CHAPTER 3

CURRENT TRENDS IN ICT APPLICATIONS IN LIBRARIES: A THEORETICAL FRAMEWORK

3.1 Introduction

The use of information communication technology in library is carrying out the manual activities and services with the help of computer networking and makes easier for the handling of information generation, processing and dissemination. The information technology application in the libraries can be categorized as computer, storage media and telecommunications. ICT is used in the libraries to automate services such as cataloguing and classification process etc. (Ebunuwele Eseohe et al., 2014; Shariful Islam & Nazmul Islam).

Information technology involves with the transmission and storage of information, installation, implementation and management of computer system within institutions, universities and other organizations. IT is the use of computer and telecommunication to store, retrieve, transmit and manipulate the data. The term is commonly used as the synonym for computer network but it also encompasses other information distribution technologies such as television and telephone etc.

3.2 Use of Information Communication Technology in library

There are many areas in library where Information Technology is used. These are:

1. Library Automation
2. Library Services
3. Library Collection
4. Information Retrieval
5. Library Security
6. Promotional Activities
7. Library Management
8. Library Networking

3.2.1 Library Automation

Automation is the process of handling the work with the help of machines. It is derived from Greek word ‘automose’ which means power of spontaneous motion. Automation word was first introduced by D.S. Harder in 1936.

According to Encyclopedia of Library and Information Science, “Automation is the technology concerned with the design and development of process and system that minimize the necessity of human intervention in operation” (Kent, 1997).

Automation of library has numerous developments that was divided into 3 phases. First phase is experimental phase which is from 1930 to 1960, second phase is local systems phase which is from 1960 to 1970 and third phase is co-operative system phase which is from 1970 to till date. There are many library management software to which house keeping activities are done. These softwares’ are KOHA, Libsys, Vertua and NewGenLib etc.

Koha is the first open source software for library automation that perform all library housekeeping activities. It was developed by Katipo Communication Ltd. for Horowhenua Library Trust in New Zealand 1999 and finally it was available for libraries in 2000. The basic purpose of this software is to enhance all library activities. This software uses Linux as an operating system and it was released under GNU General Public License and also it is available to download on the websites. PEARL is used as a programming language in the KOHA. The modules of KOHA are

Libsys was developed by LIBSYS Corporation, New Delhi. It is a fully integrated and multi user library and information management software. It offers full graphic user interface and runs on a wide spectrum of hardware and operating systems such as LINUX, UNIX and Windows NT. It supports almost all activities relating to acquisition, cataloguing, circulation, serial system, readers service, article indexing system, OPAC System (Baiju Joy, 2014; Husain & Ansari, 2007). Libsys has following modules such as Acquisition, Cataloguing, Circulation, Serial Control, Article Indexing, Web OPAC, and Customizable Report.

Virtua software is developed by Virginia-Tech Library System (VTLS) Incorporation. “Virtua Library software package is a windows based client/server application software. The Virtua software is based on six technologies: Relational Database Management Systems, Rapid Development Tools, Three Tier Client/Server Architecture, Database Warehousing, Unicode Support and ATM Network optimized application. These technologies facilitate handling data management, software development and network delivery” (Husain & Ansari, 2007). The modules of Virtua are Acquisition, Circulation, Cataloguing, OPAC, Serial Control, Statistical and Reporting.

NewGenLib is an integrated library management system explored by Versus Solutions Pvt. Ltd. It is called as new generation library software. The Domain expertise of NewGenLib is provided by Kesavan Institute of Information and Knowledge Management. The NewGenlib version 1.0 has been released in the month of March 2005. NewGenLib was declared as an open source software on 9th January
Library house-keeping activities comprise of activities that are required for acquiring, storing and organizing information with an objective to provide information services to the users. Due to increasing large collection and increasing number of users in academic library, the variety of factors are forced that automation is essential for all library operations. These factors such as users have less time, library always face inefficiency of staff, inaccuracy occur in circulation activities, new generation need, security problems etc. The most commonly used house-keeping activities are acquisition, classification, cataloguing, circulation, serial control and stock-taking.

Acquisition systems means books/documents ordering system. It is defined as the searching, selection, ordering and receiving all kind of documents in the library. With the help of acquisition system, library managers do pre-ordering search and prepare approval list of document through computer and type writers. Reminders are sent with the help of internet and telecommunication such as e-mail, telephone and fax. For inviting invoices, letters are sent through telecommunication technology. With the help of library management software, order file is maintained. The advantage of acquisition system such as helps to greatly reduce labor and paper work, allows effective and efficient control over acquisition activities, accurate and on time information can be retrieved.

In circulation section, ICT plays an important role. This is the largest section of the library. There are many activities which are involved such as preparation of description file for all circulation items, preparation of membership file, charging and discharging of documents, calculation of fine, calculation and printing of various
types of statistical reports, automatic generation of due date slip, Writing of letters for order and loss of books, reminder of overdue etc. There are many advantages to the users and staff of the library like, this system saves the library staff from drudgery of routine records, leads to fast charging and discharging which saves the time of user as well as staff and further leads to increase user satisfaction, allows maintenance of statistical record and use of bar-coding has further simplified and speedup the work of circulation (Era Shabana Tabusum et al.; Chauhan).

Library classification is the art of grouping of the documents on the basis of contents for the purpose of arranging them on the shelves in a proper way. Standard library management softwares’ provide facility to store class numbers according to keywords. Now DDC is available online, if the document is represented by these keywords, the DDC-online automatically generates class number using Online Computer Library Center (Era Shabana Tabusum et al.; Chauhan). “Classification of documents involves three distinct major processes. The first two processes of defining a structure of categories and determining a basis for the classification decision are usually performed by a classificationist, while the third process of classifying documents into categories is performed by a classifier” (Kumar, 2000).

In a catalogue, multiple entries for documents are made to meet the various possible approaches that users may adopt to seeking the documents. There are many computerized cataloguing activities such as preparation of main entry, preparation of added entry, preparation of authority file and preparation of index files etc.

With the help of ICT, use of serial control leads to effective and efficient control over subscription, claiming reminders and cancelations. In present time, online publisher catalogue are used for periodical selections. Some serial control activities using information communication technology such as inputting of serial data,
ordering of new Journals, renewing of subscription, cancellations of subscription, accessing of individual issue, sending reminders such as emails, fax, phone etc., preparation of list of periodicals received, preparation of list of cancelled/replaced journals, preparation of list of holdings with their status, maintenance of accounts for subscription and binding etc. (Era Shabana Tabusum et al.).

3.2.2 Library Services

Now days’, libraries are ICT based service oriented and these are known by their services. Librarians or library managers are undergoing dynamic changes to meet this demand. The most important changes are the acceptance of information communication technology for providing library services. These services are user leading to saving the users’ time and with the help of ICT, it is possible to meet the varied demands of today’s users. Many services like indexing, abstracting, translation etc. are the time saving, cost saving and skill staff intensive. There are many ICT based services which are used in the modern academic libraries by the users.

3.2.2.1 Document Delivery Service

In present era, the size of the document is being minimized with the help of electronic media like CDs, DVDs, microchips etc. Through email services, documents are also delivered to the demand users. In many libraries, through online subscription, document delivery service is provided by the library managers.

According to PSG Kumar, “Document Delivery Service will enable a library to request another library through for a copy of document to be transmitted via e-mail or fax. This service may be largely used for transmitting a few pages from documents say journal articles” (Kumar, 2004).

The library arrange to provide research articles from other academic institutions for study and research purpose. To avail the DDS services, faculty
members are requested to send a formal request to the library with complete bibliographic details of desired documents. In the electronic environment, document delivery service replaced and became e-DDS. It is a very fast service and serve to users within few minutes, if the document available in particular library.

3.2.2.2 Inter-Library Loan

Inter-Library Loan service is a service in which one library requests to another library (which will be rich in collection) for one or more books on the basis of loan to complete the demand of the users. This type of service is mostly provided by those libraries which are very rich in collection. This service provides the facility of reserving a book. The supply of book can be done by speed post, parcel or courier services.

3.2.2.3 Reference Services/E-Reference Service

Using computer and communication technology to provide right information to the right user in the right form in right way are known as reference service. Various term are associated with the virtual reference service such as Ask Librarian, virtual shelf, Frequently Ask Questions etc. This service is more important to establish personal relationship between library staff, user community and user communicate with library staff at anytime from anywhere.

E-reference service is initiated electronically where anybody communicate with librarian without being physically present. Channels (email communication, chat, videoconferencing, instant messaging, etc.) are used frequently in e-reference/virtual reference service.

3.2.2.4 CAS (Current Awareness Services)

CAS is the service which is intended to meet the current approach to the demand users. It provides nascent information about newly procured documents and current
activities of an institute. CAS can be provided manually as well as by mechanization. The periodicity of CAS bulletins are taken differently by the academic library, many libraries issue once a week or fortnight or sometimes once in a month. It covers different kind of services like as title announcement service, announcement of research in progress, notifications for forthcoming conferences and selective dissemination of information. Many current awareness services are like Bulletin Board Service, SMS Alerting Service, Newspaper Clipping, Email Alert Service, Monthly Book Addition, New Arrivals etc.

3.2.2.5 Selective Dissemination of Information (SDI)

SDI is the service in which librarian or library manager keep users informed with the new development of the areas of interest. H. Peter Luhn was first to given the concept of selective dissemination of information services. He defines SDI as: “The SDI is that service within an organization which concern itself with the channeling of new items of information, from whatever source, to those points within the organization where the probability of usefulness, in connection with current work or interests, is high” (Guha, 1983).

3.2.2.6 Indexing Services and Abstracting Services

Indexing and abstracting services are very important among users to fulfil user’s need. Indexing and abstracting services are excellent records of current published literature and analysis. The library has to create or update existing library services. These services are created from primary sources which fulfil the growth of publications. Indexing and abstracting services provides enormous growth of published literature and scatter the published information. These services are provided in the many subjects or disciplines.
3.2.2.7 Reprographic Services

Library provides network based photocopy facility to its user on nominal charge/payment basis. It serves user to make accessibility of any document at minimum cost. This in-house facility is very useful for user community and available all the week days in the libraries.

3.2.2.8 E-mail Alerts/SMS Alerts

Email alert is a type of notification service in which reminders are sent to the users when library items are due or overdue or reservation can be collected. We can also say that email alert is a reminder for users when anybody has requested for library items, it is reminded by the library staff that your item is ready to be collected. It is a courtesy service and it is users’ responsibility to return items on time. There are four types of email alerts like return or renewal reminder, overdue alert, request collection and recall (Yale University Library, n.d; The University of Melbourne, n.d; West Sussex Country Council, n. d.). SMS Alert is also a type of notification service in which reminders are sent via mobiles. This service is mostly provided by the circulation division of the library to the users.

3.2.2.9 Instant messaging

Instant messaging is a type of conversation between two people on Internet. In this, there is a buddy list, is a listing of trusted friends, colleagues and family members. There is a chat window and status indicator, chat window is a window where chatters input text and press enter or send. It is used in social networking sites because of its participatory, social nature. Instant messaging close the librarian and information seeker (Stefens, 2006).
3.2.2.10 Listservs

Listserv is the software which sends and receives the list of e-mails to the users or vendors of any library or organization on the internet. We can also say that Listserv sends and receives the emails to the specific group which saves the time of the sender and receiver. In this process, there is an administrator, who handles the whole process. The main purpose of using Listservs is to create a community where common interest topics are discussed and common goals are achieved (Listserve, n. d.)

3.2.2.11 Online Access to Electronic Resources

E-resources are available in electronic format and on the networked base environment such as e-journals, e-books, e-databases etc. At present, most of the academic libraries are spending more than 90% of their total library budget on subscribing e-resources every year. IIT Libraries subscribe to major e-resources in basic sciences such as IEEE database, JSTOR, MathSciNet, Nature, Science Direct, Springer Link, American Chemical Society, American Physical Society, ProQuest, EBSCO, SCOPUS, J Gate Plus, Engineering Village, CMIE database, Capitaline, ProQuest Dissertation and Theses, SciFinder, Web of Science etc.

3.2.2.12 Remote Access

Remote login is a service in which user can access the e-resources of libraries from outside of the campus by using Virtual Private Network. Academic community or users’ or members of the libraries can access the subscribed e-resources remotely. Approximate all the central library of IITs provide remote login facility to users for accessing library resources from outside of the campus.

3.2.2.13 Plagiarism Checking Service

Most of the central libraries of IITs provide anti-plagiarism software that allows faculty members and scholars to detect plagiarism of their project work, academic
research paper, article, theses or innovation related work. Library encourages academic community to use anti-plagiarism checker to find out the possible plagiarism before submitting for publication. It is the duty of the Librarian to make aware about the issue of plagiarism to faculties, students and other users of the library.

3.2.3 Library Collection

Information Technology has facilitated to convert print collection in the digital format which can be used for the development of the digital libraries. Digitized collection provides ample opportunity to the library to fulfill the diverse information need of the users. It also provides opportunities to subscribe various information resources like e-Journals, e-books, electronic databases etc. which help to develop library collection and optimum utilizations of the resources. Library can also prepare a list of open access resources like courseware, scholarly resources, journals, e-books etc. and include their library website which gives additional value to the library collection.

3.2.4 Information Retrieval

Information technology facilitates various kinds of information retrieval techniques which help to find out relevant information to their users. Users can access information within fraction of seconds from their desktop. It also assists to develop various databases that can be used information retrieval. Many libraries are developing institutional repositories and digital libraries to retrieve digital information resources through internet or intranet.

3.2.5 Library Management

Information technology offers variety of techniques to manage library collection, staff and services. It reduces the requirement of space of the library building, manpower, preservation etc. The technology can help in the tracking of the activities of the staff. It enhances the performances of the staff by reducing the duplication work. It also
helps to archive and preserve library resources in digital form which can be used for long life or perpetual access of the resources. The technology also helps to track the student’s activities in the libraries.

### 3.2.6 Library Security

Libraries are providing RFID technology, smart cards and CCTV surveillance to the betterment of library. CCTV surveillance is a part of modern technology and is being implemented in many academic libraries in India. It facilitates to provide multi-purpose security like misuse of library resource, theft control of any library resources, tearing or damages of pages, security of personal belongings and helpful to stop unauthorized activities in library like misuse of other candidate identity card, misuse of password for accessing internet or other resources, misbehavior activities inside the library etc.

A smart card, typically a type of card is of plastic that contains an embedded computer chip. All the central libraries provide multi-purpose RFID smart card to their users. These RFID smart card are of some specifications like memory, these card may be of 1024 bytes or more than 1024 bytes. RFID smart card stores individual demography, official and contact details.

RFID Technology is being used rapidly in libraries for various purposes such as in providing prompt and efficient circulation services, providing security for in-house documents, quick identification of any document, quick and accurate library physical stock verification, shelf rectification etc. To save the time of the users, RFID technology is being implemented in academic libraries.

### 3.2.7 Promotional Activities

Library offers many promotional activities using information communicational technology for their users. User orientation programs are one of the activities of the
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library which need to organize each and every year for their users. In this program, every new members of the library are familiarized with the resources, services and facilities offered by the library and its policies. Library offer training programs to assist users to develop the ability to locate, identify, use and interpret information effectively that helps in optimum utilization of library resources and services. Generally in user orientation program users gain knowledge how to use library services like how to use Web-OPAC, knowledge about e-resources subscribed by library, plagiarism checking though anti-plagiarism software, familiarity with library staff, library rules and regulation etc. Many libraries organize training program on regular basis for reference management tool like Mendeley, EndNote and Zotero. Library also include online demonstration related to electronic resource in their website which were provided by various publishers for various research databases such as SciFinder, Web of Science, Scopus, Grammarly, Turnitin etc. Library also make aware to the users about how to use the library website, what sources are being provided by the library etc.

3.2.8 Library Networking

Library networking allows sharing resources among member libraries. Networking facilitates member libraries to share expertise, resources and services among member libraries. It also works as a tool for the sharing data, information and resources from one location to another location.

3.3 Digital Library

Digital Libraries are playing vital role for the users of an academic library. These libraries are offering digital content and services to the end users through intranet or internet. The libraries store digital collection in many files, formats and languages. It includes contents in various subject filed like science, social science, education,
culture, development, health, governance and so on. Digital libraries are very much different from traditional library because digital library provides an access to multimedia content like audio, video, images etc. Digital libraries mainly store documents in digital formats and deploy large collections of those materials efficiently. It eliminates the barriers of information access and retrieval. Electronic resources can be organised, processed and transmitted to the end-users without any geographical boundaries. (Alhaji, n. d.; Seadle & Greifeneder, 2007; Trivedi, 2010).

The following definition given by the Digital Library Federation brings out the essence of this perception. “Digital Libraries are organization that provide the resources, including the specialized staff to select, structure, offer intellectual access to interpret, 3 distribute, preserve the integrity of and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities” (Alhaji, n. d.). There are many digital library software which help to create a digital library like Greenstone.

Greenstone is a software for building digital library collection. It is open-source, multilingual software, issued under the terms of the GNU General Public License developed by the New Zealand Digital Library Project, University of Waikato, and distributed in cooperation with UNESCO and the Human Info. NGO. Greenstone software empowers users of university libraries and other public service institutions to build their digital libraries. Greenstone is also capable of displaying the user interface in multiple languages and handling collections consisting of text, pictures, audio and video. Additionally, the Greenstone system support various file formats such as MS-Word, PDF, HTML, PostScript, JPEG, and GIF (Elaiess, 2012).
3.4 Institutional Repository

Repository provides the set of services to the academic community for the dissemination of digital material created by the institution. Institutional repository is helpful for long term preservation of digital documents. Institutional repository collects, preserves and provides free, unrestricted online access to all types of institutional research outputs. It includes theses and dissertations, research data, images, conference proceedings and other forms of literature. It may include a variety of research output of any organization. It provides common platform to the scholars, so that everyone in the institution can contribute scholarly material to promote cross-campus interdisciplinary research (Jain, Bentley & Oladiran, n. d.; Tedd, n. d.).

DSpace is a digital/institutional repository software which is developed in 2002 by the Massachusetts Institute of Technology and Hewlett-Packard. It is an open source software and anyone can download it freely. DSpace software is choice based software for academic, non-profit and commercial organizations which building up open digital repositories. It is free and easy to install by anyone from anywhere. It conserves and enables all types of digital content encompassing text, images, moving images and datasets (Biradar & Banateppanavar, 2013). There is one software that is E-Prints, it is a free software developed by the University of Southampton, England. E-Prints repository collects preserves and disseminates the research output created by a research community in digital format (Tramboo et al., 2012).

3.5 Social Networking Sites

The use of social networking sites are increasing day by day in the libraries to linking up with library users for the promotional activities like users education program, creating awareness about library collection and services, getting feedback or sharing the resources to the users etc. There are many social networking sites such as
Facebook, YouTube, Twitter, RSS Feed etc. which help to linking with the library users.

3.6 Internet Connectivity

Internet connectivity deals with the connection of internet. It can be connected through various media like broad band, Leased line, Wi-Fi, Li-Fi etc.

Broad Band offers high speed internet connection through various medium like coaxial cable, optical fiber, radio or twisted pair. It is more reliable and faster internet connection compare to the dial up which is earlier used in the many institutions and universities for the access of internet.

Wi-Fi is a technology for wireless local area networking with devices which includes personal computers, video-game consoles, phones and tablets, digital cameras, smart TVs, digital audio players and modern printers. Wi-Fi compatible devices can connect to the internet via a wireless access point.

The term Li-Fi was coined by Harald Haas. It is a bidirectional, high-speed and fully networked wireless communication technology like as Wi-Fi technology. It is a form of optical wireless communications which uses the visible spectrum as well as ultraviolet and infrared radiation. Li-Fi can be complement to Wi-Fi and broadband connectivity. This technology is being used by many organizations in the world.

3.7 Cloud Computing in Libraries

Cloud computing is very useful for libraries to share their data to each other. Many libraries can come under one umbrella and store their data only in a single library server without any separate server. Many libraries have also adopted the cloud computing in their libraries. For example, OCLC (Online computer library center) is doing work as a cloud computing. It means that it provides cataloguing tools on the internet and allows to every member institutions to share their centralized data.
Generally cloud computing will be beneficial for those libraries which are being digitized and subscribed the services like Google Docs, Flicker, etc.

3.8 Conclusion

The advancement of the information technology compelled to the society as well as libraries to modernize their activities and services. The technology had greater impact on each and every field of the knowledge. Libraries are utilizing various technologies for upgradation of infrastructure and services. The technology brings libraries to global network which provide many opportunities to the library professionals for their career and up-gradation of knowledge. It should be used as tools for enhancement and expedite services of the library and information centers.
REFERENCES


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