Implementation of Information and Communication Technology (ICT) in Library Management System (LMS)

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Abstract

Various changes occurred at libraries in different period. Development of libraries in different time span has affected lots on librarians and information professionals in the form of managerial skills, job opportunities, status and their survival. Present day information communication technology application in library has changed drastically in the collection development from print to electronic or digital form and increased the importance and role of librarians in the library. Information explosion is cause for rapid developing of digital information resources and services. This new information environment has brought various challenges before library and information professionals such as adopting new skills of information searching, acquiring, processing, storing and disseminating. Librarians have to enhance personal ability to understand and use information, individual skills development is the process of ongoing, learning and qualitative aspect. Important things of information society are education and leaning. The situation of education is changing due to impact of social, political, cultural and economic condition of society. The main aim of the study is to assess the need for and implementation of ICT in Library Management System (LMS) in the Contemporary period.

Keywords: Digital Library, Hybrid Library, Library Management System, Open Source System, ICT

1. Introduction

The world has changed through different phases by human knowledge. Human being has brought revolutionary changes and witnessed of various revolutions such as industrial, agricultural and information revolution. Library and Information Science (LIS) Professionals have also witnessed of different kinds of revolutions brought through Information Communication Technologies (ICT) by human being in the library.

Journey of library professionals had started from clay tablets and leaves of palm and present day it reached up to reading materials of electronic or digital content and virtual library. **Urs (2004)** stated that library professional has changed into informational professional by reflecting their goals of profession to participate and facilitate the information and use of knowledge (**Verma, 2015**).

The Revolutionary changes brought by Information Communication Technology (ICT) in Library and Information Science and changed the landscape of libraries and library professionals. Hence Libraries and librarians role is changing rapidly by the growth of Science and Technology in all disciplines. At the beginning stage, work of library professionals was limited to library boundaries but in the modern age it has spread across the globe knowing as digital library, e-library, hybrid library and virtual library. Libraries

are transferring from traditional library of four walls building to cyber environment. So in the modern age, librarians or library professionals should play various duties which require different new skills and competency as a fashion from old culture for providing right information to right users at right time. Transferring of library resources is going to convert print form to digital form **(Vanikar, A. A., 2015).**.

Professional's skills are acquired by special professional education and library professional's skills also acquired by special library professional education. Specific skills required in teaching, library programs and for application of Information Communication Technology in library. **(Mani, Thirumagal, & Priyadharshini, n.d.)** Present day library functions are performing to deliver library services faster and more efficient due to the use of information communication technology and becoming useful in the library.

2.   Role of Library in Education:

Library is hub of educational process and heart of educational organizations. We can't think education without library, library and educational organizations are two important parts of education, so library is completely support by to the education. Generally education is a process of learning basic life skills and advanced skills for making attractive person in job market. Education is essential for individual life such as food and shelter. Necessary needs of food are for good health and shelter for body, like this education is for mind. Education is an activity that society deliberately transmits one generation to another generation of their knowledge, skills and values.

▪ Education is an activity of learning.
▪ Learning process is conducted by teacher or tutor through instructions.
▪ Teacher acts by instructions to impart learning to the students.
▪ Learning is a process of gaining specific knowledge, skills and abilities.

The aim of education is that to impart knowledge, inculcate value and vocational skills creation. There are three models of education in modern society that are

2.1   Formal education:

This kind of education is given to students by teacher with contact in school, college and university. In the education process of school, college and university, library provides resources on the related subject of student's choice **(Surve, S. K., 2020).**. In this system students are educated and trained on the basis of particular curriculum within stipulated time. Students are evaluated on the basis of exam and awarded degree. In this context library play an important role that is:

- Library helps teaching to learning programmes in all levels of students from school, college and university.
- Enhances reading habit among students and researchers by providing information.
- Helps for self-learning, supports creating skills and develops critical analytical thinking.
- Supports for developing knowledge of students and motivate for research work of scholars.

2.2   Non-Formal Education:

In the non-formal education process, learner is educated without formal class and without help of teacher. In non-formal education system students enrolled for particular programme of education in educational institutes and completed by self-study. In this kind of education process library provides information to learner for self-study **(Babatunde, I. G., & Charles, A. O., 2013)**. Mostly public libraries help this kind

of non-formal education by providing books and journals. In the process of non-formal education library play an important role such as:

➢ Library provides information on requirements of learners of particular programme.
➢ Library helps learner to bridging gap of teacher by providing sources.
➢ Library supports educational programmes of organization.
➢ Inculcate self-learning process of students and encourages scholars for research work.

Present day almost all higher education institutions are offering distance education programme, hence library plays the role of teacher and source of information. In this mode of education public library play an important role and library itself want to become guide, teacher and mentor for students in process of getting education by the mode of non-formal education **(Enakrire, R. T., 2019).**.

2.3 Informal Education:

This is the informal mode of education in which learner get information and knowledge on his choice, it does not follow any kind of structured educational programme and curriculum of course which are followed in formal and non-formal education mode. In this kind informal education, illiterate person can learn reading and skill of writing then become literate. In the professional development the person learn skills and knowledge from other professionals those who have such a kind of knowledge for completing the work. Library enables society members for life long self-learning **(Gill, R. K., 2016).**. Library plays an important role in informal education mode as following:

• Disseminate information and knowledge as per requirements of individual, professionals and educational development.
• Establishing reading habit in illiterate and semi-illiterate person.
• Create responsible citizen by providing motivational reading materials.

3 Library Role in Research and Development:

Significant role is played by library in the research. Library have vast amount of books collection, various journals, magazines, research articles and subject wise bibliographical data. Library provides space for reading to students and researcher with excellent reading and research environment. Library possesses qualified, skilled and knowledgeable staff for locating information of students and researcher requirements. While beginning the research, researcher needs to visit library or online library database **(Chaputula, A., & Kanyundo, A., 2019).**. Researcher need to understand following things before selecting the problem for research.

3.1 Academic Library:

In 20th century in India, well defined and organized academic library had existed in the year of 1931 after developing Madras University Library by Dr. S. R. Ranganathan and publishing the revolutionary book 'five laws of Library Science' **(Kolhe, R. D., 2015).**. The book is immensely impacted and influenced Indian libraries and librarianship, hence the book could be aptly called book of the Millennium in the field of library and information science (**Thakur, 2015).** Over last fifty years, University Grant Commission (UGC) has offered various library development schemes as grant for library infrastructural facilities, collection development, various activities and programmes launching and implementing through INFLIBNET by sanctioning special grants to upgrade library facilities. These all efforts have kept the academic libraries in the country in shape and services. Academic libraries have developed by the efforts

of some national bodies such as Association of All Indian Universities (AIU), All India Council of Technical Education (AICTE), National Assessment and Accreditation Council (NAAC) etc. Some individual states and universities have also contributed for developing and formulating policies for effective functioning. Report on libraries entitled 'Libraries Gateway to Knowledge; A Roadmap for revitalization' published in 2007 by the National Knowledge Commission Government of India for directing the development of future academic libraries in India. Academic libraries have become hub of knowledge in 21st century for all disciplines of educational organizations **(Thakur, 2015)**.

Academic library is attached to the academic institutions. It may be schools, colleges and universities. The main aim of the academic libraries is that to provide needed learning documents to the users so it helps learners to educate in the interest area. As we say academic library is an integral part of the higher educational institutions. It is serves to support the curriculum and students and faculty research. Academic libraries help to curriculum, references, departments, managing projects, research, community relationships and class learning. The role of academic library is that to pursue the philosophy of education of any academic institutions and education is the process of learning for developing capabilities among people **(Hon, A. K., 2015)**. Academic libraries are categorized as a school library, college library and university library and its users are

1. Students
2. Teachers
3. Research Scholars
4. Library professionals, Administrative and other staff of the organization.

Each type of library has different objectives, different functions, various finance sources, required different level qualifications and different designation of the staff. Academic libraries have collections of books, periodicals, reference sources, electronic sources and databases which are useful to teaching, learning and research **(Etebu, A. T., 2010)**..

4   Characteristics of 21st Century's Academic Libraries:

Size, nature and subject area of academic library is different. There is not any measurement unit to measure academic libraries characteristics in twenty first century. But some common characteristics have explained as following:

4.1   Automation of Library:

ICT implication in library becomes revolution in the library automation. Libraries are using library management software for giving smooth services to users. Some libraries are using commercial software and some are using open source software. Commercial software is good for academic library but it is expensive. So Small libraries are not use this software. So now maximum libraries are transferring towards open source software such as Koha library management software. The cloud based software is boom for this day. It is not require multiple local hosting servers, equipment. Cloud based software overcome the issues of hardware failure, installation of software, software up gradation, and compatibility. It is cost effective and time saving to all kinds of libraries. So in future all libraries will use cloud based library management software **(Maan, I. S., 2012)**.

4.2 Library Support Software:

Libraries are using different software for different activities and enhancing library functions. Using this software in the library activities are improving the quality and efficiency of library information services. Some of them software are available freely on internet and providing qualitative and efficient services in the library **(Agbo, A. D., & Onyekweodiri, N. E., 2014).**. They are user friendly also such as D-Space, Greenstone are the very useful and free software available at worldwide. They are useful for preparing library repository and storing digital materials in the software. Zotero software is also one of them available for literature search and useful for research purpose. So many software are available on internet for free for librarians to develop and design web page of library, library blog and portal for making digital library material online **(More, N. S. ,2015)**.

4.3 Electronic Resources:

In this kind of resources, books, journals, magazines, reference sources are available in digital or electronic form or converting in electronic formats. Electronic documents are required very less space for storing and multiple user can use one copy available on the database or online and e-resources are paperless documents and can provide anywhere in the world at a less efforts. Electronic documents can be stored in different format such as audio, video, text, in CDs, DVDs, pendrives, and hard disc. Internet is an effective medium for supplying electronic documents. Day by day use of electronic resources is increasing in academic libraries **(Patil, G. R., 2015)**.

4.4 Library Organization:

As per saying of Dr. S. R. Ranganthan in five laws of library and information science, library is the growing organism. No doubt it is growing day by day. At the same time library is transferring from stock house to service providing institution. Library plays an important role in higher educations' academic libraries. It has to face challenges of attracting user group towards information resources or library and enhancing reading habit among library users. For that library has to provide extensive services to attract user. As an organization library have to support higher education's institution's goals **(Myhill, C. E., 2002)**.

4.5 Inter Library Cooperation:

Libraries are working in group with cooperation to each other libraries. It is effecting on time, cost and efforts. Library consortia are very helpful for academic small budget libraries as well as big budget libraries. In library or information or knowledge centre, library professionals are working on different designations and knowing by different names also such as information officer, knowledge manager, and document officer. They have created groups with different names for cooperation professionally. These groups are using for enhancing knowledge, exchanging ideas and problem solving **(Thakur, 2015)**.

5 Importance of Internet in Academic Libraries:

Impacts of internet in library and information services are greater mode with offering new mode of information supply and vast different of information sources. Therefor internet become integrated part of academic libraries. According to the Gryez that internet is has emerged electronic documents with greater expansion. He said that internet was at once promising and attractive due to the advantages of speed and transmissibility and profoundly elusive and confounding to the library community because of its

intangibility and malleability. Internet has become world wide and ubiquitous. It covered all continents of the country. And internet is featured daily in the business sections of all major newspapers **(Nandi, C., 2020)**.

Now days, internet has expanded in education, research, business, industry, entertainment and government. Internet is served as a backbone of libraries and connects to the information sources. It is not require specific location for getting information but internet take responsibility of controlling the issues like collecting, organizing, preserving, retrieving and dissemination of knowledge. Internet is easily allows to the scientists, business man and the common people to communicate with computer **(Kumbhar, R.,2016)**.

Present era internet is become necessary part for transforming the system of library and become medium for reaching library resources and the library services. With using internet based library's information services, reader are reaching to the library at 24/7. Internet is made available different links of various library websites. It is giving specialized information on every topic and reader can access directly from any part of the world. It is the cause major academic libraries are using internet for reaching web based information services and making access the websites of the libraries. While using internet, students can use any database or information source from any corner of the place. Billions of information sources is accessed via internet that contains books, journals, audio visual materials, and other non-print materials **(Mokari, E. O., 2013)**. Vital role is played by library professionals in collecting information and bridging the gap of information.

Academic librarian can extend the traditional librarianship in to modern librarianship with using information technologies is followings:
- Initiating bulletin Board service that gives details regarding service, product and different events organized by the library.
- Providing ready reference service with speedily and at less time.
- Orders books and journal online and technical processing also done easily.
- Information services can be delivered via emails and communicate with users and professionals.
- Electronic SDI service is provided.
- OPAC and database can be made available to the users.

Looking to these all content it shows that internet has applied in all activities of the libraries.

6   Current Trends in Academic Libraries:

Academic library is adopting core responsibilities of disseminating digital fluency among the students, researchers, faculties and external users from society. Artificial intelligent and internet of things are pressuring on academic libraries to amplify the utility and reach the services of library which were never before. "Current trends and technologies that are influenced academic libraries, library leaders, librarians, industry leaders and technologists" (Sansbury, 2017)to adopt present and future trends in academic library. ACRL Research planning and Research Committee has reviewed trends in academic libraries of higher education that are following **(ACRL, 2020):**

6.1   Change Management: New Skills for New Leadership:

Academic libraries are needed to change in the library relationship in the institutional partners, changes in the library organization and changes in the professional's skills. If you create good leadership in the academic library, it is definitely change the entire organization. The leadership skills are developed and updated through learning various leadership courses, experience, workshops or conferences and the best leader moves libraries into the future quickly and confidently **(Choukhande, V. G., 2016)**.

6.2   Evolving Integrated Library System:

Different and many Library management systems are available in the market, but libraries are preferring now cloud based integrated library management systems. Integrated library management system is focused on future academic library market to transit and expand library services with cloud based systems. Open source library management systems also adopting largely with developing needed module depending on the needs. Integrated library system should be with important characteristics such user centered, easy accessible, integrated with other institutions platform and enhance modern business intelligence capabilities **(Jambhulkar, P. S., & Deogade, N. P, 2014).**

6.3   Learning Analytics:

Learning analytics is emerging trend in academic libraries said by ACRL's 2018 report. Learning analytics is emphasized on collecting and analyzing students learning data, library usage related data, It helps institutions to understand students learning behaviors, intervene when problem arise, and it predicts before problem is arrived.

6.4   Machine Learning and Artificial intelligent:

Librarianship is dramatically changed with developing machine learning and artificial intelligent like other different professions. The history of libraries and librarians reviews that they incorporate new tools and technologies in to their spaces and practices. Jason Griffey urges in report of 2019 library technology that libraries should invest to develop these systems internally. Further Griffey states that internally developed machine learning and artificial intelligent allow libraries to evaluate critically training data and computational processes to ensure the available bias in data is not amplified through those processes. At that time professional values are represented in the collecting data and computational processes. Librarian can take care of usage and misusage of machine learning and artificial intelligent environment. This is the opportunity to academic libraries to expand curricula focused on literacies with ethical consideration in artificial intelligent and machine learning.

6.5   Open Access: Transitions and Transformations:

Major developments have seen in open access resources. It has happened due to the cancellations of deals for new agreements between libraries and publishers. Libraries are now subscribing publishers with transformative open access agreements. And journals are also transitioning in to open access publishing. There are different transformative agreements are existing between publishers and libraries and library consortia. Agreements are various types such as read and publish agreement and publish and read agreements and offsetting agreement. Transitions are happens in society publishing level for providing relevant resources and experiences to the society with open access **(Deshpande, N., & Raool, A., 2016)**.

6.6   Research Data Services- Ethics and Maturation:

Scholarly Communication is the revolution of ethical core of scientific practice. It is also technical work flow from open access, open data, open science to citizen science. Research data services in academic libraries faces potential opportunities and practical challenges in light of this dichotomy. Research data services in academic libraries are still extending from traditional advisory and training services to advance training, assisting on data analysis, visualizing and integrity of data. Individual libraries can overcome the issues of resources availability by collaborative data curation networks **(Deshpande, N., & Raool, A. (2016)**.

7   Library Automation and Development of Information Communication Technology:

Library automation is a process of making up to date method for helping libraries and library users with providing library resources effectively. Machineries are used in this process for easily working of library operations and saving time and manpower. The prime aim of the library automation is to make free library professionals for spreading knowledge among the library users. Library automation helps library for restructuring its functions and reinvent services. The term first used as 'Automation' was by D. S. Harder in 1936. After that the concept library automation was derived in the library profession literature. The International Encyclopaedia of Information Technology and Library Science defined "It is the process done using technologies for developing and designing system. It decreases the intervention of human efforts in the operations. It is an integrated system with computerizing traditional library functions using common database" **(Panda, 2013)**.

Computers are used in library automation for typical procedures of libraries like acquisition, cataloguing, circulation, serials etc. Library uses computers and other technologies in library automation process for supporting in the services of library. Automation of library converts procedures of library from manual to computerize like card catalogue is converted into OPAC. At the starting of 1960s Machine Readable Catalogue Record (MARC) developed, then the automation in library was expanded in core functions of library like acquisition, cataloguing, circulation, serial control, inter library loan and document delivery services. Now days recent trends in library is increasing importance of 'add-ons'. This is mostly concerned with supplying digital content by third party vendors such as portal, Meta search interface link resolver and module of e0resource management. Another one Add-on is web environment integration that are using browsing applications, XML, Style sheet for displaying, XML developing for import and export capabilities and closer integration of library system through learning management systems **(Library Automation, 2020)**.

Automation of library uses computers for keeping list or record of books which are newly added, issued and retuned together in the library. Now library automation is also called library management system. Automation helps user to use user friendly the system and library collections. Library stores big data consisting of titles of books, author names, publication and publishers details, rack and shelves information and other all details are stored in little space. Library automation enables user to search books on their own interests and locate any book from library **(What is library automation, 2019).**

Libraries use information communication technologies not only for automating library routines but also for supplying services to the users. Use of computers in library is growing for internal operations and for

accessing available information in the four walls of the library. Use of computers in library avoids the repetitive works, save the manpower and time of the staff and users. It is not only used as a data processing tool but also for information accessing, searching and retrieving.

In 1970s introduced the integrated library automation packages in library, It was mostly emphasized after the coming of minicomputers. Automation was implicated in acquisition, circulation, cataloguing, serial control and library OPAC. In 1980s cost of personal computer were become affordable it is the cause the computer use in library were increased and become passion. Last some decades have witnessed unprecedented evolving in computer technologies. Libraries are presently using modern computer technology to automate various activities in library and using suitable off set shelf general or specific purpose software package available in the glob for library automation **(Library Automation, 2020).**

Information Communication Technology Skills:
Present day is an information day. Information communication technologies are enhancing the abilities of various organizations, individuals and government agencies. Libraries have also inspired towards information communication technology. ICT helps librarians to provide excellent library services to user at time in remote area. Worldwide information is accessed by ICT with quick and easily so modern library services are depends on information communication technology. The present situation says that without ICT library can't imagine and not exist in future. Use of information communication technology in the library is as tool for acquiring, storing, processing, transmitting and disseminating the knowledge **(Williams, P., Jamali, H. R., & Nicholas, D., 2006).**

According to '**American Library Association (1983)** information technology is refers as application of computer technology and other technologies in library for acquisition, collecting, storing, retrieval and dissemination. Computers use for processing and storing data and telecommunication technology is used for providing information communication tool, it enables users to access databases and networks with other computers at different location'.

Generally the definition of Information communication technology is that the technology provides access to information through telecommunication.

The Information technology is defined as a diverse set of technological tools at resources used to communicate, create, store, disseminate and manage the information. The Communication technology encompasses radio, television, computer network, hardware and software, mobile phones and satellite systems etc. **(Kamble, 2015).**

Librarianship is expanding its dimension with content development, production of information, extending library beyond the buildings, adopting various kinds of collection, and providing necessary services to users. As we observes that librarian play role of traditional as well as modern with using advanced technologies. Modern library professionals should comfortable and conversant with new technology. They should have willingness and ready to speak in people. They should improve the skills of ICT and use it for lifelong learning.

Present day information is available on virtual. It can be used in anytime from anywhere from the Glob. In this situation library remains at one place but the use of new technologies libraries provide traditional as well as digital knowledge to user for learning, teaching and for research. Information communication technologies have brought many new formats of collection in the library therefor the role of librarian also have to change and adopt new technology's skills for providing smooth and effective library services.

Emanuel (2013) stated that young generation librarians are more techno savvy, they are grown with electronic online environment, it is integrated part of their lives. Among academic librarians, younger generation is more flexible while using technology oriented services. In other hand older generation professionals are not very interested as compare to new generation library professionals.

Mission and goals of Digital libraries in College:

In India, minimum college library have digital library but in universities majority number of universities have good digital library but some universities till the day not have good digital library. The mission of digital library in the college library is to give quick and direct information access of digital and non-digital resources. These services are provided in structured and authoritative manner to cope information technology, education and culture in modern library services. To fulfill the mission of college digital library's following goals are mentioned:

- Encouraging digitization, accessing and preservation of cultural and scientific.
- Supplying information resources to all users of library with respecting intellectual property rights.
- Promoting open accessing of information resources in digital form
- Creating gateway of digital and electronic resources.
- Reducing long term expenditure, storage of print collection cost and care.
- Acquiring, collecting, storing and dissemination of digital resources to users.
- To provide resources and services to support academic research.
- Collaborating other libraries and developing networks for development in research.
- Creating awareness of digital library provides permanent access of digital materials.

8   Hybrid Library:

The term hybrid library is used to describe mix collection of library resources that contains print as well as digital materials. Mix collection comprises print books, journals, magazines and in electronic form documents audio visual collection, e-books, e-journals, e-magazines etc. The term Hybrid library is coined by Chris Rusbridge in 1998 in the research article for D-lib Magazine. Skilled staff is required for hybrid library for supporting readers to retrieve the information from vast of collection. Librarians should adopt skills of electronic and print resource collecting, generating, storing, retrieving and disseminating.

9   Conclusion

In the world, development of information communication technology is developing rapidly in other hand user expectation and requirement also changing on the same way. Therefor Degree college libraries should also adopt emerging new technologies in the library for giving smooth and effective services to users. Only purchasing new technology in the library is not only the part of giving good, effective and efficient services to user but the library professionals must possess the skill of advance information communication technology. Emerging information communication technology knowledge, its skills and application in the

library among library professionals is very necessary for fulfilling objectives of the degree college library. The techno savvy librarian improves the quality of information services and fulfills the need of user.

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