A Study of the Use of ICT Applications in Medical College Libraries

Mr. Vijayakumar Jalagar[1], Dr. Shreekant G. Karkun[2]

[1]*Research Scholar, Visvesvaraya Technological University, Belagavi- 590018*

[1]*Librarian, P.M.N.M. Dental College and Hospital, Bagalkot- 587103, Karnataka, India*

[2]*Librarian, Basaveshwar Engineering College, Bagalkot- 587102, Karnataka, India*

Abstract—**The paper discusses ICT-based libraries and information services in medical school libraries. The current study demonstrates and elaborates on the primary method of learning about ICTs, the purpose of using ICT-enabled library services, the extent to which users use ICT-based library services and facilities, various aspects of Internet usage, and favourite search engines. The paper also highlights online database services and library infrastructure facilities. Information Communication Technology (ICT) is being used in medical college library services to meet the needs of users in modern times and values. The importance of ICT in college libraries provides immediate and easy access to information, which leads to the modernization of college library services. Medical college libraries play an important role in the promotion of medical education and health care information, as well as indirectly in various health welfare programs.**

Index Terms—**Information and Communication Technology; Medical College Library; Library Automation; Networking; Library Consortia.**

1.INTRODUCTION

The introduction of information and communication technologies has created many opportunities and challenges in the provision of library and information services in the health sector around the world, and the rapid delivery of knowledge-based resources is having an impact on clinicians', researchers', and health students' work and learning as medical libraries change. It is critical for the development and administration of healthcare services to have timely access to accurate and relevant medical information. With web-accessible databases and resources, users can easily search and identify online full-text journals, books, and other sources, and the information is instantly available at the point of need.

Every second, information is published in various mediums via various applications of information technologies. Throughout history, a number of technological advancements have had a significant impact on society. These advancements either provided previously unknown capabilities or significantly improved the efficiency of an activity. The invention of printing/writing technology, for example, enabled the accurate recording of knowledge. The phenomenon of mechanisation of traditional library activities such as acquisition, cataloguing, circulation, serial control, Online Public Access Catalogues (OPAC), and so on is referred to as emerging information communication technology. In the context of technical processes, procuring, storing, retrieving, and disseminating knowledge or information, information communication technologies provide a wide range of tools and services for the development and modernization of libraries.(1)

2.INFORMATION AND COMMUNICATION TECHNOLOGY'S ADVENT

A new global economy "Powered by technology, fueled by information, and propelled by knowledge" has been formed as a result of the acceleration of globalisation and technological transformation processes during the past several years. Every aspect of human society has been changed by information and communication technology (ICT). The globe has become a small, interconnected village as a result of widespread computerization, the development of the internet, and the proliferation of the World Wide Web.(2)

In this global village, people from all over the world can communicate with one another as if they were neighbours. People employ a variety of

communication technologies, including voice-over IP, instant messaging, chatting, and video conferencing. Users from all around the world can keep in touch and interact frequently using social networking sites like Facebook, blogs, and twitter.

The history of medical libraries spans several centuries, from the chained and closed-access libraries of the past to the modern hybrid, digital, and virtual libraries that use cutting-edge technology to provide knowledge through a variety of services. Today's libraries are surrounded by networked data that is linked to a wide ocean of internet-based services to provide the academic community, including teachers and students, with access to the necessary information sources. A library's electronic resources (e-resources) are crucial for giving patrons quick and easy access to the information they require. Print media's significance and use are being gradually replaced by the internet, CD-ROM databases, online journals, online books, and OPACs. In order to promote academic achievement and research, one must be knowledgeable about the use and exploitation of e-resources. Many libraries are switching to digital e-resources since they are more convenient and less expensive because of this important aspect. Different electronic and digital media, computer-aided electronic equipment, networks, and the internet have provided significant role in retrieval and dissemination of information and playing a vital role in the modernization of libraries. These technologies are used for various housekeeping, management, and administrative functions of the library.

3.ICT'S IMPACT ON LIBRARY SERVICES

For library operations to run well, a variety of electronic devices and communication technologies must be used. The pooling and sharing of information resources and infrastructure is one of the library's main goals. In order to address shortcomings through automation and computerization, many medical libraries have reexamined their old techniques and services. The following broad categories might be used to categorise the services offered by libraries.

1.1 LIBRARY AUTOMATION:
Library Automation is a key ICT library service application. The fundamental requirement for every library to be modernised is library automation. It is typically distinguished from similar topics like textual analysis, automatic indexing and abstracting, and information retrieval. Today, a definite line between the two is not always kept, and library automation occasionally encompasses allied sectors as well. Modern hardware and software are needed to update library services. Using automation to gather, process, store, and retrieve information as well as perform other library-related duties is known as library automation. Computerization in libraries is a component of library automation. The term "library computerization" refers to the application of computer technology to routine library tasks including management, acquisition, cataloguing, circulation, serial control, OPAC, and so on. One of the most crucial elements that should be considered while automating is library software. Many diverse software applications with unique features are currently on the market, produced by numerous organisations in India and overseas.(3)

IMPORTANT SOFTWARE AND MANUFACTURER NAMES:

Sl. No.	Name of the Software	Manufacturer	Place
1.	ARCHIVES	MIFIFAX Electronics Ltd	Mumbai
2.	CDS/ISIS	UNESCO	Paris
3.	DELSIS	Libsys Corporation	New Delhi
4.	EASYLIB	Easylib Pvt Ltd	Bangalore
5.	GRANTHALAYA	NISCAIR	New Delhi
6.	LIBMAN	Datapro Consultancy Service	Pune
7.	LIBRIS	Frontier.IT. Pvt. Ltd.	Hyderabad
8.	LIBSUITE	Softaid Computer Pvt. Ltd.	Pune
9.	LIBSYS	Libsys Corporation	New Delhi
10.	MAITRAYEE	CMC Ltd.	Kolkata
11.	NEWGENLIB	Kesavan Institute of Information and Knowledge Management	Hyderabad
12.	MINISIS	International Development Research Centre	Canada
13.	OASIS for DOS	Softlink Pvt.	Australia
14.	SANJAY	DESIDOC	New Delhi
15.	SLIM	ALGORYTHMS Co.	Pune
16.	SOUL	INFLIBNET	Ahmedabad
17.	TULIP	Tata Unisys	Noida
18.	WILISYS	WIPRO India	Bangalore

(Fig.1: Library Automation Important Software Names with Manufacturers)

1.2 BAR-CODING TECHNOLOGY
A key component of automating library operations, notably circulation, is barcode technology. Its use enhances the efficiency and precision of activities. With the help of barcode technology, text data may be readily and affordably encoded for reading by low-cost electronic readers. Barcoding is another method for efficiently and precisely collecting data

1.3 RFID TECHNOLOGY
Another form of ICT application in medical libraries is the use of RFID technology. The most recent technology

being utilised in contemporary libraries to stop material theft is RFID (Radio Frequency Identification). Contrary to Electromechanical (EM) and Radio Frequency (RF) systems, which have been employed in libraries for decades, RFID-based systems have progressed beyond security to become tracking systems that combine security with more effective tracking of materials throughout the library, including easier and quicker charge and discharge, inventorying, and material handling. Radio frequency identification (RFID) and microchip technology are combined in RFID. Radio frequency technology is used to read the data stored on microchips in the tags attached to library resources, regardless of the orientation or alignment of the item, and distance from the item is not a crucial element except in the case of extremely wide departure gates. The corridors at the building entrances can be up to four feet wide because each of the two parallel exit sensors can read the tag from up to two feet away. Barcodes and EM or RF theft detection targets can both be replaced by the target used in RFID systems. The upgrading of medical libraries must include RFID.(4)

1.4 NETWORKING SERVICES

Networking entails the sharing of computers, add-on hardware, software, and switches that are all linked through communications channels that connect network users. The joint use of knowledge and resources is the end result. The network's goal is to provide users who need network services with information. A specialised library collaboration for the centralised development of cooperative programmes and services is the library network. Telephone, lines, satellite, microwave, public switching telephone network, pocket switching data network, etc. are all used in networking technologies.

The main objectives of Library Networks:
- ✓ *By offering automated facilities in acquisition, serial control, cataloguing, circulation, user's services, and funds accounting, it is possible to increase resource utilisation and user service levels at individual libraries.*
- ✓ *To provide effective and dependable means of resource sharing in areas like inter-library user services, document delivery services, manpower training, access to national and international databases, and communication link through*

publication and inter-personal communication and procurement of micro-documents.
- ✓ *To improve resource sharing by giving individual libraries access to composite databases like union catalogues, CAS, and SDI.*
- ✓ *To enable publication sharing of duplicates.*

Networks can be divided into star networks, hierarchical networks, dispersed networks, and LANs (Local Area Networks), which support resource sharing and library maintenance. Wide Area Network (WAN) that enables electronic communication between distant users Major WAN in India include DELNET, INDONET, INFLIBNET, MALIBNET, NICNET, T, and National Network of Libraries of Medicine (NN/LM), Association of Academic Health Sciences Libraries (AAHSL), and Section of Health and Biosciences Libraries of the International Federation of Library Associations (IFLA).

1.5 SERVICES ON THE INTERNET:

A library's major objective is to "give the right information to the right person at the right time." Libraries must make information accessible regardless of where it is stored if they are to achieve this purpose. The TCP/IP protocol is used to connect computers all over the world through the Internet, which is an interconnected system of networks. The development of the Internet has made it feasible for people all over the world to connect to computers and access information. User-friendly tools like Gopher, e-mail, Telnet, FTP, and the World Wide Web (WWW) are used to process and access information. Access to visuals, databases, papers, software, archives, pictures, and audio is made possible through the internet. The Internet provides open standards and a few guidelines for the interchange of multimedia information. Universities, colleges, schools, and other educational institutions are linked by the internet for the exchange of information. Since email plays a significant part in the dissemination of information, libraries and information centres are embracing email services and incorporating them into a variety of information-related services. The WWW is integrating all other access tools and offering a very practical mechanism for publishing and accessing multimedia, hypertext-linked documents stored in computers spread

throughout the world. Once the material is accessible online, it can be accessed from anywhere in the world.

1.6 CONSORTIUM-BASED SERVICES:

A library consortium is a community (a cooperative) of two or more information organisations that have formally decided to coordinate, collaborate, or combine some functions in order to further their shared goals. It is an association of libraries working together for common good. The group of libraries offers these advanced level services to facilitate resource sharing.

The goals of library consortiums are as follows:

- ✓ To regulate and cut information expenses,
- ✓ To enhance the sharing of resources,
- ✓ To create a network information environment using Internet, university networks, and campus systems.
- ✓ To exchange information about licencing concerns.
- *HELINET* (Health Science Library and Information Network), founded by RGUHS, Bangalore, in 2001, is one example of an Indian medical library consortium.
- The Dr. NTR University of Health Sciences-affiliated teaching institutes formed the *NTRMEDNET* cooperation in July 2008.
- The National Medical Library in New Delhi is home to the Electronic Resources in Medicine (*ERMED*) partnership.
- UGC consortium Information Network (*INFONET*)
- A pilot project to link 25 Government Medical College Libraries across the nation has been launched by the National Medical Library Consortia in New Delhi.

These have a significant impact on the joint acquisition of the resources for digital information. Services like information retrieval, EDDS, download, and literature reviews are important advantages.

1.7 SERVICES FOR ONLINE DATABASES SEARCH:

According to each user's unique needs, this is the most significant library service offered by the medical institution. Even though internet services are expensive, they offer precise information and properly meet user needs. These services are essentially user-need services that assist in giving users accurate information. Cochrane Library, CINAHL (Cumulative Index to Nursing and Allied Health), MEDLINEPLUS, PUBMED, EBSCO, Science direct, Wiley Online Library, EMBASE: Biomedical database with a significant focus on pharmacological and pharmaceutical research, Up-to-date, Proquest, Clinical Key, etc.(5)

1.8 E-RESOURCES:

The electronic resources (e-resources) accessible in a library play a significant role in supporting users' quick and easy access to the information they need. Electronic resource categories;

- Texts and Books in Electronic Format
- Electronic Journal's
- Library Directories
- Referencing Sources
- Sources of Statistics
- Audio Recordings
- Imaging Databases (Art, Maps, Medical, etc.)
- Databases
- Links to External Websites
- Search Engines
- Online Bookstores
- Online News

1.9 ADVANCED OPTICAL DISC STORAGE TECHNOLOGY:

One of the most recent computer technologies to reach libraries is optical disc storage. Text, images, animation, video clips, and sound files can all be represented via CD ROM in a digital setting. The successor to CDs is the digital video disc, sometimes known as the digital versatile disc (DVD). The primary characteristics of DVD include data compression technology and multi-layer data storage; it can hold 17 GB of data and is currently the only reliable genuine multimedia format. As a result of its great storage density, low cost, and simple system requirements, CDs and DVDs have emerged as the best storage options.

1.10 TECHNOLOGY OF SCANNING

The scanner is a crucial piece of technology for library renovation. It is helpful for optical character recognition (OCR) applications as well as scanning book text, image, and content pages for display in the OPAC (Online Public Access

Catalogue). Documents that have been scanned can be simply shared and accessed. Scanners are a huge asset in the development of digital and virtual libraries.(6)

4.DIGITAL v/s VIRTUAL LIBRARIES

The global sharing of knowledge and resources for delivering the appropriate information to the appropriate user at the appropriate moment is one of the fundamental ideas behind digital and virtual libraries. It refers to computer terminals connected to various electronic or digital information sources. A digital library is a collection of organised, digitalized information that provides features beyond those of conventional libraries. New types of information resources, fresh methods for gathering, classifying, and cataloguing material, as well as extensive use of electronic networks and systems, as well as significant changes in organisational, organisational, and electronic practises, are all produced by digital libraries. A virtual library is one that distributes selective information to distributed libraries directly, usually electronically, and has little or no physical collection of books, periodicals, reading space, or support staff. The virtual library resources are superior to those available through traditional search engines; we must visit the virtual library to conduct research. Virtual and digital libraries enable quick access to electronically stored information, which is at the forefront of modern library services.(7)

5.LIBRARIANS' ROLE

In today's digital environment, medical librarians must work independently or collaboratively to deliver services-oriented and user-centered applications, instructions, programs, projects, and services. In addition to general qualifications and requirements, a commitment to excellent user-centered services, effective oral and written communication, and team collaboration are required.

- ✓ To work with resources in a particular area of expertise.
- ✓ To provide scholarly access to relevant information resources while placing a premium on the needs and expectations of users.
- ✓ To include all available media and document formats, both physically and remotely accessible via the WWW.

- ✓ To train clients on the Internet using tools, search engines, online databases and catalogues, and e-journals.
- ✓ To create an awareness of library services on the web by designing the library's web page and searching and evaluating information resources to be linked to the site.
- ✓ Assess, comprehend, consider, and implement changes that are appropriate to the situation rather than becoming a blind follower of versatile technological developments.
- ✓ Knowing how to design, develop, launch, and maintain digital content management systems, as well as assess, evaluate, recommend, and test various methodologies, policies, and standards for using computer software in the process of creating and preserving digital collections and resources.

6.CONCLUSION

Medical libraries must drastically alter their primary operations in the coming years. Traditional educational strategies are far too costly to meet the needs of their users. The advancements in scientific publishing and the implementation of new information and communication technologies provided a once-in-a-lifetime opportunity to use technology - not to do old things differently, but to do new things for the first time. Structured computer and information technology training for medical students would provide them with the skills they need to practise up-to-date, evidence-based medicine in the future, which is critical to improving medical care quality. Computer-assisted medical education will prepare them to be self-directed learners, information seekers, information managers, and proficient users of computer technology in their future practice and education.

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