challenge to provide these services to their clientele in order to fulfil the desired information needs.

2. Objectives of the study

The major objectives of the current study are following:

- ❖ To find out the latest Information Communication Technologies being applied in the academic libraries.
- ❖ To assess the impact of Information Communication Technologies on library resources and services and entire Academic Library System.
- ❖ To find out the benefits derived by library users with the implementation of Information Communication Technologies in academic libraries.

3. Applications of Information Communication Technologies in Academic Libraries

Academic library is a hub of any academic institution nourishing the growth and development of the faculty, students and staff in teaching, research and other academic activities. The Libraries of the academic institutions are on the forefront in the application of Information Communication Technology. The academic libraries are extensively using ICT for rendering digital library services to meet the user expectations.

3.1 Networking

Initially computers were being used as standalone system and gradually the computer networks emerged and today we have various types of Computer Networks like Local Area Network (LAN), Campus Area Network (CAN), Metropolitan Area Network (MAN) and Wide Area Network (WAN) depending upon the size and complexity of Network. The Computer Networks have various geometrical arrangements known as network topologies. Mostly star topology is used for connecting computers in a LAN. The server is connected through switch with other computers (clients) and computer peripherals in client server architecture. Therefore libraries which are using ICT, function in a networked digital environment. The Library LAN is connected to the WAN. In this way the resources publicly available on the library server may be accessed from anywhere and anytime. The OPACs and Web OPACs, Institutional Repositories and many other resources and services made publicly available by any academic library are globally accessible 24/7.

3.2 Library Automation

With the advent of ICT, the libraries are functioning in automated network environment. The traditional manual functions of the library like acquiring learning resources; technical processing and circulation have embraced ICT in most of the libraries including Academic Libraries. Most of the academic libraries are using Library Automation software for the automation of their traditional library functions. There are broadly two kind of software are available, the one proprietary software or commercial software, which are being developed and maintained by the commercial firms and another type of software are Open Source Software (OSS). The source code of OSS software is publically available and such software are developed and maintained by the particular software communities. The prominent proprietary Library Automation Software include LibSys, Soul, Liberty, and Alice for

Window, etc., while KOHA is the most widely used OSS which is maintained by the Koha Community. The regular updates of Koha are released and full technical support is provided by the Koha Community. Libraries may adapt to the OSS without making any expenses for the software and large library systems may maintain this software at their own or with minimum expenditure for software management availing the software management services provided by the various firms in the market. Contrary to this for commercial Library Automation software libraries are required to pay lot of expenditure on procurement as well as on annual maintenance expenses. Due to these reasons many Libraries using the commercial software have switched over to the OSS. The Academic Libraries may take decision according to the availability of funds and their system requirements but according to the current trend for library automation OSS are quite promising. A typical Library Automation Software includes various modules like Acquisition, Circulation, Serial Control, Cataloguing, Report generation and Administration for the effective management of library in automated environment.

3.3 RFID Applications

Radio Frequency Identification RFID is the latest technology being used for the automation of the circulation in automated library system. RFID technology being more efficient, libraries are using this technology to replace the Barcode system of circulation for lending items in the libraries. In this technology a radio frequency antenna of the RFID work station identifies the information contained in a microchip or tag kept in the book or lending item. The RFID workstation not only reads the digital information stored in the tag or chip but can also activate and deactivate the chip so that RFID Gate installed at the entry point will accordingly trigger the alarm or will not trigger the alarm, acting as the anti theft device. The entire RFID system includes Workstations, Tags, Book Drops, Self Checkin/Checkout Kiosks, Handheld Readers and RFID Card Printer. The RFID system uses third party hardware and software which communicates with the LMS like KOHA through Session Initiation protocol SIP/SIP2. The RFID system has inherent problems depending upon the quality of the hardware but for a large library system efficient circulation or lending services may be provided with minimum staff with the implementation of efficient RFID System.

3.4 E-resources

With the advent of Information Communication Technologies, the Academic Libraries started subscribing E-resources. The traditional printed Books, Journals, Theses, Standards, are now available in electronic format and some of the resources are predominantly being subscribed in electronic format like online journals. The print format of Journals is gradually getting obsolete. The Reference sources like Dictionaries, Yearbooks, Encyclopaedias, etc. are also published in online electronic format. The easy access search and retrieval makes online electronic format most suitable for the reference sources. The electronic format has made it possible to subscribe e-resources in consortia mode and consortia like e-ShodSindhu and CeRA etc. are catering to e-resource needs of all the educational institutions in their purview. The Electronic Thesis and Dissertations (ETDs) are so popular and suitable for long term preservation that it has been made mandatory for all academic institutions to submit a

copy of theses in electronic format in Shodhganga Repository or any other repository of parent Institution or Organisation. All the major Indexing Abstracting services like AGRIS, CABI, Biological Abstracts etc. are now available in electronic format only. Most of the printed resources are now available in electronic format consequently the share of e-resources in academic libraries is gradually increasing. This is also necessary for the academic institutions to provide round the clock accessibility of e-resources within and outside the campus. The third party resources like publisher's e-resources including e-Books, e-Journals and Databases are online accessible on the LAN of the campus through IP based access and may be made accessible to the users outside the campus through remote authentication technology.

3.5 Library Web Portal

The web presence of the libraries is indispensable in this digital era. Most of the Libraries have either the separate web site with different domain name or most often a distinct part of the website of the academic Institution. Libraries provide complete profile of the Library through web page integrating the information about the staff functions, location map of the Library, opening hours of the library, rules and regulations of the Library, library subscribed and consortia resources and various other linked resources accessible to the users, and complete description of all the user services available in the library. The Online Public Access Catalogue (OPAC) and Institutional Repository of the institution are also linked with the websites. The Library web page not only functions as the interface for searching library resources and services but reveals the detailed information about the library where users may login to avail various library services. Library Web Sites have turned into Library Web Portal with the increase in digital contents and services.

3.6 Digital Libraries/Institutional Repositories

The Digital Libraries and Institutional Repositories are sometimes being used synonymously while both terms have different connotations. A Digital Library is the broader term for the entire digital library system of the institutions including institutional contents as well as third party electronic resources while Institutional Repository or Digital Repository holds the institutional contents only. Digital Repository Software like Dspace, Greenstone, E-print, etc. enable the institutions to archive, showcase, share and reuse the intellectual output of the institution like research articles, conference papers, theses, research reports and institutional publications. In due course of time various types of repositories have emerged like repositories holding only Theses and Dissertations of the institution called ETD Repositories, the repositories holding research articles of the faculty and research scholars of the institution called Research Repositories, Data Repositories visualising Research Data of the institution, Learning Resource Repositories holding learning resources and various other types of repositories.

3.7 Social Media Applications

The role of social media has great impact on the communication in the society. The Social media applications like WhatsApp, Telegram, Facebook, Twitter, Instagram, YouTube and

LinkedIn etc. have become integral part of interpersonal communication. Therefore presence of libraries on social media platforms has become necessary to keep the library users aware of library resources and services. The libraries world over have their official presence on Facebook, Twitter, Instagram and Youtube. The YouTube has become a platform where not only individuals upload their videos but libraries are extensively uploading the videos informing in detail about libraries and educating users about various resources and services. The social media presence greatly affects the reputation of the institutions and libraries and their and impact rankings. The library Blogs are also a means of communication with library users providing links to various library resources and services. The social media is being used by the libraries to make their effective presence over this media, communicating, educating and updating their users regularly. The premier Indian educational Institutions like IITs, NIITs, IIMs, AIIMS and certain other private and government educational institutions and Universities are quite active on social media but there is still a long way to go for the effective presence of Indian educational Institutions over the social media

3.8 Cloud Computing Applications

Cloud computing services are commercially available to provide wide range of services like Platform as a Service (PaaS), Software as a Service (SaaS) or Infrastructure as a Service (IaaS). The cloud storage is available for hosting services and long term storage of Critical Data. Cloud computing allows libraries to offer round the clock services like OPACs, Digital Repositories and websites etc. without maintaining digital Infrastructure. If we do the cost benefit analysis taking into account the all the expenses incurred in maintaining digital infrastructure including servers, networks, physical space, electricity expenses, manpower cost and annual maintenance cost etc., the cloud based options are much cheaper and provide hassle free service. Traditionally libraries are maintaining entire digital infrastructure which often remains erratic due to connectivity, software, hardware, power supply and manpower related issues may opt for cloud options for better web based library services. Google Cloud, Amazon Web Services (AWS) and Microsoft Azure are the few major cloud service providers.

3.9 Internet Applications

The Internet is the World's largest computer network which covers all the areas across the world. The Internet makes it easy to access and disseminate information at multiple locations irrespective of time and space. People around the world can share data, information, through the Internet. Some of the most popular services offered by the Internet are e-mail, mailing lists and listserv, chats and instant messaging, voice over Internet, e-commerce and telnet. All these services being offered by Internet are helpful to Academic Libraries. Let us describe each service of internet in the context of academic Library system

3.9.1 Electronic Mail (E-Mail)

The most commonly used Internet service is Electronic mail or e-mail. It allows exchanging mail with millions of users worldwide. E-mail is equivalent to postal mail in e-format. The prominent commercial E-mail services are Yahoo mail, Gmail, Rediffmail and Hotmail etc.

While institutions may setup their e-mail services with personalised domain names e.g. emails like inflibnet.ac.in, ugc.ac.in etc.. This E-mail service of Internet is very useful to academic library system for instance academic Libraries provide virtual Reference Service on their website as “Ask Your Librarian”. In this service users can ask any query regarding libraries through e-mails and Library staff respond to these queries in limited time frame. the academic Libraries provide alert services for new arrivals in the library, overdue reminders and seek book recommendations etc. through e-mails.

3.9.2 Mailing Lists and Listserv

Mailing lists are a special form of e-mail. It is controlled by the list administrator, who monitors and ensures the mailing list is working. It runs on a server machine called list server or ‘listserv’. Once a listserv is subscribed the subscriber automatically gets e-mail messages, directly into their personal mailbox. This kind of mailing lists or listservs are very useful to the academic library system as academic libraries can sent important information like special topic of interest of the user community.

3.9.3 Chats and Instant Messaging

Internet Relay Chats (IRC) is a multi-user chat system, where people come together on "channels" (a virtual place, usually with a topic of conversation) to talk in groups, or privately. For example, Google Chat, MS chat etc. Through Chats or instant messaging, the library user community can ask any query in real time regarding any topic from library. The virtual reference service may also be rendered through chat along with e-mail.

3.9.4 Voice over Internet Protocol (VoIP)

The Voice over Internet Protocol (VoIP) is standardized method that is used between computer systems to deliver and receive audio data over the Internet. This type of service is very helpful to the Library user community of the academic Library systems for directly communicating with Library over the Internet without requirement of telephonic connection.

3.9.5 E-Commerce

The e-commerce refers to use of Internet for buying and selling of products or services online. The academic Library systems may also use E-Commerce platforms for selling specific library services or products. Currently libraries are using to accept payments of library fees, fines, etc. and made payments of bills to the vendors for purchased items by adopting E-Commerce.

3.9.6 Online Surveys

Online Surveys can be conducted easily on the Internet through a questionnaire created on the applications like Google Form and that can be answered online. The academic Libraries may conduct online survey of user community to access the strength and weaknesses of the library services. The libraries may reach to a large number of users in very short time for strengthening the library services.

3.9.7 Online Collaborative Tools

The White Board is an application used to set up online discussion and collaborative work on the web that allows many users to discuss over a given topic with each other in the real time. This application is very much used in teaching learning environment. The online courseware like edX, Coursera etc. use this application to enable discussion on a given topic pertaining to particular course between students and teachers. The Academic Libraries may make use of this application for discussion with library user community or facilitating discussion between teachers and students.

4. Conclusion

The Academic Libraries are facing financial crunch and tremendous pressure to serve the large number of users with limited staff. The applications of ICT has significant role to play in this context. With the application of most modern ICT tools & techniques academic libraries are able to cater their users addressing to the resource crunch. The academic libraries gradually transforming into digital resource centre reaching to the users any time anywhere. The increasing digital resources and management systems, search systems, dissemination tools, remote access solutions have enabled the academic libraries to manage successfully to a great extent with the available space and staff.

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