TECHNOLOGY ENABLED LIBRARY SERVICES

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ABSTRACT

Libraries are service oriented institutions established in societies to provide various information based services. The nature of these services depends on the category of library, the nature of library users, the mission of the institution where the libraries are located and many other factors. Twenty-first century classrooms are SMART boards instead of chalk boards. Students prefer virtual mode over physical mode of reading. The redesigned learning space is loaded with integrated technology that enables students to understand and use technology to achieve a specific goal. ICT has changed the entire landscape of libraries from traditional libraries to Library 2.0. The study highlights government initiatives in higher education to promote technology-based learning, ICT services to their users, tools for remote access to continue the teaching and learning process, and technology-enabled library services. The development of information and communication technologies has affected every aspect of libraries and information centers.

Key words: Digital Environment, Information and Communication Technology, ICT based Library Services, libraries

I. INTRODUCTION

The digital environment is the communications environment, digital devices and content and activities that are conducted. This concept built integrated and implemented digital electronics for the community. Websites, cloud servers, search engines, social media outlets, mobile apps, audio and other web-based services are all elements of the digital world.

A digital environment is an "environment" created by one or more computers and networking for conducting business. The digital environment is a modern setting with a wide range of computer and networking technology. It has been observed that their usage is increasing as they focus on utilizing the modern business digital environment. It is important to note that the dependence on the digital environment is increasing.

Digitization and technological advancements are affecting all aspects of life besides the education system. Till today, we follow traditional learning where class lectures and students listen and do not have the opportunity to actively participate in lectures in the classroom. The whole way of learning has changed with the advent of technology and upgrading lectures and students to meet the changing system creates challenges. He transformed his regular class session into interactive, interesting and engaging sessions. Digital education has provided the educator with the benefits of transforming the physical classroom into a digital classroom to improve their teaching skills, improve the student evaluation system, and provide quality content to improve student learning at a faster pace.

II.CONCEPT OF DIGITAL ENVIRONMENT AND EDUCATION TECHNOLOGY

With the Advent of ICT education and students are exposed to wide range of education tools which makes the teaching and learning environment interesting, interactive and easy. This has changed the entire learning platform and gave more feasibility for students to learn at their pace, due to which the educational institutions identified the need to change the teaching process and adopted the new modes of technology, Higher educational institutions stared using the digital tools for delivering quality lectures to meet the requirements and expectations of various students communities. Government has also taken initiatives in promoting digital education through Diksha, NDL, N-LIST, Spoken Tutorial, Swayam Prabha, ARILA, VIDWAN, E-PG PATASHALA, NPTEL, SHODH GANGOTRI, SWAYAM, ETC and issued guide lines for proper implementation of digital technology in educational institutions. Education Technology is a process of developing and designing tailor made educational tools which suits the changing environment for promoting education and improves the performance of student's Educational technology has developed various concepts of learning depending on the needs of the learners. Some of the concepts are Blended learning, cloud Computing, Adaptive learning, Mobile learning, MOOCs, Learning Management Systems, etc.

III.OBJECTIVES OF THE STUDY

➢   To study the impact of ICT on Libraries
➢   To Explain ICT-based Services to their users
➢   To provide the details of digital initiative by Government of India.

IV.IMPACT OF ICT ON LIBRARIES

ICT has changed the nature of Libraries. A variety of terms such as hybrid, digital and virtual library are used to refer to the academic library. A digital library can be defined as a "Managed collection of information with associated services where the information is stored in digital format and accessible over a network". The virtual library has been defined as "Remote access to the content and services of libraries and other information resources, combining an on-site collection of current heavily used materials both print and in electronic form with an electronic network which provides access to and delivers from the external worldwide library and commercial information and knowledge sources. Hybrid libraries are libraries that provide access to both electronic resources and paper-based resources". From the definitions, it is clear that most of today's Libraries fall in the hybrid category. The internet has made information access and retrieval both simple and complex. Information retrieval systems are being designed to suit the need of end users and therefore try to simplify the process. Simultaneously however the user is overwhelmed with so much information resources and choices that the process becomes complex.

➢   ICT made information creation in digital format possible.
➢   ICT made online access and file transfer possible.
➢   ICT made networking and sharing of information resources possible.

The shift from print to digital information has a high impact on libraries, information centers and other institutions directly involved in processing information. This shift is generally attributed to the merging of computing, telecommunications technologies, and other industries. Computers have permeated society because of their ability to perform high volume error-free repetitive tasks at speeds much faster than human beings, while recent and emerging developments in the area of computing; telecommunications, networking and resource sharing made access to information anytime, anywhere possible.

With the developments and application of ICT, the whole scenario of libraries has changed. There is a shift from traditional libraries to hybrid libraries. We see the emergence of libraries with different nomenclatures operating in the universe of knowledge. These libraries are automated libraries, electronic libraries, digital libraries or ubiquitous virtual libraries. In the web environment there has emerged the concept of Library 2.0. All these libraries are using different information technology applications for performing activities ranging from the acquisition of materials to the dissemination of information.

Libraries are also providing various ICT-based services to their users, including the following.

- **Web-based Online Public Access Catalogues (Web-OPAC):** The internet and web-based technologies have made it possible for the libraries to provide access to their catalogues globally. It helps the library users to access to information from anywhere in the world when OPAC is available on the internet. The library users also find it easier to learn and use the OPACs from different library systems. Web-based OPAC allows for linking to other information resources such as tables of content, full-text documents, author, title, publisher, publication year etc.

- **Digital Library Service:** Digital library provides a variety of digital information sources. It reduces the physical space, the user can access to information remotely and it also provides access to distributed information resources. Its advantage is that it has the ability to handle multilingual content. Using ICTs librarians are creating digital libraries, that is libraries where some or all of the holdings are available in electronic form, and the services of the library are also made available electronically

- **Electronic Document Delivery Service:** The libraries are implementing ICT-based Inter-Library Lending (ILL) using networks to deliver copies of journal articles and other documents in digital format like PDF (Portable Document Format) to the users' desktops. It helps the users to access information which is not available in their respective libraries. It is one of the most useful services for users, specifically research scholars of remote areas.

- **Institutional Repository Service:** Institutional Repository (IR) is a set of services that a university offers to the members of its community for the management and distribution of digital materials by the institution and its community members. It is most essentially an organization committed to the stewardship of these digital materials, including long-term preservation where appropriate, as well as organization and access or distribution. It provides citation features, easy access to the content and the content can be stored permanently. Institutional repositories involve different stakeholders, each bringing different contributions to the repository, and librarians are among the key stakeholders in institutional repository projects. Librarians bring skills and standards required to manage digital information resources and work towards continued preservation of and access to digital resources.

- **Current Awareness Service- CAS:** Current Awareness Services has been an important means for keeping the users up to date in their areas of interest. A current awareness service may be as simple as a copy of the table of contents or a bulletin containing bibliographic records, of articles selected from the current issues of journals and other material, and usually organized by subjects. Libraries now compile current awareness bulletins using a predefined search strategy and running on the database either on CD-ROM or online periodically and getting the desired output. Subject to copyrights, the output can also be stored on a local system, and disseminated online (internet, intranet) and offline (print, CD-ROM, email).

- **Audio-Visual Services:** Audio-visual materials are important sources of information, education, and entertainment. Many libraries particularly media libraries and large academic and public libraries hold audiovisual material such as music, films, pictures, and photographs etc. Old media of LP records and tape slide have long been replaced with audio and video tape. The new multimedia of an audio CD, Video CD (VCD), and Digital Video Disks (DVD) have the advantage of higher storage capacity, random access and longer life than audio and video tapes and cassettes. Many libraries allow their members to borrow these. Multimedia documents can now be played on standard PCs, stand-alone or networked. Recent developments in storage media, compression, and encryption technology have made it possible to store a large number of multimedia documents on the hard disk and disseminate through the internet. Software such as Quick Time Player, Microsoft Media Player etc is now freely available to play or see these documents in a browser.

- **Online User Education:** Libraries are using ICTs, especially the Web, to implement online based bibliographic or library use (library literacy) programmes targeting their clients. Among others, these programmes include online or CD-ROM based tutorials on searching online resources and virtual tours of library collections, and these are mainly accessed on intranets, extranets or the Internet. Use of ICTs enables libraries to avoid problems associated with the use of lecture-based approaches or library orientation programmes. Problems such as dealing with large numbers of students or having a

shortage of staff to deliver the programmes or too little time to deliver so much information to students. In addition, ICTs offer students an opportunity to follow the programmes at their own pace in their own time.

- **Readers' Advisory and E-Reference Services:** ICTs offer libraries an opportunity to provide Web-based versions of readers' advisory services and reference services. These include services such as informing users via the Web about new releases or additions to the library collection, selective dissemination of information (SDI), announcements, and facilities for readers to interact with the reference staff (Virtual Reference Desks), etc. In academic institutions offering courses via distance learning, libraries are able to support their students through ICT based advisory services.

- **Electronic theses and dissertations (ETDs):** Related to institutional repositories, especially in university libraries, is the provision of access to full-text copies of Electronic Theses and Dissertations (ETD). Without ICTs it has been impossible to access full-text copies of theses and dissertations from a remote location.

- **Online Chat Services:** Online chat may refer to any kind of communication over the Internet, which offers an instantaneous transmission of text-based messages from sender to receiver. In Libraries, it can be used for online reference service and real-time consulting service. Online chat may address as well as point-to-point communications as well as multicast communications from one sender to many receivers.

- **Electronic Books Service:** The elements that are considered as importing for the use of E-books in an academic library are the Content, Software and Hardware Standards, Protocols, Digital Rights Management, Access, Archiving, privacy, market, pricing and features. Electronic books (e-Books) are one way to enhance the digital library with global 24X7 accesses to authoritative information, and they enable users to quickly retrieve and access specific research material easily, quickly, and effectively.

- **Electronic Journals:** Service Electronic journal may be defined broadly as any journal, magazine, newsletter or type of electronic serial publication which is available over the internet and can be accessed using different technologies such as the World Wide Web, Gopher, FTP, telnet, e-mail or listserv. Many publishers who offer subscriptions to print journals, sometimes also offer a subscription to the electronic version of the journal free of charge. Some of the publishers who are providing e-journals include Emerald, Elsevier, Sage, Springer, EBSCO, J-Gate, John Wiley, etc.

- **Electronic Mail (E-mail) Service:** This medium can also be used to send and receive emails. This is commonly and widely used with the internet facilities. E-mail is very useful for sending messages to and from remote areas with the enhanced network. Further, it is also useful in various aspects of the library environment. Thus, it may be stated that e-mail may play a significant role in information dissemination services.

- **Internet Service:** As a source of serious subjects of the universe of knowledge, has become information superhighway and opened the floodgates for scholarly communication. The Internet is a truncated version of inter-networking, which refers to interconnecting two or more computer networks. The Internet is described as a worldwide network of computer and people. It is an important tool for global online services. The emergence of Internet offers very high bandwidth, which will widen the scope for information processing and dissemination as never before. Internet connects universities, colleges, schools, and other educational institutions for information sharing and exchange. Access to information through the Internet has changed the total scenario of librarianship.

- **Document Scanning Services:** Scanner is important equipment in the modernization of library. It is useful for scanning text, image and content pages of books and providing great help for establishing a digital and virtual library.

- **Reprographic & Micrographic Service:** These technologies are still widely used technology in libraries globally. Most of the research libraries have a reprographic machine and provide photocopies of any document on demand. Microform is a generic term for all information carriers which use microfilm or similar optical media (including study) for the high-density recording and storage of optically encoded information in the form of micro images of the printed document, bit patterns or holograms.

- **Library Network Service:** The important function of the network is to interconnect computers and other communication devices so that data can be transferred from one location to another instantly. Networks allow many users to share a common pathway and communicate with each other. The networks include the local area network (LAN) in library housekeeping and resource sharing and wide area network (WAN) that covers wide geographic area such as a country or state, that covers limited geographic area such as campus, or building e.g. – DELNET, ADINET, INDONET, INFLIBNET, MALIBNET, NICNET, ADINET etc are major WAN in India.

- **Open Source Software Service:** Open Source Software or the OSS is freely available computer software, which allows altering the source code and customizing the software to anyone & for any purpose. In the last few years we have seen the development of a number of ILS products in the open source world such as Integrated Library Systems (ILSs) like Koha; Digital library software, like Greenstone; Digital Repository Software, like DSpace; Content Management Software, like Moodle, etc.

- **Library Portal Service:** A library portal is a single access point combining the library catalogues subscribed database, electronic journals etc. Library portal meets the individual needs of the users and the portal is now the standard interface to generate library resources and services through single access and management point for users. Librarians are becoming increasingly aware that the multiplication of electronic resources is a problem for end users. Users find it difficult to have the most appropriate database or resource to search for their information need. Library portal reduces the barrier of users to remember various log-on. Example: Jayakar Library Portal.

- **Ask-A-Librarian Service:** Ask-A-Librarian services are Internet-based question and answer service that connects users with individual who possess specialized subject knowledge and skill in conducting precision searches. Most "Ask-a-Librarians" services have a web-based question submission form or an e-mail address or both. Users are invited to submit their queries by using web forms or through e-mail. Once a query is read by a service, it is assigned to an individual expert for answering. An expert responds to the query with factual information and or a list of information resources. The response is either sent to the user's e-mail account or is posted on the web so that the user can access it after a certain period of time. Example: Oxford College Library.

- **Bulletin Board Service:** A bulletin board is an electronic communications forum that hosts posted messages and articles connected to a common subject or theme or interest. It allows users to call in and either leaves or retrieves messages. The messages may be directed to all users of the bulletin board or only to particular users. But all messages can be read by all users. Several libraries are using bulletin boards for their web-based library services. The bulletin board system is also used as an interactive interface to invite suggestions on activities and services of a library. It can also be used as an interface to distribute library services. A Bulletin Board System, or BBS, is a computer system running software that allows users to connect and log in to the system using a terminal. Once logged in, a user can perform functions such as uploading and downloading software and data, reading news and bulletins, and exchanging messages with other users, either through electronic mail or in public message boards.

V.DIGITAL INITIATIVES OF MHRD, GOVERNMENT OF INDIA

To improve the learning outcomes and improve the access and quality of learning, Technology offers solutions, in the form of digital education. National Mission on Education through ICT (NMEICT) is a major initiative of Ministry of Human Resource Development (MHRD) to infuse digital education solutions to improve the access to quality contents and also to improve the learning out comes. The Ministry of HRD along with support of many state governments, AICTE and leading universities also provide multiple platforms for the benefit of user. Some of them are listed below:

- **SWAYAM** (Study of Webs of Active Learning for Young Aspiring Minds): Swayam provides Massive Open Online Courses with 140 universities approved credit transfer feature. Students enrolled in Jan-20 & in total are 26 Lakhs & 1.57 Cr respectively. Total 1900+ courses covering school & higher education. All the courses are interactive, prepared by the best teachers in the country and are available, free of cost to any learner. More than 1,000 specially chosen faculty and teachers from across the country have participated in preparing these courses.

- The courses hosted on SWAYAM are in 4 quadrants – (1) video lecture, (2) specially prepared reading material that can be downloaded/printed (3) self-assessment tests through tests and quizzes and (4) an online discussion forum for clearing the doubts. Steps have been taken to enrich the learning experience by using audio-video and multi-media and state of the art pedagogy / technology. https://swayam.gov.in/

- **N-LIST:** The Project entitled ("National Library and Information Services Infrastructure for Scholarly Content): The N-LIST project provides access to e-resources to students, researchers and faculty from colleges and other beneficiary institutions through server(s) installed at the INFLIBNET Centre. The authorized users from colleges can now access e-resources and download articles required by them directly from the publisher's website once they are duly authenticated as authorized users through servers deployed at the INFLIBNET Centre. https://nlist.inflibnet.ac.in/

- **SWAYAMPRABHA**: Swayamprabha provides high quality educational programs 24*7 through 34 DTH channels. Around 56,000 total videos have been telecasted covering school & higher education. It has 3+ crores total views on Youtube since inception.The contents are provided by NPTEL ,IITs, UGC, CEC,IGNOU, NCERT and NIOS. The INFLIBNET centre maintains the web portal. https://www.swayamprabha.gov.in/

- **SHODHGANGA:** a reservoir of Indian theses. The Shodhganga@INFLIBNET Centre provides a platform for research students to deposit their Ph.D. theses and make it available to the entire scholarly community in open access.. https://shodhganga.inflibnet.ac.in/

- **NATIONAL DIGITAL LIBRARY**:National Digital Library is a repository of e-content on multiple disciplines from primary to PG levels. It has 4.3 crores content (Text / Audio / Video / Simulation /Graphics), harvested from 250 sources; in 300+ languages. NDL has 55 Lakhs + registered users.It provides a single-window search facility to access digital contents currently existing in India as well as other digital sources under a single umbrella. https://ndl.iitkgp.ac.in/

- **E-SHODH SINDHU (eSS):** the Ministry of HRD (now renamed as Ministry of Education) has formed e-ShodhSindhu merging three consortia initiatives, namely UGC-INFONET Digital Library Consortium, N-LIST and INDEST-AICTE Consortium.The e-ShodhSindhu will continue to provide current as well as archival access to more than 10,000 core and peer-reviewed journals and a number of bibliographic, citation and factual databases in different disciplines from a large number of publishers and aggregators to its member institutions including centrally-funded technical institutions, universities and colleges that are covered under 12(B) and 2(f) Sections of the UGC Act. https://ess.inflibnet.ac.in/.

- **VIRTUAL LAB:** Virtual Labs project is an initiative of Ministry of Human Resource Development (MHRD), Government of India under the aegis of National Mission on Education through Information and Communication Technology (NMEICT).Virtual Lab has developed Web-enabled

curriculum based experiments designed for remote – operation. Its 275 labs with 2200+ experiments made 18+ Lakhs students benefitted. This project is a consortium activity of twelve participating institutes and IIT Delhi is coordinating institute. It is a paradigm shift in ICT-based education. https://www.vlab.co.in/

- **E-PG PATASHALA:** E-PG Patashala is a gateway for e-books up to PG which provides High quality, curriculum based, and interactive content in different subjects across all disciplines**.** https://epgp.inflibnet.ac.in/

- **DIKSHA** (Digital Infrastructure for Knowledge Sharing) is a national platform for school education Teachers & all other learner, an initiative of National Council for Educational Research and Training (NCERT). DIKSHA can be accessed by learners and teachers across the country and currently supports 36 Indian languages. https://diksha.gov.in/

- **E ACHARYA:** e-Acharya is an integrated e-content portal developed under National Mission for Education through ICT (NME-ICT). The portal provides facility to search and browse the learners all learning materials includes audio, video, textual materials, etc. through a single interface. https://eacharya.inflibnet.ac.in/vidya-mitra/

- **E-KALPA: Creating Digital-learning Environment for Design** also called e-Kalpa is an initiative of the Ministry of Human Resources, Government of India as part of the National Mission in Education through Information and Communication Technology (NMEICT). https://www.dsource.in/

- **VIDWAN:** Vidwan is an Expert Database and National Research Network which has profiles of scientists / researchers and other faculty members working at leading academic institution. https://vidwan.inflibnet.ac.in/

- **SPOKEN TUTORIAL:** Spoken Tutorial is a Tutorial in IT application which provides self-training in IT fields. This project helps everyone learn various Free/Libre and Open Source Software all by oneself. The self paced, multilingual courses ensure that anybody with a computer and a desire for learning can learn from any place, at any time and in a language of their choice. Internet is not required to use Spoken Tutorials. This project is being implemented by IIT Bombay. https://spoken-tutorial.org/

- **SAKSHAT:** Sakshat is one Stop Education Portal for addressing all the education and learning related needs of students, scholars, teachers and lifelong The portal provides the latest news, press releases, achievements etc related to Ministry of HRD. www.sakshat.ac.in

- **NPTEL:** Largest online repository in the world of courses in engineering, basic sciences and selected humanities and social sciences subjects. YouTube channel for NPTEL – most subscribed educational channel, 1 billion views and 42+ lakhs subscribers. More than 56000 hours of video content. Most accessed library of peer-reviewed educational content in the world 52000+ hours of transcribed content; 51000+ hours of subtitled videos. https://nptel.ac.in/

- **NIRF**: The National Institutional Ranking Framework (NIRF) was approved by the MHRD and launched by Honorable Minister of Human Resource Development on 29th September 2015. This framework outlines a methodology to rank institutions across the country. The methodology draws from the overall recommendations broad understanding arrived at by a Core Committee set up by MHRD, to identify the broad parameters for ranking various universities and institutions. The parameters broadly cover "Teaching, Learning and Resources," "Research and Professional Practices," "Graduation Outcomes," "Outreach and Inclusivity," and "Perception". https://www.nirfindia.org/

CONCLUSION

ICTs have transformed libraries and their services to reach remote uses and improved access to information for their users with various digital platforms. The government has also launched support programs to improve the quality and standards of higher education in India. The technology that enables library services has improved the teaching-learning scenario in an efficient way to reach the target users.

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