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Use of Information and Communication Technology in Academic Library in terms of Higher Education: An Overview

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Abstract

The library is an important component of an ideal educational institution. The academic community of educational institutions like colleges and universities are greatly facilitated by the library. This paper deals with the concept of Information and Communication Technology (ICT). Academic library along with objectives of academic library has been discussed in this article. Difference between traditional library and digital library has also been discussed in this paper. Planning of digital library and components of digital library have been mentioned in this paper. To meet with the demand of the time, modern libraries have adopted web 2.0 which aims to provide fast and customized library service to the users. This paper discusses the components of Web 2.0 and the tools of web 2.0 technology in library. The ICT application in academic libraries in present scenario has been emphasized in this article. Major ICT based library services have been identified and discussed in this paper. The challenges on the way of digitalization of academic library have also been pointed out here.

KEYWORDS: ICT, Academic Library, Traditional Library, Digital Library, Web 2.0, Higher Education

INTRODUCTION

Education brings about equalization in the society through individual development without any discrimination on the basis of the individuals' background. The library is an indispensable part of an ideal educational institution. The academic community of educational institutions like colleges and universities are greatly indebted to the library for their academic activities. Therefore, needless to say, the library is core to the dignity of an educational institution and library services are fundamental to same. The concept of library dates back to the ancient ages but it has evolved through the ages without losing its basic idea. With no printing options, the ancient libraries of India only offered copies of manuscripts. In those days the mode of learning was 'Sruti-Smriti'. Information and Communication Technology (ICT) have changed the library services globally.

INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

ICT is the use of computing and telecommunication technologies, systems and tools to expedite the way information is created, stored, processed, retrieved and

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transmitted. It includes technologies like servers, computers and software applications as well as the wired and wireless communication technologies that support telephones, the internet, the Internet of Things (IoT) and the metaverse (Rouse, 2023). The word Information and Communication Technology is not new to contemporary culture. 'ICT is a scientific, technological and engineering discipline and management techniques used in the handling, application and association of information with social, economic and cultural issues', according to the UNESCO (Hussaini et al., 2021). According to the Encyclopedia of Computer Science, "Information Communication Technology (ICT) is an imprecise term frequently fundamental to broad areas of technologies and associated with the use of computers and communications (Singh).

ACADEMIC LIBRARY

An academic library is a specialized repository of knowledge that remain within educational institutions, primarily universities, colleges, and research centers. Academic libraries are designed to meet the specific needs of students, faculty, researchers and other members of the academic community. These libraries play an important role in supporting the educational mission of their institutions by offering a wide range of resources that facilitate teaching, learning, and scholarly research (LISEDUNET Work, 2023). According to the International Federation of Library Associations and Institutions (IFLA), an academic library is defined as a library that is a part of educational institution, primarily a higher education institution like a university or college. It serves the teaching, learning, research and informational needs of students, faculty and researchers affiliated with the institution. Academic libraries provide access to various resources including print and electronic materials to support academic programs and foster intellectual growth. Academic libraries contribute to the academic success and advancement of knowledge within the educational community they serve (Acharjya, 2023). According to the Dictionary of Library & Information Science, academic library is a library that is an integral part of a college, university or the other institutions of post-secondary education, administered to meet the information and research needs of its students, faculty and staff (Pandey, 2013).

OBJECTIVES OF ACADEMIC LIBRARY

Objectives of academic library are mentioned below-

- Provide access to information resources
- Support learning and teaching
- Facilitate research
- Promote information literacy
- Promote outreach programme
- Contribute to institutional goals
- Preserve and promote cultural heritage (Acharjya, 2023)

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ICT APPLICATION IN LIBRARIES

i)   **Computer Technology:** Prompted by our instruction computer can perform tasks such as storage and reproduction of data useful for a library with precision.

ii) **Communication Technology:** It is the way to transfer information from the generator to the user. The popular channels for it include telephone, e-mail, fax etc.

iii) **Multimedia Technology:** This technology includes use of text, sound, video and image especially in bigger libraries for special students.

iv) **Networking Technology:** This refers to the use of communication technology through computer.

v)   **Barcode Technology:** It refers to the use of parallel black bar marking on white background having encoded meaning. It is used for stack verification and dissemination of library documents. (Shukla and Syuhlo, 2015)

vi) **RFID (Radio Frequency Identification):** It uses a tag attached to books for tracking and transferring data in an automatic way. It has found immense popularity in the fields of education and industry. Modern libraries are rich with not only books but also electronic reading materials, periodicals, CDs and DVDs etc.

vii) **Digital Transforming with Quick Response (QR) Code:** The use of QR Code technology is a Japanese invention in 1994 and is ascribed to Denso-Wave Corporation. The data containing capacity of it is much higher than barcode. Now QR Code is used in libraries for literally quick transformation of data.

viii) **Digital Transformation with Mobile Apps:** Today many libraries provide accessibility to library services to the beneficiaries on their own mobile applications 24x7.

ix) **Digital Transformation with Library Kiosks:** A Library Kiosk refer to a self-service library tool that the beneficiaries use both inside and outside the library campus for the activities of issue-return, reservation, catalogue viewing, renewal and patron account accessing. (Singh, 2018)

TRADITIONAL LIBRARY AND DIGITAL LIBRARY

Traditional Library	Digital Library
Print collection.	All resources in digital form.
Stable with slow evolution	Dynamic and ephemeral
Individual objects not directly linked with each other.	Multi-media and fractal objects.
Limited access points and centralized management.	Unlimited access points, distributed collections and access control.
One-way interactions.	Dynamic real-time dialogue.
It is created on a physical space.	A digital library is formed on virtual space.
Traditional library follows rack-based search and indexing.	A digital library implements web interface-based search and indexing.
Traditional library is material degradation, mutation and loss over time.	A digital library serves digital preservation and longtime archival of the contents.

(Bamgbade et al., 2015)

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PLANNING OF DIGITAL LIBRARY

Planning includes-

- ❖ To specify the need for creating the digital library collection.
- ❖ To define the source material that constitutes the digital library collections.
- ❖ To specify the particular portion of the material to be digitized.
- ❖ To identify the nature of the collection.
- ❖ To determine the policy of the information.
- ❖ To allocate budget for digital library.

COMPONENTS OF DIGITAL LIBRARY

A digital library has the following components-

i) **Collection Infrastructure:** A digital library has its own digital collection and or access to digital reading material. It typically has two components namely metadata and digital objects. The metadata is like a bibliography or index that provides information about the digital objects to the end users. The users use metadata to access the digital objects according to their requirement.

ii) **Access Infrastructure:** With the rising growth and complexity of the digital resources an effective access mechanism becomes indispensable for a digital library to facilitate the users with browsing, navigating and searching. This infrastructure consists of a search and browse interface for local collection, webPACs and multi-webPACs for catalogues, portals i.e. subject gateways for web resources and websites for specialized image-based local collection.

iii) **Computer and Network Infrastructure:** A digital library features is the exchange of data between the client and the server through hardware and software components. Here clients are basically machines used by the users to access the digital library while the server hosts databases, digital objects, browse and search interfaces to facilitate its access.

iv) **Digital Resource Organization:** A digital library contains digital contents like numeric data, structured or unstructured texts, multimedia objects, scanned images etc. which need to be organized for being comprehensive and easily accessible to the user. Being a part of Web and Internet Technology, digital libraries use addressing protocol and objects of internet.

v) **Manpower Training:** Digital libraries are similar to conventional physical libraries involving selection, access, housing, evaluation, preservation and user support. But paper-based materials and digital materials are way too different. Hence, special knowledge and skill is required on the part of the librarians to handle and manage the system. (Digital Libraries: An Overview)

CREATION OF DIGITAL RESOURCES

The following points are important for creation of digital resources.

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- ➢ Database of digital material that is open to all users over the campus-wide LAN.
- ➢ High bandwidth Internet connectivity
- ➢ Focus selectively on acquiring digital resources
- ➢ Focus on electronic journals and elimination of print subscriptions gradually
- ➢ Licensed databases
- ➢ Creation of local digital content available within the institution (Trivedi, 2010)

WEB 2.0 IN LIBRARY

'Web 2.0' is combined with library services, it is transformed into 'Lib 2.0' as the application of interactive, collaborative and multimedia based technology for library services and collection. Essential components of Web 2.0 are:

i) **User Centered:**
The dealing and creation of content is dynamic thus the role of libraries and user are not always clear.

ii) **Multimedia Character:**
Multimedia experiences are provided for both the collection and services of Web 2.0.

iii) **Social Networking:**
The librarian's web presence includes user presence, they are both synchronous and an asynchronous way for user to communicate with one another and with library.

iv) **Communally Innovative:**
It is an important aspect of 'Lib 2.0'. (Majumdar and Shukla, 2008)

TOOLS OF WEB 2.0 TECHNOLOGY IN LIBRARY

i) **Synchronous Messaging:** This technology, widely known as Instant Messaging (IM), has found massive popularity within the library community allowing real time text communication between users in the mode of SMS in mobile phones.

ii) **Streaming Media:** Streaming media (audio and video) dates back to Web 1.0 time but its usefulness makes it important to facilitate the users.

iii) **Blogs and Wiki:** Blogs and wikis in 'Web 2.0' provide quick solution for moving library services and collections with its user-centred and interactive approach.

iv) **Tagging:** Web 2.0 enables the users to create subject headings for the object at hand. It is easy with Web 2.0 because it allows users to add and change not only content (data) but content describing content (metadata).

v) **RSS Feeds:** RSS feeds and technologies related to it provide the user the facility to syndicate and republish his/her materials on the web.

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vi) **AJAX:** It is a very useful tool to create interactive pages the components of which can be easily changed. (Majumdar and Shukla, 2008)

DIFFERENT EMERGING LIBRARY TECHNOLOGIES

Different emerging library technologies are mentioned below-

i) **Bibliographic Citation Management Software:** Using this software, user can collect and manage groups of citations; set up groupings by topic; sort references; select the ones to cite in a particular article; and so on.

ii) **Library Automation Software:** Library Automation Software are web based multi user easy to use, specifically designed and developed to simplify the administration, circulation and acquisition of books and members of a library and institution.

iii) **Electronic Resource Management Software:** Electronic Resource Management refers broadly to an evolving array of problems, tasks, processes and practices associated with the management of electronic resources such as databases, electronic journals and electronic books in libraries.

iv) **Classroom Management Software:** Classroom Management Software offers an end-to-end and modular information management solution that can be used by learning communities for admissions, enrolment and registration, student demographics, attendance, advanced scheduling, discipline, grades, state reporting, custom report cards, parent portal, student portal, standards-based grading, and more.

v) **Integrated Search Software:** Integrated Search Software is a software system that is designed to carry out web search by pulling information from various sources. (Moruf and Dangani, 2020)

ICT BASED LIBRARY SERVICES

i) **Electronic Journals:** There are technologies which enable us to access magazines, newspapers, electronic serial publications or newsletters easily.

ii) **Document Scanning Services:** Nowadays a modern library cannot be thought of without a scanner. It offers the facility of scanning pages from physical reading materials supporting the concept of a digital library.

iii) **Electronic Document Delivery Service:** Libraries distribute reading materials to desktop users in PDF (Portable Document Format) in case of non-availability of physical reading material in the library through Inter-Library Loan service.

iv) **Institutional Repository Service:** Institutional Repository in terms of library service refers to a collection of resources that the concerned institute

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provides to its community members for the control and dissemination of digital reading material.

v) **Electronic Mail (E-mail):** E-mail is also commonly used to exchange digital reading materials over the internet between near and far places having internet connectivity. Hence, it is useful in library service.

vi) **Bulletin Board Service:** A bulletin board is an electronic messaging site that displays posted articles or messages on popular themes or topics. This service gives the users the facility of viewing and recovering their messages. Hence, it has found application in library service.

vii) **Ask-A-Librarian Service:** This service is an internet-based query service offered commonly by libraries allowing the user to submit his/her query to a well informed and expert librarian with search skills through a query form and/or an e-mail address.

viii) **Web OPAC:** It is a web-based catalogue service provided by libraries to the users at global level. (Hussaini et al., 2021)

CHALLENGES

i) **Lack of Professional Skills:** Lack of proper knowledge and skill of using computer and advanced technology makes it difficult for the librarians to handle e-resources.

ii) **Shortage of Library Funds:** Running an ICT based library requires continuous supply of funds and proper infrastructure. Inadequacy of funds makes it difficult for most libraries to gather and cater e-resources among the users to meet with their demands.

iii) **Technical Infrastructure:** Technical resources in an ICT based library refers to equipment, software, hardware, internet connectivity etc. all of which makes the information communication system easier and smoother. Hence, lack of strong network and wired or wireless connection, server etc. cause hindrance on the way to the implementation of digital library.

iv) **Lack of Cooperation of Staff:** Lack of cooperative culture among the staff is also an issue on the way of digitalization of a library.

v) **Copyright Issue:** The piracy of software together with plagiarism often makes it difficult for the library professionals to provide digital library service.

vi) **Organizational Structure:** Technological advancement has altogether changed the face of rigid hierarchy of knowledge. Hence, the role of the librarian in the knowledge society is due to be redefined.

vii) **Collection of e-resources:** Gathering reading materials demands foresight regarding the prospect of their present use and future requirement on the

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librarian's part. Hence, the librarians face challenge to create policies regarding digital collection development and provision of digital library service not only to the present users but also to the future users. (Negi and Srivastava, 2014)

CONCLUSION

The use of ICT standardizes the academic environment of an educational institution. Students, teachers and scholars of an educational institution are greatly benefitted by the library. The introduction of ICT to the field of library service has had positive impact on the societal and humanitarian activities by enhancing the capacity of library services. The use of ICT in library has made accessibility to the library services more convenient to the users. The information service of the library has included various fields after the introduction of ICT. It is expected that the challenges faced by the LIS professionals while using ICT based system will lead to enhancement of the system.

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