One Year Bachelor Degree Programme

Library And Information Sciences

Second Semester

ICT IN LIBRARY

Guru Prasad Das School of Interdisciplinary and Vocational Studies

KRISHNAKANTA HANDIQUI STATE OPEN UNIVERSITY

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Table of Contents

UNIT		Page
UNIT 1:	**INTRODUCTION TO ICT IN LIBRARIES**	**7-12**
	Overview of ICT (Information and Communication Technology), Concept, Need in library, Importance of ICT in Library Services, Historical Context and Evolution of ICT in Libraries.	
UNIT 2:	**COMPONENTS OF ICT**	**13-17**
	Types of Information and Communication Technology; LAN; ICT application in library: Daily operation, Technical Service, ITC based services.	
UNIT 3:	**LIBRARY MANAGEMENT SYSTEMS (LMS)**	**18-24**
	Definition and Components of LMS, Functions and Features of LMS, Popular LMS Software in Libraries.	
UNIT 4:	**LIBRARY AUTOMATION**	**25-33**
	Automation of Cataloguing and Classification, Digitization of Print Materials, Challenges and Benefits of Digitization.	
UNIT 5:	**DIGITAL LIBRARIES**	**34-39**
	Definition and Characteristics of Digital Libraries, Types of Digital Libraries, Tools and Technologies for Digital Library Development.	
UNIT 6:	**LIBRARY WEBSITE DEVELOPMENT**	**40-45**
	Importance of Library Websites, Design Principles for Library Websites, Content Management Systems (CMS) for Library Websites.	
UNIT 7:	**ELECTRONIC RESOURCE MANAGEMENT (ERM)**	**46-51**
	Managing Electronic Journals, Databases, and E-books, Licensing and Access Control, Integration with Library Catalogues.	
UNIT 8:	**OPEN ACCESS AND INSTITUTIONAL REPOSITORIES**	**52-59**
	Overview of Open Access Movement, Creation and Management of Institutional Repositories, Benefits and Challenges of Open Access.	
UNIT 9:	**LIBRARY NETWORKING AND CONSORTIUMS**	**60-65**
	Interlibrary Loan Systems, Resource Sharing among Libraries, Collaborative Collection Development.	

UNIT 10: RFID TECHNOLOGY IN LIBRARIES **66-70**

Introduction to RFID (Radio Frequency Identification), Applications of RFID in Library Management, RFID Implementation Considerations and Best Practices.

UNIT 11: MOBILE APPLICATIONS FOR LIBRARIES **71-77**

Mobile-friendly Library Services, Development of Library Mobile Apps, Use Cases and, Examples of Library Mobile Applications.

UNIT 12: SOCIAL MEDIA AND LIBRARIES **78-83**

Utilizing Social Media for Library Promotion, Engaging with Users on Social Media Platforms, Social Media Policies and Guidelines for Libraries.

UNIT 13: INFORMATION LITERACY AND ICT **84-92**

Integration of ICT in Information Literacy Programmes, Teaching Digital Skills and Critical Evaluation of Online Information, Assessing Information Literacy Competencies.

UNIT 14: EMERGING TRENDS IN ICT AND LIBRARIES **93-100**

AI (Artificial Intelligence) Applications in Libraries, Virtual and Augmented Reality in Library Services, Block chain Technology for Secure Information Management.

Course Introduction

The course *"ICT in Library"* introduces learners to the fundamental concepts, applications, and emerging innovations of Information and Communication Technology (ICT) in the context of libraries and information centres. In today's knowledge-driven environment, libraries are evolving from traditional repositories of printed materials to hybrid and digital knowledge hubs. This transformation has been largely influenced by ICT, which has redefined the ways information is acquired, processed, stored, retrieved, and disseminated. The course is designed to provide both theoretical understanding and practical insights into the use of ICT for effective library management and services.

Beginning with an overview of ICT and its historical development in the library sector, the course explores how technological advancements have enhanced the efficiency and effectiveness of library operations. Learners will gain familiarity with the major components of ICT, including computer networks, databases, and communication systems, and how these are applied in various library functions such as cataloguing, circulation, and reference services. Special emphasis is placed on understanding Library Management Systems (LMS) as integral tools for automating technical and administrative tasks, and on examining popular LMS software used in modern libraries.

As libraries increasingly adopt digital solutions, the course delves into the processes of library automation, digitization, and digital library development. Learner will explore the principles, tools, and technologies used in creating and managing digital content, addressing both the benefits and challenges of digital transformation in libraries. The significance of developing user-oriented library websites and managing electronic resources is highlighted, along with the methods for integrating electronic journals, databases, and e-books into catalogues through efficient Electronic Resource Management (ERM) systems.

Further, the course introduces open access initiatives, institutional repositories, and library networks such as consortiums that facilitate resource sharing and collaboration. Emerging technologies like RFID, mobile applications, and social media are discussed in relation to their roles in improving library access, user engagement, and promotional activities. Information literacy, as a key learning outcome, is integrated into the course to equip students with the ability to effectively use ICT tools for evaluating, managing, and communicating information in digital environments.

The learner will study the developments and future trends in ICT applications for libraries, including Artificial Intelligence (AI), Virtual and Augmented Reality (VR/AR), and Block chain technology. Through a balanced combination of conceptual understanding and applied learning, *"ICT in Library"* aims to prepare library and information science professionals for the challenges of managing digital information systems and delivering technology-enabled library services in the 21st century.

UNIT 1: INTRODUCTION TO ICT IN LIBRARIES

UNIT STRUCTURE

1.1 Learning Objectives
1.2 Introduction
1.3 Overview of ICT (Information and Communication Technology Concepts)
1.4 Need in library, Importance of ICT in Library Services
    1.4.1 The Concept of ICT in Libraries
    1.4.2 The Necessity of ICT in Libraries
1.5 Historical Context and Evolution of ICT in Libraries
    1.5.1 Developments on a Global Scale
    1.5.2 Development in India
1.5 Let Us Sum Up
1.6 Answers To Check Your Progress
1.7 Further Readings
1.8 Model Questions

1.1 LEARNING OBJECTIVES

After going through this unit, we will be able to,

- explain the meaning and basic features of ICT in general and in the library context.
- describe the concept and need of ICT in libraries, especially in relation to information growth and user needs.
- discuss the importance of ICT in library services and operations such as acquisition, cataloguing, circulation and reference.

1.2 INTRODUCTION

Libraries have consistently been instrumental in the facilitation of reading, learning, and investigation by collecting, organizing, and facilitating access to a variety of documents. In the past, the majority of libraries relied on printed materials, manual catalogues, and in-person services at a predetermined location and time. The creation, storage, and sharing of information have been significantly altered by the advancement of information and communication technology (ICT), which has had a direct impact on the workings of libraries and the expectations of users regarding information access.In the present day, information is generated in both print and non-print formats and expands at an astounding rate. However, library budgets and staffing levels do not expand at the same rate. ICT enables libraries to manage the growing volume of information by utilizing digital tools, networks, and computers to store, retrieve, and deliver information resources. ICT has also enabled

libraries to transcend physical boundaries and offer users access to electronic resources, databases, and online services, irrespective of their location and time.

1.3 OVERVIEW OF ICT (INFORMATION AND COMMUNICATION TECHNOLOGY CONCEPT

Information and Communication Technology is a comprehensive term that refers to the technologies that are employed to generate, process, store, retrieve, and transmit digital information. ICT encompasses the physical apparatus, software, and networks that facilitate the transfer of information from one location to another and its utilization by various individuals and systems. To put it simply, ICT encompasses all the technological tools and resources that are employed to communicate and manage information, including computers, the internet, telecommunication networks, and a variety of digital applications.

Applications and networks are the two primary components of ICT. Fixed line, wireless, and satellite telecommunication systems, as well as broadcasting networksand other communication channels, are all examples of networks that facilitate the connectionbetween devices and consumers. The internet, database management systems, information storage and retrieval systems, email, multimedia tools, library software, and other programs used to manage information and communication are all examples of applications.

The primary characteristics of ICT that are pertinent to libraries include the capacity to store substantial amounts of data, high-speed processing, precision, the capacity to network numerous sites, and support for multimedia formats such as text, images, audio, and video. ICT tools assist in the conversion of information into a machine-readable format, its compressed storage, its rapid search using various access points, and its dissemination to users via local networks or the internet.

1.4 NEED IN LIBRARY, IMPORTANCE OF ICT IN LIBRARY SERVICES

1.4.1 The Concept of ICT in Libraries

The application of ICT in the library environment typically involves the utilization of computers, networks, and related technologies to facilitate library operations and services. Library automation or library computerization is a frequently used term in the context of ICT applications in libraries. It refers to the utilization of computer-based systems to execute conventional library administrative tasks, including acquisition, cataloguing, circulation, serials control, and reference. ICT also facilitates the provision of more sophisticated services, including electronic document delivery, access to digital collections, online public access catalogues, and participation in library networks and consortiums.

A hybrid library is a term that occasionally refers to a library environment that is founded on ICT and combines print and electronic resources. Users are able to access a variety

of digital materials, including e-books, e-journals, databases, and printed books, through computers and networked devices in this type of library. ICT enables the digital preservation of the catalogue, user records, and numerous library services, thereby simplifying their updating, searching, and integration with other systems.

1.4.2 The Necessity of ICT in Libraries

Several practical conditions necessitate the implementation of ICT in libraries. First, the volume of recorded information is growing rapidly, while physical space, staff and financial resources in most libraries are limited. It is not possible for any single library to acquire everything that is published, nor is it easy to store and manage an ever-growing print collection without the help of technology. ICT facilitates the ability to access resources from other libraries and networks, more efficient organization, and compressed digital storage, rather than requiring each item to be owned locally.

Second, user expectations have changed with the spread of computers, smartphones and the internet. Users now expect quick, often instant, access to updated information, the ability to search across large collections, and access from outside the library building and beyond normal working hours. Manual systems cannot meet these expectations effectively, especially when the number of users and the complexity of their queries increase. ICT based systems allow libraries to respond to these expectations by providing web-based catalogues, remote access to resources and various digital services that reduce waiting time and better support learning and research.

Third, ICT is needed to manage the diversity of formats and sources that now exist. Libraries handle printed books and journals, digital texts, audiovisual materials, online databases, institutional repositories and more, and ICT provides tools for integrating and managing these different types of resources in a unified way. ICT also supports cooperation among libraries through networks and consortia, which helps in resource sharing and in reducing costs for expensive e resources

1.5 HISTORICAL CONTEXT AND EVOLUTION OF ICT IN LIBRARIES

1.5.1 Developments on a Global Scale

The utilization of technology in library operations has a long history and can be traced back to the early attempts to manage large volumes of data using mechanical and electromechanical devices. A mechanical system was employed for circulation at the University of Texas in 1936, which was one of the first recorded applications of automated data management in a library. The experimental use of punched cards, data processing apparatus, and early computers in libraries, particularly in the United States and the United Kingdom, was a result of computer developments in the 1950s.

The Machine-Readable Cataloguing project, or MARC, was a significant milestone in library automation. It was initiated by the Library of Congress in the 1960s to establish a standard format for computer-readable cataloguing documents. The concept that

bibliographic data can be generated once and disseminated broadly in a standardized format, which is crucial for cooperative cataloguing and networked access, was established by the success of MARC and related projects like INTREX. The Ohio College Library Center, now referred to as OCLC, was established in 1967 as an online shared cataloguing and union catalogue system. This marked a significant advancement in the utilization of computers and communication technologies to facilitate cooperative networks and resource sharing.

Many libraries in North America and Europe began to develop online systems for catalogues, circulation, and other functions, as well as to design networks that linked libraries for shared databases and services, starting in the 1970s. In the 1980s, the pervasive introduction of microcomputers and the use of online systems, optical disks, and CD ROMs in libraries made automation more affordable for a wider range of institutions, including smaller libraries. Libraries were able to transform the nature of library services from building-centered to network-centered in the 1990s as a result of the expansion of the internet and the world wide web, which enabled them to post catalogues and services online, support digital libraries, and provide remote access to resources.

1.5.2 Development in India

The utilization of computers in libraries in India was initiated incrementally and was influenced by national advancements in information technology. In the 1950s, the Indian Statistical Institute in Kolkata was among the first institutions to install a computer. The first recorded use of computers for library work was at INSDOC in the mid-1960s, when computers were employed to prepare indexes for Indian Science Abstracts and for union catalogues. In the 1970s, numerous libraries began to construct computerized databases and experiment with automation, frequently with the assistance of national agencies like NISSAT.

The Information and Library Network, or INFLIBNET, and CALIBNET in Kolkata, as well as DELNET in Delhi, established a robust foundation for resource sharing and automation in academic libraries. INFLIBNET, which was established by the University Grants Commission, played a catalyst role by offering financial support, standardization, training, and software for library automation in universities and institutions throughout India. In the course of time, numerous Indian libraries transitioned from manual systems to integrated library management systems for the purposes of cataloguing, circulation, and serials control. Additionally, they began to subscribe to electronic journals and databases that were accessible through consortiums like UGC INFONET.

Government initiatives in information technology and e governance, such as the establishment of the Department of Electronics, National Informatics Centre, and various national policies, created a broader ICT environment that also influenced libraries in parallel to these developments. In accordance with the global trend toward digital and networked libraries, libraries in India began developing digital collections, institutional

repositories, and online services for their users as internet connectivity and digital infrastructure improved.

CHECK YOUR PROGRESS

Q 1: State any two reasons why ICT has become necessary in modern libraries.
Q 2: How ICT is helpful in providing CAS?

1.6 LET US SUM UP

The introduction of ICT in libraries was the subject of this unit, which focused on the transformation of the creation, storage, retrieval, and sharing of information through the use of technological instruments and networks. ICT was defined as a comprehensive collection of tools and resources that facilitate digital communication and information management, including both networks and applications. Its primary attributes, including high storage capacity, speed, accuracy, and multimedia support, were associated with the requirements of libraries.

The unit discussed the concept of ICT in libraries and the necessity of utilizing ICT to address the information surge, limited resources, changing user expectations, and diversity of formats. The significance of ICT in library services was assessed in terms of enhanced access to information, improved operational management, and the development of novel services, including electronic document delivery, virtual reference, digital resources, and online catalogues. The historical evolution of ICT in libraries was subsequently traced, beginning with early mechanical and computer-based systems and progressing to online networks and digital libraries worldwide. The emphasis was then on key developments in India, including the role of national networks and consortia.

1.7 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1: ICT has improved access to information by enabling online public access catalogues that can be searched in many ways, and by providing remote access to electronic resources such as e journals, e books and databases that users can consult from outside the library building and beyond normal working hours.

Answer to Q 2: ICT helps in providing current awareness and selective dissemination of information services by allowing libraries to maintain computerized user profiles, monitor new additions and updates in databases and collections, and send targeted alerts or bulletins via email or web platforms to users who need information on particular subjects.

1.8 FURTHER READING

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1.9 MODEL QUESTIONS

Q 1: List two requirements for information and communication technology (ICT) in libraries.

Q 2: What are the primary components of ICT in libraries?

Q 3: In what ways does information and communication technology (ICT) facilitate circulation services?

Q 4: What is the function of data management systems in libraries?

Q 5: Clearly articulate the necessity and significance of ICT/Automation in libraries, utilizing appropriate examples.

Q 6: Outline the ways in which information and communication technologies (ICT) are implemented in the technical services and daily operations of libraries.

*** ***** ***

UNIT 2: COMPONENTS OF ICT

UNIT STRUCTURE

2.1 Learning Objectives
2.2 Introduction
2.3 Types of Information and Communication Technology
2.4 ICT application in library: Daily operation, Technical Service, ITC based services
    2.4.1 ICT in Daily Operations
    2.4.2 ICT in Technical Services
2.5 Let Us Sum Up
2.6 Answers To Check Your Progress
2.7 Further Readings
2.8 Model Questions

2.1 LEARNING OBJECTIVES

After going through this unit, we will be able to,

- learn about ICT, its need, components.
- types, application in daily operations in libraries.

2.2 INTRODUCTION

Almost every library operation now requires Information and Communication Technology, from basic record keeping to more advanced digital services for patrons. ICT is not only about computers; it also includes a whole range of tools and systems that let you store, analyze, send, and get information in diverse forms, such text, images, audio, and video. ICT helps libraries with all of their main tasks, such as building collections, organizing them, making them accessible, and helping people find and use information in the best way.

Libraries can't just use manual ways to manage their resources anymore because there is so much information available in both print and electronic versions. With the help of experienced staff and defined processes, ICT lets libraries work more efficiently by using hardware devices, software applications, networks, databases, and communication tools in a coordinated fashion. This lesson talks about the key parts and types of ICT and how they are used in library work, technical services, and ICT-based services. This way, learners may understand how different tools work together in real libraries.

Need of ICT:

I. To handle the information explosion and increasing user demands efficiently.
II. To save time and effort compared to slow manual library processes.

III. To manage the continuous growth of recorded information despite limited physical space.
IV. To organize and retrieve large and complex information effectively.
V. To perform housekeeping operations quickly and accurately through automation.
VI. To manage resources available in multiple formats (print and non-print).
VII. To overcome limitations of budget, space, and human resources in acquiring all publications.
VIII. To avoid duplication of work and improve speed, quality, and effectiveness of services.
IX. To provide better information management and retrieval, including access to national and international databases.
X. To respond to the impact of communication technology and digital expectations of society.
XI. To enable remote and web-based access to resources and other library networks.
XII. To promote resource sharing, networking, and financial efficiency among libraries.

2.3 TYPES OF INFORMATION AND COMMUNICATION TECHNOLOGY

ICT in libraries is best understood through its core components because each plays a recurring and essential role in daily library operations. The primary components are hardware, software, networks and communication technologies, data management systems, people, and procedures or policies. While they are often described individually, in practice they function as a unified system, and a weakness in any single component can lower the effectiveness and quality of user services.

Hardware forms the physical foundation of library ICT. It includes computers, laptops, and servers that run library automation systems and digital repositories. Additional devices such as tablets, self-service kiosks, routers, switches, printers, scanners, barcode and RFID equipment support activities like cataloguing, circulation, document digitization, internet access, and user self-checkout. Without reliable hardware, electronic services cannot operate smoothly.

Software consists of the programs that make hardware functional and purposeful. Operating systems manage basic computer functions, while Integrated Library Management Systems (ILMS) such as Koha handle acquisition, cataloguing, circulation, serial control, and OPAC services. Libraries also depend on office applications for reports and communication, web browsers for accessing online information, security utilities for system protection, and digital repository software like D Space or E Prints for storing and preserving electronic resources.

Networks and Communication Technologies provide connectivity and information flow. Local networks connect internal devices, whereas the internet links libraries to global information sources such as e-journals, databases, and other library catalogues. Communication tools including email, video conferencing, and VoI Penable digital

reference services, staff coordination, remote training, and collaboration with other institutions.

Data Management Systems focus on organizing and retrieving information efficiently. Bibliographic and user databases maintain structured records, while digital repositories and content management systems store full-text documents, multimedia files, and institutional outputs. Cloud storage, backup systems, and statistical reporting tools further enhance data security, accessibility, and decision-making.

People and Procedures give ICT its practical value. Librarians, IT staff, and administrators design, operate, and maintain systems, while users interact with digital tools to access knowledge. Clear procedures and policies covering data backup, cyber security, privacy, copyright, and acceptable ensure that ICT services remain consistent, secure, lawful, and sustainable over time.

2.4 ICT APPLICATION IN LIBRARY: DAILY OPERATION, TECHNICAL SERVICE, ITC BASED SERVICES

2.4.1 ICT in Daily Operations

ICT has transformed daily library operations by making them faster, more accurate, and easier to control.

In acquisition, library automation software helps staff record requests, check duplication, select vendors, track orders, receive materials, and manage invoices within one system. It also generates reports on budgets, pending orders, and new arrivals, while email and vendor portals simplify communication with suppliers.

In circulation, ICT manages issuing, returning, renewals, reservations, and fine calculation. Each user and item is linked to a barcode or RFID tag, enabling quick and error-free transactions. Systems automatically update item status, send overdue notices, and produce usage statistics. RFID further allows self-check machines and rapid stock verification using handheld scanners.

For serials management, automation records subscription details, issue arrivals, missing numbers, and renewal dates. It can also manage e-journals alongside print and send automated reminders. Stock verification, once manual and time-consuming, is now completed through database lists and barcode/RFID scanning.

2.4.2 ICT in Technical Services

ICT has greatly improved technical services, which focus on organizing library collections for easy retrieval.

In cataloguing, integrated library systems support standards like MARC and allow libraries to import or copy records from national and international catalogues instead of creating them from scratch. This saves time, reduces cost, and ensures uniformity across libraries.

In classification, many records already include standard numbers such as DDC or LCC, which can be directly adopted. Online classification tools help librarians assign accurate numbers to new or interdisciplinary subjects. Automation systems can also automatically generate spine labels, catalogue cards, and lists, minimizing repetitive typing and human error.

For digital collections, ICT supports the creation and management of metadata describing e-books, theses, images, audio, and video files. Repository software structures information like title, author, keywords, format, and rights, ensuring easy search, sharing, and long-term accessibility. Thus, ICT enables technical services to manage both print and digital resources in a unified catalogue system.

CHECK YOUR PROGRESS

Q 1: What is ICT?
Q 2: Name of two hardware used in Library.
Q 3: Give one example of one library automation.

2.5 LET US SUM UP

Information and Communication Technology (ICT) has become indispensable in contemporary libraries, as it facilitates nearly every operation, from fundamental record-keeping to sophisticated digital services. In addition to computers, information and communication technologies (ICT) encompass a variety of hardware devices, software applications, networks, databases, and communication tools that facilitate the storage, organization, analysis, and sharing of information in text, audio, image, and video formats. Manual methods are no longer adequate due to the proliferation of information, the scarcity of space, and the rise in user expectations. ICT facilitates improvements in access to both print and electronic materials, efficient resource management, and quicker housekeeping operations. Its fundamental componentshardware, software, networks, data management systems, personnel, and procedurescollaborate to provide dependable services. ICT applications are evident in technical services such as metadata creation, classification, and cataloguing, as well as in daily operations like acquisition, circulation, and serial control. It also fosters resource sharing, remote access, improved financial management, and collaboration among libraries, thereby improving service quality and user satisfaction.

2.6 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1: Information and Communication Technology.

Answer to Q 2: Computer.
Answer to Q 3: KOHA.

2.7 FURTHER READING

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2.13 MODEL QUESTIONS

Q 1: Write any two needs of ICT in libraries.
Q 2: What are the main components of ICT in libraries?
Q 3: How does ICT help in circulation services?
Q 4: What is the role of data management systems in libraries?
Q 5: Explain the need and importance of ICT/Automation in libraries with suitable points.
Q 6: Describe the applications of ICT in daily library operations and technical services.

*** ***** ***

UNIT 3: LIBRARY MANAGEMENT SYSTEM

UNIT STRUCTURE

3.1 Learning Objectives
3.2 Introduction
3.3 Definition
3.4 Components of Library Management Software
3.5 Functions and Features of LMS
3.6 Popular LMS Software in Libraries
3.7 Let Us Sum Up
3.8 Answers To Check Your Progress
3.9 Further Readings
3.10 Model Questions

3.1 LEARNING OBJECTIVES

After going through this unit, we will be able to,

- get insights about library management.
- get to know about popular Library Management System (LMS).

3.2 INTRODUCTION

Libraries are evolving from manual, traditional systems to automated, data-driven knowledge centres in the current digital era. The Library Management System (LMS), a potent software program that streamlines and improves library operations, is at the centre of this change. To ensure efficient and error-free administration, an LMS manages necessary functions like book cataloging, user account management, loan tracking, and report generation. Key features like automated circulation, real-time inventory tracking, and user-friendly search interfaces enhance accessibility for both staff and patrons. Furthermore, libraries can make data-driven decisions about acquisitions and resource allocation with the aid of advanced analytics. An LMS greatly increases productivity and user satisfaction by decreasing manual labour, minimizing errors, and speeding up service. Adopting an LMS is now strategically necessary for modern libraries to remain relevant in an increasingly digital world; it is no longer an option.

3.3 DEFINITION

Simply, LMS includes a wide range of software applications which are designed to manage library operations efficiently. It helps the librarians and the users to automate cataloguing, circulation, report generation and maintenance of library resources including books, journals as well as digital media. An LMS is a software program created to oversee every facet of a library's operations is covering book categorization, user account management,

item tracking, and return handling. An LMS guarantees that library tasks are optimized and carried out effectively by integrating much functionality.

3.4 COMPONENTS OF LIBRARY MANAGEMENT SOFTWARE

An LMS is a connection of software designed to manage library operations efficiently. The key components of LMS include the followings:

- **Cataloguing Module:** A vital component of LMS that deals with organising and managing bibliographic records within a library by providing features to create, edit and maintaining accurate and comprehensive bibliographic data.
- **Circulation Module:** This helps in lending and borrowing library materials as well as management of library user data and efficient circulation workflow,
- **OPAC(Online Public Access Catalogue):** An online bibliography of a library collection that is accessible to the general public is called an OPAC (Online Public Access Catalogue). OPACs were first created as stand-alone online catalogs, frequently via VT100 terminals in a mainframe library computer. Since the advent of the internet, the majority of libraries have made their OPAC available to users worldwide via a server. It is also possible to combine various OPACs into a single "union" OPAC with the help of Z39.50 protocol.
- **Acquisition Module:** It handles acquiring new materials.
- **User Management:** Manages user's data, access, permissions and make sure the smooth functioning of the library.
- **Serial Management**: It tracks and manages serial publications including journals, magazines, periodicals etc.
- **Administration and security**: Important for system access, configuring workflows as well as ensuring data security.

3.5 FUNCTIONS AND FEATURES OF LMS:

- Catalogue management
- User Management
- Inventory management
- Book Issue & return
- Report generation
- Digital Media Integration
- Barcode & RFID Integration

3.6 POPULAR LMS SOFTWARE IN LIBRARIES

The Popular LMS currently being used in different libraries can be classified as open source and paid versions.

Open sources LMS

In simple words, open sources LMS are free to use and customizable. Some of the widely used such LMS includes:

- **KOHA:** It is the first library automation package available for free. Utilized globally, its advancement is guided by an expanding user base working together to accomplish their technological objectives. Koha's feature set keeps growing and changing to accommodate its user base's demands. It is an integrated library system (ILS) and was the first open-source ILS. Koha was created in 1999 by Katipo Communications for the Horowhenua Library Trust in New Zealand. The first installation went live in January of 2000. Koha releases new versions every six months that includes new features and bug fixes, Apart from that there are monthly maintenance releases focusing on stability and bug fixes.

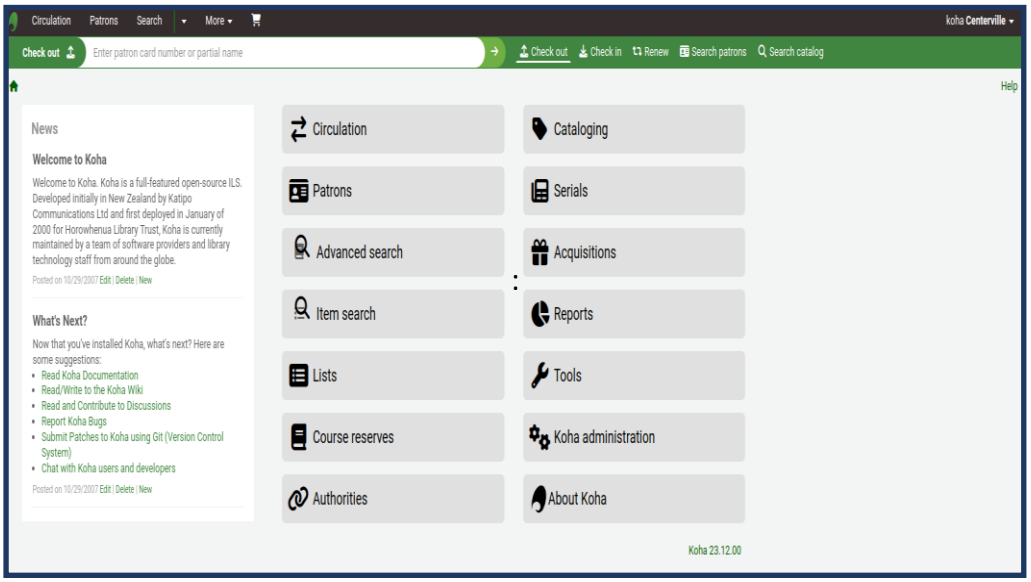


Fig 1: KOHA interface

- **Evergreen:**
  Evergreen is a highly scalable library software program that helps libraries manage, catalog, and circulate resources of any size or complexity while also assisting users in finding materials. Evergreen is freely usable and modifiable as open-source software under the GNU GPL (v2 or later). More than 2,000 libraries around the world utilize Evergreen, an open-source Integrated Library System (ILS). In addition to supporting backend functions like circulation, acquisitions, and resource sharingparticularly across library consortiait powers public catalogs.
  Evergreen was initially designed in 2006 by the Georgia Public Library System to support more than 275 public libraries in Georgia. It has spread to library networks in the United States, Canada, and other countries since its inception.
- **Php My Bibli:** The French library automation system PMB (formerly called PhpMyBibli) is built on top of PHP and MySQL. It is a very adaptable tool for productivity.In addition to managing networks of libraries combined into a collective catalog, PMB is made for

medium-sized and big libraries. It makes use of the UNIMARC cataloguing format. Additionally, the software integrates importation and format conversion technologies (such as XML and USMARC).

- **New Gen Lib:** This integrated library management system is created by Verus Solutions Pvt Ltd. Kesavan Institute of Information and Knowledge Management in Hyderabad, India, offers domain expertise. Verus Solutions announced NewGenLib as Open-Source Software on January 9, 2008, under the GNU GPL License. New GenLib is thought to be the primary integrated library management system used by 2,500 libraries in 58 different countries.
- **OPALS:** OPALS (**Op**en **S**ource **A**utomated **L**ibrary **S**ystem) is an open-source project with strong support from librarians worldwide and excellent customer satisfaction scores. Its community is supported by dedicated, full-time OPALS software developers and technical support. By creating novel system function requirements and testing engineering improvements, librarians propel the development of OPALS. Requesting a free sample site is the best method to assess OPALS. Enjoy the advantages and security of a Web-based, hosted turnkey system. Within 24 to 48 hours of uploading the library data to a fully functional system, one will be able to explore every aspect of the feature-rich system.
- **SANJAY:** As part of a NISSAT (National Information System for Science & Technology) initiative, DESIDOC (Defence Scientific Information & Documentation Centre) created the library automation program SANJAY. Developed as an improved expansion of CDS/ISIS (Version 2.3), it streamlines library operations and fixes major issues with the original system.

Paid/ Subscription Based LMS:

SOUL: INFLIBNET Centre created SOUL (Software for University Libraries), a cutting-edge, integrated library management system, to address the unique requirements of academic libraries in India. This client-server-based system, which complies with international standards, was created following extensive research and discussions with leading library professionals. It efficiently automates all essential library processes. With its powerful capability and user-friendly design, SOUL is appropriate for a variety of library types, including university and school libraries. The software, which was first released as SOUL 1.0 during CALIBER 2000, has undergone multiple iterations. SOUL 2.0 was debuted in January 2009, and the most recent version, SOUL 3.0, was released in February 2021. The most recent version supports contemporary database systems such as MS-SQL and MySQL, adheres to MARC 21 bibliographic standards, supports many languages using Unicode, and integrates SIP 2 and NCIP 2.0 protocols for improved security and monitoring. This all-inclusive solution offers Indian academic institutions a potent library automation tool by fusing local features with international technical standards.

SOULis designed to address the practical, day-to-day operational needs of libraries with robust features for stock verification, book bank management, and comprehensive maintenance functions. The system incorporates transaction-level security protocols to

ensure data integrity and protection. For enhanced convenience, it allows users to generate and distribute reports via email, with flexible export options including Word, PDF, Excel, and MARCXML formats.

SOUL features a highly intuitive OPAC interface that accommodates both basic and advanced search functionalities, with the added capability to export search results in multiple formats (PDF, Excel, MARCXML) for user convenience. It maintains standardized authority control for personal names, corporate bodies, subject headings, and series names, ensuring consistency in cataloging. The system facilitates seamless data exchange through ISO-2709 standard compliance.

SOUL simplifies financial management with an integrated budgeting system and streamlines circulation operations through a unified interface. To ensure reliable on-going support, the system offers strong regional assistance through dedicated coordinators, complemented by comprehensive online and offline support channels including email, live chat, and telephone assistance during working hours. This combination of practical features and strong support infrastructure makes SOUL particularly effective for meeting diverse library management needs.

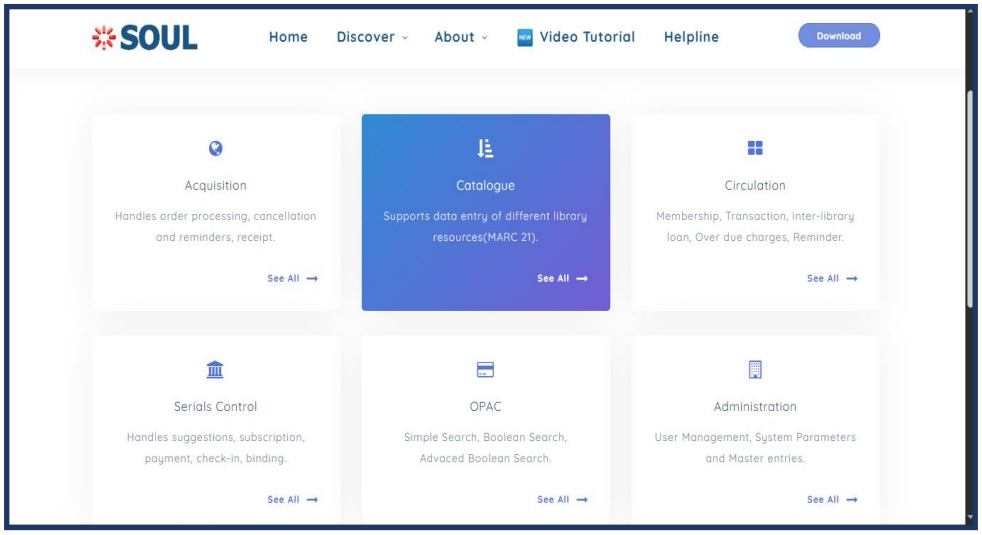


Fig 2: SOUL Modules

LibSys/ LibSys Neo:

LIBSYS is a cutting-edge web-based library management system that redefines the contemporary library experience by going beyond simple automation. They assure smooth interactions for both library employees and users with each use by fusing operational efficiency with an improved user journey. Their solution, which is based on decades of specialized knowledge in user behaviour analysis and library science, integrates technology advancements and intelligent procedures that have gained broad institutional adoption. LIBSYS 10, which includes state-of-the-art capabilities that enhance service standards and streamline library operations. They are turning traditional library operations into dynamic, future-ready ecosystems that provide quantifiable value at every touch point, from back-office administration to patron engagement, by fusing intelligent automation with intuitive user interfaces. Our research-based methodology guarantees that every feature

anticipates changing user expectations in the digital age while addressing actual library difficulties.

CHECK YOUR PROGRESS

Q 1: **Fill in the blanks:**

a) ……. is a paid LMS specially designed for Indian Universities.
b) ……. and ……. are two technologies used for efficient book tracking in LMS.
c) ……. Protocol allows different OPACs to communicate.
d) SOUL is developed by……..
e) SOUL 1.0 came in ……

3.7 LET US SUM UP

The Unit gives a thorough introduction to Library Management Systems (LMS), which are crucial as contemporary libraries move from manual to automated operations. Firstly, it explains how LMS software improves efficiency and user satisfaction by streamlining essential tasks like cataloging, circulation, user administration, and report generating. The description makes it clear that LMS includes a variety of technologies made to oversee all library operations, from monitoring books to managing digital resources. Cataloging modules, circulation systems, Online Public Access Catalogs (OPACs), acquisition and serial management, and security features are the main elements of an LMS. Additional features that improve library operations include analytics, automated book lending, and barcode/RFID connection. It also highlights well-known LMS software, classifying it into paid/subscription-based (e.g., SOUL, LibSys) and open-source (e.g., Koha, Evergreen, PMB, NewGenLib, OPALS) alternatives, and describing its special features and fit for various library requirements. In order for libraries to stay effective and user-friendly in the digital age, the conclusion highlights that implementing an LMS is now strategically required rather than optional. For additional research of LMS technology and their uses, more references and resources are offered.

3.8 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1:

a) SOUL, b) BARCODE and RFID, c) Z39.50, d) INFLIBNET, e) 2000

3.9 FURTHER READING

- *Free Online NTA UGC NET Guide Book December 2020—Library Management Software Packages*. (n.d.). Retrieved April 22, 2025, from https://www.netugc.com/library-management-software-packages
- Halder, S., & Haldar, S. (n.d.). *A Brief Introduction to Koha ILS and its Modules*.

- *Official Website of Koha Library Software*. (n.d.). Retrieved April 22, 2025, from https://koha-community.org/
- *What is OPAC (Online Public Access Catalog)? | Definition from TechTarget*. (n.d.). Search Data Management. Retrieved April 22, 2025, from https://www.techtarget.com/searchdatamanagement/definition/OPAC

3.10 MODEL QUESTIONS

A. Short Answers type question:

a) What are open and proprietary LMS?

b) What are LMS and their features?

B. Long Answers type question:

a) Describe the importance of LMS in modern day Libraries

b) Write a note on popularly used Library Management systems in modern day libraries.

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UNIT 4: LIBRARY AUTOMATION

UNIT STRUCTURE

4.1 Learning Objectives
4.2 Introduction
4.3 Automation of Cataloguing and Classification
4.4 Digitization of Print Materials
  4.4.1 Need for Digitization
  4.4.2 Steps in digitisation
  4.4.3 Tools for the Digitization of Print Materials in Libraries
4.5 Challenges and Benefits of Digitization
4.6 Let Us Sum Up
4.7 Answers To Check Your Progress
4.8 Further Readings
4.9 Model Questions

4.1 LEARNING OBJECTIVES

After going through this unit, we will be able to,

- learn about library automation of Cataloguing and Classification process.
- digitization process of Print Material and different challenges and benefits of Digitization process.

4.2 INTRODUCTION

Library automation is the process of utilizing computers and associated information technologies to perform traditional library activities, including acquisition, cataloguing, circulation, serials control, and reference services, with minimal manual effort. The objective of automation is to enhance the speed, accuracy, and efficiency of library work by substituting paper-based, repetitive duties with computer-based processes and shared databases. In the past few decades, automation has gradually transformed libraries from exclusively manual institutions to hybrid and digital environments. These environments enable users to access and discover information through online catalogues, databases, and networked services.

The basis of library automation was established through early experiments in the use of machines for circulation and indexing, as well as later initiatives like Machine Readable Cataloguing at the Library of Congress, which established standard formats for computer-based bibliographic records. Automation became feasible for a diverse array of libraries, including those in developing nations, as a result of the proliferation of microcomputers, networks, and integrated library systems. In the present day, automation is inextricably linked with digitization, as libraries not only automate their internal operations but also

digitize portions of their print collections to enhance access, preservation, and resource sharing.

History of Library automation

The implementation of punch card machines for routine operations, including circulation and acquisitions, marked the beginning of library automation in the 1930s. During the Great Depression and World War II, development was sluggish; however, automation improved incrementally as computer and communication technologies were developed.

Early computers, such as the UNIVAC I, were introduced in the 1950s and were primarily employed for government data processing. Concurrently, the development of operating systems and programming languages commenced. The integrated circuit, which was developed in the 1960s, was a significant technological advancement that considerably enhanced the speed of computers and reduced their size.

Subsequently, innovations that were library-centric emerged. H. P. Luhn introduced the KWIC (Keyword in Context) indexing technique in 1961, which was well-suited for computer-based retrieval systems. The Library of Congress initiated the MARC initiative in the mid-1960s, which subsequently became an international standard for the exchange of bibliographic records via machine-readable cataloguing. The 1970s witnessed the development of cooperative cataloguing initiatives such as OCLC and commercial databases like DIALOG, as well as the expansion of networking with the establishment of ARPANET in 1969.

The 1980s were characterized by the rapid proliferation of microcomputers in libraries, the free distribution of CDS/ISIS by UNESCO, the emergence of integrated library software such as LibSys, and the introduction of CD-ROM technology. In the 1990s, the Internet and the World Wide Web revolutionized the field of information exchange, facilitating the development of online databases, expert systems, and more efficient information exchange. This ultimately influenced the development of modern automated and digital library services.

Need and Purpose

- **Manages information explosion:** Computers are capable of managing large volumes of data that manual systems are unable to efficiently manage.
- **Efficient storage and retrieval:** Offers rapid, precise, and timely access to information.
- **Reducing repetitive manual work:** repetitive manual works like record updating, cataloguing, circulation, and acquisitions are reduced.
- **Usage of a single bibliographic record:** A single record may be employed for the following purposes: ordering, processing, OPAC, circulation, and binding.
- **Decentralized and simultaneous access:** Records can be accessed simultaneously by multiple personnel and users from various locations.

- **Eliminates the need for duplicate files and inquiries:** Users and staff can directly verify the status of orders or volumes.
- **Enhances operational efficiency and staff productivity:** by guaranteeing the economical, precise, and rapid execution of human labour and freeing professionals from administrative tasks to provide user-oriented services.
- **Enhances the motivation:** by utilizing computers to make their work more engaging and fascinating.
- **Improves the quality of library services:** this leads to more dependable, quick, and efficient user services.

4.3 AUTOMATION OF CATALOGUING AND CLASSIFICATION

Automated Cataloguing Systems are intended to facilitate the sharing and utilization of bibliographic data at the local, regional, national, and international levels, as well as to oversee both clerical and technical cataloguing activities in libraries. The manual labour is reduced, and speed and accuracy are enhanced by these systems. Major benefits include the ability to import/export records and interact with external databases, the elimination of repetitive work, faster data entry and retrieval, searchable data fields, and creation of a bibliographic record required only once. Additionally, the system offers flexible output formats and the ability to import/export records.

Advantages of automated catalogueing are:

- Reduced Duplication and Single Record Creation
  - A bibliographic record is generated only once and is subsequently utilized for numerous purposes.
  - Disposes of the necessity for distinct main and added catalogue entries.
  - Eliminates redundant and repetitive tasks.
- Versatility and Efficient Searching
  - It is possible to make any data field searchable in order to facilitate retrieval.
  - Supports composite and interactive searches, thereby enhancing the depth and flexibility of the search.
- Output Flexibility and Speed
  - In comparison to manual systems, data extraction and retrieval are executed at a faster pace.
  - Reports and outputs from the catalog can be produced in any format that is necessary.
- Connectivity and Data Exchange
  - Facilitates the import and export of bibliographic records.
  - Enables the interconnection with external databases to facilitate the sharing and access of a broader range of information.

Some of the key features of automated cataloguing includes:

- Support for Standards and Multilingualism

- Offers multilingual support for Indian and foreign languages that is UNICODE-based.
- Sticks to international cataloguing standards, including ISO-2709, MARC21, AACR-2, and MARCXML, for the purpose of data exchange and copy cataloguing.

➢ Resource and Database Compatibility
- Operates on a variety of database platforms, including MySQL, MS-SQL, and other relational database management systems (RDBMS).
- Encourages the cataloging of a wide range of electronic resources, such as e-books and e-journals.
- Facilitates the direct cataloging of online copies from MARC21 bibliographic databases.

➢ Data Entry Flexibility and Templates
- Provides default templates for a variety of document types.
- Enables users to build and personalize their own data entry templates.
- Contains a variety of templates for leaders and fixed fields of MARC21.

➢ Options for Output and Reporting
- Provides users with the ability to create personalized reports by utilizing query parameters and templates.
- Allows for the storage and sharing of reports in a variety of formats, including PDF, Excel, and MARCXML, as well as the facility to send them via email.

➢ Search, OPAC, and Authority Control
- Offers an OPAC that is user-friendly, with the ability to export results in a variety of formats and both basic and advanced search features.
- Supports authority files/databases for personal names, corporate bodies, subjects, and series headings.

Contains global search and replace capabilities for words or phrases.

Bibliographics formats used for automated cataloguing:

- MARC (Machine Readable Cataloguing)
  MARC is the most widely used format for automating cataloguing, developed by the Library of Congress in the 1960s to enable exchange of bibliographic data between libraries. MARC21 is the current version used by most ILMS. It provides a structured coding scheme to store detailed bibliographic information for various types of materials.
- CCF (Common Communication Format)
  CCF was developed by UNESCO in 1984 for countries needing a single standard for both library and non-library bibliographic agencies. It provides machine-readable bibliographic record standards and follows ISO rules. It is especially useful for developing countries.
- UNIMARC
  UNIMARC was created by IFLA in 1973 to solve problems caused by multiple national MARC formats. It facilitates international exchange and translation of bibliographic

records. It acts mainly as a carrier format for sharing data between national bibliographic agencies.

- ISBD (International Standard Bibliographic Description)
  ISBD was introduced by IFLA in 1969 to standardize the form and content of bibliographic descriptions. It ensures uniform cataloguing rules across countries and supports machine-readable data. Later revisions included computer files and electronic resources.
- FRBR (Functional Requirements for Bibliographic Records)
  FRBR is a conceptual model developed by IFLA that defines entities, relationships, and attributes in bibliographic data. It focuses on user tasks such as finding, identifying, selecting, and obtaining resources. It is independent of specific cataloguing codes like AACR2 or ISBD.
- RDA (Resource Description and Access)
  RDA is a modern cataloguing standard released in 2010 as the successor to AACR2. It is structured around FRBR principles and emphasizes user needs and relationships among resources. RDA is compatible with digital environments and multiple metadata schemas.
- UNICODE
  Unicode is an international encoding standard that enables consistent representation of text in over 150 languages. It supports multilingual bibliographic records and ensures uniform character display across systems. Common encodings include UTF-8 and UTF-16, widely used in digital libraries and ILMS.

Automation in library circulation:

The primary objective of circulation control in a library is to ensure that materials are issued and returned systematically, allowing users to access resources easily while keeping the collection secure and properly used. In an automated circulation system, both users and items are maintained in a digital database for accuracy and quick processing.

a) User and Item Records
   i. Each registered user has a database record containing:
      - Personal details
      - Membership category
      - Borrowing limits
      - Expiry/validity dates
   ii. Each library item has an individual record with a machine-readable identifier such as a barcode or RFID tag.
   iii. During issue or return, the system automatically:
      - Records the transaction
      - Assigns due dates based on rules
      - Updates the user's loan list
      - Changes the item status through staff or self-service scanning.

b) Functions of Automated Circulation Systems
   i. Generation of overdue notices and due-date reminders.
      - Preparation of reservation pickup lists.

- Creation of usage statistics by subject or user category.
- Management of renewals, reservations, and inter-library loans.
- Barcode and RFID technologies reduce manual entry, speed up transactions, and minimize errors.
- RFID systems can integrate security and circulation, enabling exit-gate detection and self check-in/check-out.

ii. Management and Decision Support

Automation also assists library administration by providing analytical data such as:

- Borrowing and return trends
- Penalty and fine records
- User behaviour patterns over time

This helps libraries to:

- Identify high-demand materials needing extra copies.
- Detect underused resources for weeding.
- Determine peak service hours for staffing.
- Plan targeted services for different user groups.

4.4 DIGITIZATION OF PRINT MATERIALS

Digitization is the conversion of analogue information, such as printed documents or photographs, into digital data containing binary codes (0s and 1s). The resulting files are recorded in computer-readable formats, and this conversion is performed using tools such as digital cameras or scanners. These digital files are typically accessible through digital repositories or websites, in addition to metadata and search capabilities, in library initiatives.

4.4.1 Need for Digitization

- Enhances accessibility by permitting concurrent remote utilization by multiple users.
- Reduces physical handling to safeguard uncommon and fragile materials.
- Improves search and navigation by utilizing hyperlinks and optical character recognition (OCR).
- Encourages the sharing of resources and collaboration among institutions.
- When combined with appropriate storage and migration strategies, it contributes to long-term preservation.

4.4.2 Steps in digitisation

i. **Materials Selection:** The process of selecting items based on their intellectual value, user demand, physical condition, copyright status, and available resources.

ii. **Scanning/Image Capture:** The process of determining the resolution, color mode, bit depth, and file format by utilizing flatbed scanners, overhead scanners, or digital cameras.

iii. **File Formatting:** Save master files frequently in TIFF format and generate access duplicates in JPEG or PDF.
iv. **Indexing and Metadata Creation:** The process of incorporating bibliographic information, including the title, author, subject, date, and keywords.
v. **OCR:** Optical Character Recognition (OCR) is the process of transforming scanned text images into searchable, machine-readable text.
vi. **Storage, Backup, and Access Design:** The process of organizing digital data, creating backups, and facilitating access through web interfaces, repositories, or catalogues.

4.4.3 Tools for the Digitization of Print Materials in Libraries

Hardware for Scanning and Image Capture

- **Flatbed Scanners:** Suitable for books, journals, and photographs with loose or flexible pages.
- **Overhead/Planetary Scanners:** Utilized to prevent spine damage in rare or bound volumes.
- **Sheet-fed scanners**: They are optimal for scanning large volumes of unbound pages and office documents.
- **DSLR setups and digital cameras:** They are advantageous for fragile manuscripts, posters, and maps that are exceptionally large.
- **Book cradles and V-shaped scanners:** They are designed to safeguard the delicate bindings of books during the scanning process.

Computers and Storage Devices

For the purpose of image processing and OCR duties, high-performance computers/workstations are required. External hard drives and servers are utilized to store large digital image files. Cloud storage systems offer remote backup and disaster recovery capabilities. Centralized storage for institutional access is known as Network Attached Storage (NAS).

Software for Image Processing and Digitization

Scanning software: Manages file formats, colour mode, and resolution.

Image Editing Tools: For the purpose of cropping, de-skewing, color correction, and enhancement (e.g., GIMP, Adobe Photoshop).

Software for Optical Character Recognition (OCR) that transforms scanned text images into searchable and modifiable text.For instance, Adobe Acrobat OCR, Tesseract OCR, etc.

4.5 CHALLENGES AND BENEFITS OF DIGITIZATION

Challenges of Digitization

i. Restrictions with money and resources
    - Equipment, software, and storage systems are quite expensive.

- Need for trained workers and regular upkeep.
- Large or fragile materials need special scanners and cautious handling.
- More time is needed for system testing, quality control, metadata development, and fixing OCR errors.

ii. Technological concerns
- Problems with file types, resolution, compression, and picture quality.
- High-quality photographs need a lot of storage space and take a long time to download.
- Changing technologies make it necessary to keep digital files safe for a long time and move them to new formats.
- OCR errors caused by bad print quality, fonts, or language differences.

iii. Challenges with the law and policy
- Limits on intellectual property rights and copyright.
- Need for permissions and access limits for some groups of users.
- When digitizing personal or culturally sensitive artifacts, there are privacy and ethical issues to think about.
- Problems with interoperability and standardization when institutions share collections.

Advantages of Digitization

i. **Better access and ease of use:** Students, researchers, and people who are far away can all access the same thing at the same time. Full-text search, zooming, copying citations, and digital integration into study and research workflows are some of the features.

ii. Help with preservation
- Lessens the need to physically handle rare and fragile originals.
- Making digital copies and surrogates for documents.
- Multiple saved copies make it easier to make backups and recover from disasters.

iii. Sharing resources and working together
- Making union repositories, portals, and subject gateways.
- Makes institutional collections more visible and important.
- It helps with instructional materials, exhibitions, digital humanities initiatives, and data analysis, which opens up new study possibilities that aren't available with just physical artifacts.

CHECK YOUR PROGRESS

1. **Fill in the Blanks**
   a) …….. is the process of using computers and information technologies to perform traditional library activities.
   b) …… format was developed by the Library of Congress.

c) Digitization converts analogue information into binary codes of …….. and ……..
d) OCR stands for …… .

4.6 LET US SUM UP

Library automation is the use of computers and other information technology to do traditional library tasks like buying books, cataloging them, lending them out, and providing reference services with little or no human effort. It speeds things up, makes them more accurate, more efficient, and better service, and it cuts down on clerical work that has to be done over and over again. Automation has changed libraries over time from manual systems to hybrid and digital spaces. Now, you can access them through online catalogs and networked databases. Punch card machines were the first automated tools, and then came new technologies like MARC, microcomputers, CD-ROMs, and the Internet. Automated cataloging makes it possible to create a single record, search faster, and share data using standards like MARC, RDA, and UNICODE. Using barcodes or RFID, circulation automation makes sure that things are checked out and returned in a planned way. By turning print materials into digital formats, digitization makes access, preservation, and cooperation even better. Even though there are problems like cost, technological limitations, and copyright concerns, automation and digitalization together make modern library services and access to information stronger.

4.7 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1:

a) Library automation,
b) MARC,
c) 0 and 1,
d) Optical Character Recognition.

4.8 FURTHER READING

- Bhoi, N. K. “Use of Information Communication Technology (ICT) and Library Operation: An Overview.” Proceedings of the International Conference on Future Libraries: From Promises to Practices, 2017.
- “Digitization – Part I.” e-PG Pathshala, INFLIBNET, Digital Libraries, Module 10.
- H G, H. (n.d.). *Library Automation: Cataloguing – Information Communication Technology for Libraries*. Inflibnet.ac.in. https://ebooks.inflibnet.ac.in/lisp5/chapter/library-automation-cataloguing/
- Uddin, N. “Library Automation and ICT Applications in Libraries.” In ICT in Libraries and Information Centres, 2009.

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- Holley, R. “Recognizing Digitization as a Preservation Reformatting Method.” Microform and Imaging Review, 33(4), 171–180, 2004.

4.9 MODEL QUESTIONS

Q 1: What is the main objective of library automation?
Q 2: Name any two tools used for digitization of print materials.
Q 3: Explain the need and purpose of library automation in modern libraries.
Q 4: Describe the steps involved in the digitization of print materials in libraries.

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UNIT 5: DIGITAL LIBRARIES

UNIT STRUCTURE

5.1 Learning Objectives
5.2 Introduction
5.3 Definition and Characteristics of Digital Libraries
5.4 Types of Digital Libraries
  5.4.1 Stand-alone Digital Library (SDL)
  5.4.2 Federated Digital Library (FDL)
  5.4.3 Harvested Digital Library (HDL)
5.5 Tools and Technologies for Digital Library Development
5.6 Let Us Sum Up
5.7 Answers To Check Your Progress
5.8 Further Readings
5.9 Model Questions

5.1 LEARNING OBJECTIVES

After going through this unit, we will be able to,

- learn about the digital libraries, its concept, definitions, characteristics and types.
- various tools and technologies used for DL management.

5.2 INTRODUCTION

In many colleges, research institutes, government agencies and institutes of higher educations, digital libraries are now a significant component of the information ecosystem. Through networked computer systems, they make digital and born digital resources accessible, frequently to people who are unable to visit the library's physical location. A digital library is a designed system that integrates collections, services, people, and technology to enable learning, teaching, research and cultural preservation in a digital arena. It is more than just a website with a few documents on it.

The relevance of digital libraries has increased due to the quick growth of electronic publishing, the opportunities that digitization has created, and the ubiquitous availability of web technologies and the internet. Users can search, browse, download, and reuse content in accordance with specified rights and permissions, and they can give users access to a variety of assets, such as text, photos, audio, video, and data. Librarians and information workers must systematically address the new issues they bring up about selection, metadata, technical standards, long-term preservation, intellectual property, and sustainability.

5.3 DEFINITION AND CHARACTERISTICS OF DIGITAL LIBRARIES

A specialized collection of digital materials, including text, photos, audio, and video, that are kept in electronic formats rather than print or microform is called a digital library and sometimes referred to as an electronic library or digital repository. It offers systems and techniques for remotely or locally organizing, storing, and retrieving digital information via computer networks. Digital libraries can be run by individuals, groups, or educational institutions and they can range in size from tiny to enormous. Following the 1994 NSF/DARPA/NASA Digital Libraries Initiative, they gained widespread recognition and serve as information retrieval systems. These libraries hold digital information as "digital objects," which are made up of content and related metadata, such as structure and information on intellectual property.

Characteristics of DL

- The primary content is in digital format, either born-digital or digitized from analogue sources.
- The organization of information through the use of structured metadata and cataloguing practices.
- Search and perusing interfaces are utilized to locate content.
- Accessible via networks, with a particular emphasis on web-based platforms.
- Remote access from a variety of devices and locations.
- Multiple users simultaneously accessing the system.
- Offer services such as retrieval, search, download, and linking.
- Personalized alerts, annotations, and sharing tools may be implemented.
- Concentrate on the long-term digital preservation of resources.
- Format management, storage maintenance, integrity tests, and data migration strategies are necessary.
- Regulated by policies regarding collection development.
- Adhere to the regulations concerning intellectual property rights.
- Establish privacy and access control policies.
- Establish standards for data exchange and system compatibility to ensure interoperability.

5.4 TYPES OF DIGITAL LIBRARIES

5.4.1 Stand-alone Digital Library (SDL)

A traditional library that has been completely computerized is essentially a Stand-alone Digital Library. In this sort of library, the majority of the collections are in digital format, either because they were originally created electronically or because they were converted from print through scanning and digitization. It is self-contained, which means that the resources are stored and managed within a single system or institution. In layman's terms, an SDL is the digital equivalent of a traditional library that capitalizes on the benefits of

computer technology, including simplified administration and faster access. Some of the most well-known examples include the Library of Congress and its National Digital Library.

5.4.2 Federated Digital Library (FDL)

A Federated Digital Library is established by connecting numerous independent digital libraries via a network. These libraries typically share a common subject focus or theme and are incorporated in a manner that provides users with a single, unified interface during the search process. This poses a significant challenge in the construction and maintenance of such networks, as each participating digital library is autonomous and may employ a variety of systems or standards. Interoperability is a critical objective. They are interconnected through communication technologies to operate as a single, extensive digital library system, despite their disparities. The Networked Computer Science Technical Reference Library (NCSTRL) and the Networked Digital Library of Theses and Dissertations (NDLTD) are two examples of federated digital libraries.

5.4.3 Harvested Digital Library (HDL)

A Harvested Digital Library is a virtual library that typically does not retain complete documents. Rather, it accumulates and preserves metadata, as well as hyperlinks that connect users to resources that are accessible elsewhere on the internet. An Information Specialist "harvests" and summarizes the materials to guarantee that only pertinent and quality-controlled information is incorporated. While it primarily maintains summaries and pointers, it still offers standard digital library services and is generally well-organized and subject-oriented. Additionally, the Information Specialist is responsible for the annotation and preservation of the integrity of the resources. Examples of harvested digital libraries include the Virtual Library and the Internet Public Library.

5.5 TOOLS AND TECHNOLOGIES FOR DIGITAL LIBRARY DEVELOPMENT

Software:

- **Alfresco**
  Alfresco is a free and open-source Enterprise Content Management (ECM) system that is compatible with Microsoft Windows and Unix-like operating systems. Organizations utilize it extensively to efficiently manage a variety of digital content, including documents, web pages, records, images, and collaborative files. Its primary asset is the efficient organization and management of large volumes of digital information.
- **Cambridge Imaging System**
  Cambridge Imaging System is a software company that was founded in 1996 in the vicinity of Cambridge, United Kingdom. It primarily concentrates on media management solutions and enterprise video platforms. The company also maintains a

subsidiary in London, Screenocean, which serves as an online digital archive that contains program materials and associated metadata from the Channel 4 archive.

- **Digital Commons**
  Digital Commons is an open-access publishing platform and institutional repository that is hosted. It offers tools for peer-reviewed journal publishing, conference management, and multimedia sharing in addition to storing academic content. This renders it appropriate for research institutions and universities that require a single system that includes both repository and publishing capabilities.
- **DSpace**
  DSpace is a widely used open-source repository software that is primarily intended for the creation of open-access repositories of scholarly and research materials. Despite the fact that it shares some features with content and document management systems, its primary objective is the long-term preservation, storage, and effortless retrieval of digital content. It is extensively embraced by academic institutions across the globe.
- **eXo Platform**
  eXo Platform is a Java-based, open-source enterprise social platform that is licensed under the GNU Lesser General Public License. It is intended to facilitate the exchange of knowledge, communication, and collaboration among organizations. eXo Inc., which maintains operations in numerous nations, including the United States, France, Tunisia, and Vietnam, distributes the platform globally.
- **Fedora Commons**
  The Flexible Extensible Digital Object Repository Architecture, also known as Fedora Commons, is a digital asset management framework that is employed to construct digital repositories and archives. It is a modular architecture that enables institutions to create customized repository systems, rather than a fully pre-made application. Its interoperability, flexibility, and extensibility are facilitated by well-defined modules.
- **Greenstone**
  The New Zealand Digital Library Project at the University of Waikato has developed an open-source software suite known as Greenstone. It is intended for the creation and distribution of digital library collections via the internet or CD-ROM. The software has been developed in collaboration with the Human Info NGO and is multilingual and released under the GNU General Public License.
- **IntraText**
  IntraText is a digital publishing platform and library that presents texts in a hypertextual and interactive format. It allows users to generate concordances, word lists, statistics, and links to referenced works by merely clicking on words. The system is advantageous for comprehensive text analysis, browsing, and reading, as it is founded on cognitive ergonomics and Human Language Technologies. A significant portion of its content is accessible under Creative Commons licenses.
- **Invenio**
  Invenio is an open-source digital repository software that is primarily employed to manage scholarly and research outputs in institutional repositories. It offers instruments for the organization, preservation, and provision of access to digital assets.

The CERN Document Server Software team is responsible for the development of the software, which is frequently employed in open-access digital libraries.

Hardware:

The operation of a digital library is contingent upon the presence of a variety of hardware components that facilitate the access, storage, digitization, and output of information. The primary hardware components consist of:

- **Computers and Mobile Devices:** Desktops, laptops, tablets, or smartphones that enable users and personnel to access digital resources and connect to the network.
- **Database Servers / Storage Devices:** Cloud storage systems, servers, or hard drives that are employed to securely store large volumes of digital data and information.
- **Scanners:** They are devices that are employed to convert printed or physical materials into digital formats, such as PDFs or images.
- **Printers:** They are hardware devices that are employed to generate physical reproductions of digital documents as needed.
- **Internet modems and networking equipment:** They are devices that facilitate communication between systems over a network and provide internet connectivity.
- **Traditional Materials:** Physical sources, such as books, journals, and magazines, that are frequently digitized to construct digital collections.

CHECK YOUR PROGRESS

Q 1: What is a digital library?
Q 2: What format is the primary content in digital libraries?
Q 3: Name one type of digital library.
Q 4: What device is used to convert print into digital form?

5.6 LET US SUM UP

Digital libraries are a fundamental component of contemporary information systems inside academic institutions, research organizations, and governmental entities. They offer remote access to born-digital and digitized resources via computer networks, facilitating learning, teaching, research, and cultural preservation. A digital library transcends a mere website; it amalgamates collections, services, personnel, and technology. The significance has increased because to electronic publishing and internet accessibility. Digital libraries categorize information using metadata, facilitate concurrent user access, and guarantee long-term preservation. They encompass numerous categories, including Stand-alone, Federated, and Harvested libraries, and depend on diverse software applications and hardware devices for their development and management.

5.7 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1: A designed system integrating collections, services, people, and technology for digital learning and research.
Answer to Q 2: Digital format (born-digital or digitized).
Answer to Q 3: Stand-alone Digital Library (SDL).
Answer to Q 4: Scanners.

5.8 FURTHER READING

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5.9 MODEL QUESTIONS

Q 1: Describe two attributes of a digital library.
Q 2: What constitutes a Federated Digital Library?
Q 3: Identify two software applications utilized in digital libraries.
Q 4: Explain the concept, attributes, and classifications of digital libraries, as well as the requisite tools and technology for their establishment.

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UNIT 6: LIBRARY WEBSITE DEVELOPMENT

UNIT STRUCTURE

6.1 Learning Objectives
6.2 Introduction
6.3 Importance of Library website
6.4 Design Principles for Library Websites
  6.4.1 Usability centered on the user
  6.4.2 Structure and Navigation
  6.4.3 Currency and Content Quality
  6.4.4 Readability & Accessibility
6.5 Content Management System for Libraries (CMS)
6.6 Let Us Sum Up
6.7 Further Readings
6.8 Answers To Check Your Progress
6.9 Model Questions

6.1 LEARNING OBJECTIVES

After going through this unit, we will be able to,

- learn about library websites, its importance, design principles of library websites.
- Learn about content management systems, its importance, popular open sources CMS and their advantage in libraries.

6.2 INTRODUCTION

A library's website serves as its primary online interface, and for many patrons, it serves as their first opportunity to meet the library before they ever set foot inside. Online catalogs, electronic databases, digital collections, tutorials, and online assistance are just a few of the services that may be accessed through a library website in higher education. The website serves as a gateway to the library's collections and services as well as a public representation of the institution in the community, as library services are increasingly provided online and through computer systems.According to studies, library website development began in the 1990s when the Web emerged as a significant communication medium for information sharing. Libraries had to carefully consider how to present content and how to build sites so visitors could find what they need quickly and easily as more services migrated online. A crucial element is that a library website should focus on utility, dependability, and convenience of use rather than just having visually appealing pages. This is because consumers tend to abandon websites that feel slow or complex.

Practical constraints also influence website development in actual library environments. Websites for academic libraries frequently fall under the web design guidelines of their

parent institutions, and library employees may disagree on whether the website should primarily serve as a subject gateway, a communication tool, or a showcase for services and projects. Without proper maintenance and regular updating websites can soon become outdated. Library website construction requires clear goals, a content plan, and a procedure for routine checking and updating.

6.3 IMPORTANCE OF LIBRARY WEBSITE

A library website is a online platform that offers access to the resources and services of a library including access to library's catalogues, databases, e books and other digital resources along with theinformation about the library hours, location and important events. Many library websites also provide access to research guides, portals, and other tools to help patrons find and use the information needed by them.

Importance of a Library websites are as follows:
A website for a library allows access "anytime and anywhere" and facilitates communication with patrons who are unable to visit because of distance or other constraints. Because websites frequently offer search features and links for books, e-books, journals, databases, and other materials, it also serves as a gateway for finding resources. In higher education, library websites are referred to as entry points for academics, researchers, and students. They facilitate tasks including submitting interlibrary loan requests, conducting database research, asking online reference inquiries, and accessing papers electronically.

Additionally, a library website facilitates basic instruction and communication. Users save time by not having to call or visit the library for routine information because many websites offer library hours, regulations, membership information, staff contacts, and notices. Although they could still be missing some user support features like frequently asked questions, content analysis studies in public library settings reveal that library websites frequently offer information about facilities, services, and e-resources. This indicates that the website is a working tool as well as a "display page," and it should be made with user duties like finding things, comprehending policies, and accessing digital services in mind.

The website can serve as a representation of the library's identity and level of service, which is another reason why it is important. Because it displays collections, services, facilities, communication choices, and other information, one debate refers to the library website as "a mirror of the library" and part of the public image of the institution. Because it may include content and search possibilities, including OPAC access and resource links, the website may feel to some users like the library itself. For this reason, libraries need to budget for frequent updates and issue resolution, and dependability, durability, and performance are critical requirements rather than optional extras.

Studies on how people use library websites make clear how important usability is. Users may find it difficult to access and retrieve material from a library website if it is poorly designed, according to research on higher education institutions. For this reason, the site must be easy to use, navigate, and access. Usability, which has a direct impact on how

frequently users return to the library website, is defined in the same context as the ease with which the typical user can use the website to accomplish particular goals. Website assessments also provide evidence that slow pages make a website harder to use, especially for visitors with slower connections, and that design decisions like large graphics can lengthen download times.

6.4 DESIGN PRINCIPLES FOR LIBRARY WEBSITES

The main goal of good library website design is to make it easy for people to find information and services. A study on the design of academic library websites says that libraries need trustworthy content and an easy-to-use interface. It also says that user acceptance and usability are important problems in library website design. A user-centred design model is also emphasized. This means that the website is planned around the needs of real users and tried to make sure the design works for users as well as the developer. This method works well in libraries because the website for an academic library has to help a lot of different types of people with their knowledge needs and skill levels.

6.4.1 Usability centered on the user

In order to find problems with language, navigation, and job completion, user-centered design incorporates users into the development and testing of websites. According to studies, people tend to abandon complicated websites fast and may believe that services that are difficult to locate do not exist. Using structured checklists founded on the concepts of human-computer interaction, libraries can enhance usability. In order to make sure users can readily access rules, databases, and service requests, these checklists typically evaluate four areas: locating information, comprehending it, assisting user duties, and clearly displaying content.

6.4.2 Structure and Navigation

Users can navigate between pages more easily when there is clear navigation. Descriptive site names, obvious home links, standardized menus, and easy access to important services like catalogs and e-resources are all examples of effective practices. Additional tools that help users find content and offer input include site maps, indexes, and search features.

6.4.3 Currency and Content Quality

The information on library websites must be correct, understandable, and updated frequently. The display of update dates conveys relevancy and dependability. Transparency and authority are also crucial; providing contact information, maintenance information, and copyright notices fosters trust and enables users to report problems like wrong information or broken connections.

6.4.4 Readability & Accessibility

The website's accessibility guarantees that users with a range of devices and abilities may utilize it. Important guidelines include eliminating color-only information cues, offering text alternatives for images, and preserving a high contrast between the text and the background. Because unreadable or useless content immediately restricts access to library services, accessibility should be a constant design concern.

6.5 CONTENT MANAGEMENT SYSTEM FOR LIBRARIES (CMS)

Software called Content Management System (CMS) assists users in producing, organizing, storing, and editing digital information. This comprehensive system serves as a one-stop shop for storing content, including websites, apps, and photos, in an intuitive interface that can be tailored to the requirements of a company and its staff.

Additionally, it's critical to distinguish between Digital Asset Management (DAM) and a CMS. Although they are complementary, the two systems cannot be used interchangeably. By centrally storing an organization's digital assets, DAM software helps it. To put it another way, a DAM is merely a system for organizing and storing a brand's digital data, whereas a CMS creates and maintains the content for the brand's website.

Principal advantages of a CMS for libraries are:

- Centralized production, classification, organization, and real-time updating of digital material and collections (e-books, journals, research papers, multimedia, and archives) are all components of effective digital content management.
- Improved user experience: An easy-to-use website with features including categorized categories, advanced search, and tailored suggestions for various user groups.
- 24/7 remote access: Helps users who are unable to visit in person and supports distant learners by allowing users to browse and access digital resources from any location.
- Simplified workflows and collaboration: Role-based permissions (create, edit, approve, and publish) enable employees to work more quickly and maintain correct and up-to-date content.
- Integration with library systems: able to establish connections with ILS and LMS to offer a single platform/portal for unified access to both digital and physical resources.
- Flexibility and customization: The platform may be easily adapted to meet library needs by adding services like research aids, online catalogs, event calendars, news updates, and forms.
- Data analytics and insights: Monitors user behavior and usage trends to inform programming choices, service enhancements, and collection creation.
- Scalability: Allows for the expansion of digital collections and new features without experiencing significant performance problems.
- Security and content protection: Offers measures like access rights and authentication to safeguard user information and limited resources.

- Cost-effectiveness: While still providing sophisticated functionality, open-source CMS choices (such as Word Press and Joomla) can be less expensive than custom-built websites.

Some popular Open-Source CMS Systems are

Word Press (PHP): More than 40% of all websites are powered by WordPress (PHP), which provides a huge ecosystem of plugins and themes for simple, adaptable website building.

Drupal: Highly secure and modular, Drupal (PHP) is frequently used for intricate, business-level, or governmental websites.

Joomla (PHP): Suitable for social networking or intricate portals, it strikes a compromise between Drupal's intricacy and WordPress' ease of use.

Omeka: a digital collection management tool.

Other such examples include, Strapi, Ghost (Node.js), Wagtail (Python/Django), Concrete CMS (PHP) etc.

CHECK YOUR PROGRESS

Q 1: What is the primary role of library websites?
Q 1: What does CMS stand for?
Q 1: Name some popular open-source CMS used in libraries.

6.6 LET US SUM UP

The idea, significance, and layout of library websites are explained in this subject, along with the use of content management systems (CMS) in libraries. The main online entry point for patrons to access databases, digital collections, research guides, catalogues, and library information at any time and from any location is a library website. As a representation of the library's identity, it needs to be dependable, user-friendly, and updated frequently to prevent user annoyance. To ensure that a wide range of users can find services and information with ease, a well-designed website adheres to user-centered concepts, straightforward navigation, high-quality and up-to-date material, accessibility, and readability. Development is also influenced by institutional standards, maintenance responsibilities, and practical planning. Additionally, the section presents CMS as software that facilitates the effective creation, organization, updating, and management of digital information in libraries. CMS platforms facilitate remote access, enhance user experience, facilitate teamwork, guarantee security, and permit expansion. Well-known open-source content management systems (CMS) like Word Press, Drupal, Joomla, and Omeka offer flexible and reasonably priced options for managing digital collections and library websites.

6.7 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1: To act as the main online gateway to access library resources and services.

Answer to Q 2: Content Management System.

Answer to Q 3: Drupal, Joomla, WordPress, Omeka.

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6.9 MODEL QUESTIONS

Q 1: Mention two services commonly available on a library website.

Q 2: State two advantages of using a CMS in libraries.

Q 3: Explain the importance of a library website for users and institutions.

Q 4: Describe the role and benefits of a Content Management System (CMS) in libraries.

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UNIT 2: ELECTRONIC RESOURCE MANAGEMENT (ERM)

UNIT STRUCTURE

7.1 Learning Objectives
7.2 Introduction
7.3 Managing Electronic Journals Databases, and E-books
7.4 Licensing and Access Control, Integration with Library Catalogues
7.5 Let Us Sum Up
7.6 Further Readings
7.7 Answers To Check Your Progress
7.8 Model Questions

7.1 LEARNING OBJECTIVES

After going through this unit, we will be able to,

- learn about e journals and e book databases,
- licensing and access control for e resources
- learn about library catalogue integration of e resources

7.2 INTRODUCTION

Academic library collections now typically include electronic resources. Due to the rapid expansion of electronic publishing and the desire of users for instant access to up-to-date information and full text, many libraries now subscribe to electronic journals, databases, and e-books. Since computer systems and networks are typically used to access electronic resources, managing them involves more than just purchasing content; it also entails making sure that there is consistent access, accurate links, and unambiguous user support.

Because electronic resources provide a different kind of workload than print, electronic resource management, or ERM, was established. When it came to print, a library's primary concentration was on ordering, receiving, storing, and maintaining tangible materials. A library must manage license conditions, authentication, platform updates, access issues, usage data, and renewal choices when it comes to electronic resources, frequently for sizable collections of titles that undergo frequent modifications. ERM procedures and, eventually, ERM systems and tools grew as a result of many libraries discovering that traditional library systems were insufficient to handle the complete complexity of electronic resources.

The tone is set with a straightforward definition. ERM is defined as the methods and procedures used by library employees to monitor the selection, acquisition, licensing, access, maintenance, utilization, assessment, retention, and de-selection of electronic information resources. This definition demonstrates that ERM is not a single task. The

library must consider an electronic resource from the time it is identified as a potential purchase until it is renewed, cancelled, or replaced. This is known as the life cycle approach.

There are numerous formats for electronic resources. Typically, academic libraries offer online databases, e-books, e-journals, e-theses, e-dissertations, and occasionally multimedia services like audio and video. The fact that these resources are available around-the-clock, allow several users to use them at once, conserve physical storage space, and enable remote access outside of the library building makes them valuable. However, they can also present difficulties like expensive upfront costs, equipment needs, incompatibilities, inconsistent publisher standards, and copyright issues. ERM seeks to address these challenges in a methodical manner so that patrons receive dependable service and the library can defend its investment.

7.3 MANAGING ELECTRONIC JOURNALS DATABASES, AND E-BOOKS

Understanding Electronic Journals

- E-journals are digital copies of print journals that may be accessed both online and offline and include hyperlinks.
- Typically, subscription agents, aggregators, or publishing platforms provide access.
- Local copies are usually not kept in libraries; access is offered as a service.
- Practical for everyday usage, but susceptible to changes in business and technology.
- Delivery methods and license agreements determine long-term access.

Choosing and Acquiring Electronic Journals

- Libraries must evaluate content relevance for courses and research.
- Take value for money, license terms, and pricing into account.
- Prior to making a final purchase, the trial access stage is crucial.
- Evaluation of usability, search capabilities, and interface quality is aided by user input.
- Technical compatibility with user devices and internet speed must be verified.

Purchasing and Obtaining Licenses

- Confirming subscription durations and package specifics is part of acquisition.
- Examine the terms of the license, copyright regulations, and allowed uses.
- Because license periods vary, management is frequently less effective than print.
- Libraries are required to disclose access information and keep holdings lists up to date.
- needs tools and systems to keep track of payments, title modifications, and renewals.

Bundled Deals and E-Journal Packages

- Bundled packages of several titles are frequently offered by publishers.
- Packages, particularly through consortia, might offer greater access at a reduced total cost.

- Frequently changing title lists might complicate management.

- Cost-benefit analysis may be impacted by the low consumption of some titles.
- It is challenging to balance each title's consumption with the total cost of the bundle.

Archiving and Maintaining Electronic Journals

- Multiple physical copies allowed for natural preservation during the print period.
- Long-term access is at danger since e-journals frequently rely on single publisher systems.
- Some libraries maintain both print and electronic subscriptions, increasing costs.
- Long-term preservation requires a lot of work and resources.
- Digital replication is supported by programs such as LOCKSS (Lots of Copies Keep Stuff Safe).

Database Management

- Like e-journal administration, but with regular updates and more sophisticated search.
- Full-text, bibliographic, abstracting, and reference databases are among the types.
- Evaluation criteria include support, interface design, update frequency, and content coverage.
- need authentication techniques like user accounts or IP access.
- For full-text access, link resolvers and discovery tools are frequently incorporated.

Taking Care of E-Books

- Valued for its portability and capacity to store several books on a single device.
- Libraries have to deal with user and platform limitations.
- Think about device/file format compatibility and downloading privileges.
- Annual subscriptions and perpetual access are examples of purchase models.
- Libraries need to keep track of what is owned and what is rented.
- To prevent broken links, access notes and URLs must be kept up to date.

The Life Cycle Approach to E-Resources

- Utilize a single management life cycle for all e-resources.
- Important phases include: Discovery, Trial, Selection, Acquisition, Access, Renewal, and Cancellation.
- Feedback gathering and ongoing usage tracking are crucial.
- Helps ensure cost-effectiveness and relevance over time.
- supports decisions about renewal or discontinuance that are supported by evidence.

7.4 LICENSING AND ACCESS CONTROL, INTEGRATION WITH LIBRARY CATALOGUES

Two essential elements of Electronic Resource Management (ERM) in libraries are licensing and access control. Electronic resources are typically licensed rather than owned, in contrast to physical books, which are owned after purchase. This indicates that the library and publishers or vendors enter under a formal contract that specifies exactly how the resource may be accessed and utilized. In addition to outlining allowed

activitiesviewing, downloading, printing, and sharingthese license agreements usually include limitations to guard against abuse or copyright infringement. Multi-user or simultaneous access rights, off-campus or remote access, perpetual access after the subscription expires, institutional archiving rights, usage statistics provision, payment and renewal clauses, liability for unauthorized use, and dispute resolution conditions are, in general, important license terms. A carefully negotiated license shields the university from financial and legal risks while guaranteeing that the needs of staff, researchers, and students are met.

The practical aspect of licensing is access control. It describes the administrative and technical safeguards put in place by libraries to guarantee that only authorized users can access electronic resources that they have subscribed to. Libraries frequently employ proxy servers, username and password systems, IP-based authentication on campus networks, and other remote authentication technologies for users who are not on campus. For authorized users to have seamless, continuous access, effective access management must strike a balance between security and user convenience. Users can find and connect to full-text information more rapidly with the use of supporting technologies including browsing lists, federated search systems, link resolvers, discovery services, subject indexes, and A-Z journal lists.

The technical and legal foundation of e-resource services is made up of access control and licensing. In academic and research libraries, effective administration in these areas guarantees adherence to publisher agreements, consistent digital content availability, equitable usage monitoring, and an overall increase in user satisfaction.

Integration with Library Catalogues

A key component of electronic resource management is the integration of electronic resources with the library catalogue, which guarantees that users can find digital materials using the same system they already use for print collections. Through integration, databases, e-books, and e-journals are added directly to the Online Public Access Catalogue (OPAC) rather than being dispersed among several web pages or distinct listings. This method turns the catalogue from a list of the library's physical holdings into a complete access tool that represents all of the resources, regardless of format or location, to which the library grants access.

Centralization of maintenance and access is a key benefit of integration. Instead of being kept in numerous disjointed subject guides or static web pages, the URLs, access notes, and metadata of e-resources are kept in a single authoritative database when they are categorized. This guarantees uniformity across platforms, avoids out-of-date links, and lessens task repetition. The cited study emphasizes how important it is for cataloging personnel and systems librarians to work together since successful management of dynamic URLs, authentication methods, and display formats requires technical know-how.

Utilizing standard cataloguing procedures and metadata fieldsparticularly the MARC 856 field, which houses the public access notes and electronic access linkis another crucial component. When this field is used appropriately, the catalogue interface can show

clickable hyperlinks that take visitors straight to the entire resource from the bibliographic record. Clear call-number indicators like "Electronic Journal" or "Electronic Database," consistent vocabulary, and uniform location codes like "Internet" aid users in rapidly identifying the type of resource.

Additionally, integration raises user awareness and experience. Consumers favour "one-stop searching," in which digital and print resources are combined into a single search result. Users no longer have to remember numerous entry points, like distinct database listings or vendor portals, when electronic resources are fully linked. According to the study, this approach makes licensed resources more visible to users and strengthens their comprehension that these digital resources are library-provided and not publicly accessible online.

Lastly, integration facilitates effective long-term administration. Tracking holdings, managing authentication changes, updating URLs, and doing normal maintenance are all made simpler with centralized catalogue entries. Additionally, it enables departmental websites and subject guides to link back to a single catalogue record instead of maintaining separate links of their own. Therefore, the technical and organizational strategy of integrating e-resources with library catalogues improves the sustainability, consistency, and accessibility of digital library services.

CHECK YOUR PROGRESS

Q 1: Define ERM.
Q 2: What are e resources? Why are they important?
Q 3: Give Two examples of e resources.
Q 4: What is Licensing of e-resources?

7.5 LET US SUM UP

Many electronic resources, including databases, e-books, and e-journals, are now available in academic libraries to satisfy patrons' demands for immediate, full-text access. Because of the complexity of managing these resources, Electronic Resource Management (ERM) was created. It uses a life-cycle approach to encompass selection, licensing, access, maintenance, evaluation, renewal, and cancellation. E-resources save space and offer remote access around-the-clock, but they come with a price tag, technical problems, and copyright issues. Libraries are responsible for managing usage data, archiving, authentication, and license terms. For both print and digital collections, integration with the library catalogue guarantees discoverability, centralized maintenance, consistent linkages, and a one-stop search experience.

7.6 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1: ERM is the set of methods and procedures used to manage selection, acquisition, licensing, access, maintenance, evaluation, and de-selection of electronic resources.

Answer to Q 2: E-journals, e-books, and online databases are examples of digital information sources that may be accessed electronically (via a computer or network). It is significant because it enables remote use for researchers and learners and provides quick, anytime access to current information. Online databases and e-journals are two examples.

Answer to Q 3: The licensing of e-resources entails establishing a legal agreement (a license) between the library and the publisher or vendor, which explicitly delineates the e-content accessible to the library and the permissible usage thereof. It generally delineates the authorized users, permissible uses (such as viewing, downloading, printing, etc.), associated costs, the duration of the license, and stipulations for renewal or termination.

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7.8 MODEL QUESTIONS

Q 1: Discuss the life-cycle of the administration of electronic resources.

Q 1: Identify four issues encountered in the management of electronic resources.

Q 1: Examine the management of electronic journals, databases, and e-books in academic libraries, encompassing selection, purchase, licensing, and preservation processes.

Q 1: Discuss the significance of licensing, access control, and the integration of electronic resources with library catalogs in facilitating efficient digital library services.

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UNIT 8: OPEN ACCESS AND INSTITUTIONAL REPOSITORIES

UNIT STRUCTURE

8.1 Learning Objectives
8.2 Introduction
8.3 Overview of Open Access Movement
8.4 Creation and Management of Institutional Repositories
  8.4.1 Establishing a Repository for the Institution
  8.4.2 Workflows for Content Recruitment and Deposits
  8.4.3 Discoverability, Standards and Metadata
  8.4.4 Sustainability and service management
8.5 Benefits and Challenges of Open Access
  8.5.1 Benefits of Open Access / Institutional Repositories
  8.5.2 Open Access and Institutional Repositories' Difficulties
8.6 Let Us Sum Up
8.7 Further Readings
8.8 Answers To Check Your Progress
8.9 Model Questions

8.1 LEARNING OBJECTIVES

After going through this unit, we will be able to,

- learn about open access, open access movement
- learn about institutional repositories
- benefits and challenges of open access.

8.2 INTRODUCTION

The basic issue that libraries and research institutions face is that knowledge expands more quickly than the library's budget or collection can. Libraries and research institutions exist to assist learning and study. Over time, the commercialization of scholarly journals, the growing subscription fees, and the widespread practice of authors giving copyright to publishers before publication, began to worry many academic authors and librarians. Libraries shut down journals when subscription costs exceed their budgets, depriving researchers of crucial source material for study and instruction.

For authors sharing their work to anyone at anywhere at any time, the internet opened up new possibilities. Open Access, which seeks to lower barriers to access so that research findings can be read and used more widely, grew as a result of this possibility. Publishing in open access journals and storing research results in open repositories are two key concepts that enable open access. Because they give a university or research

organization a place to gather, organize, preserve, and disseminate its intellectual output in digital form, institutional repositories are among the most useful tools in this field.

The OA movement, the function of institutional repositories, and the primary advantages and difficulties that institutions encounter when attempting to create long-lasting open access services will all be covered in this course. The unit also links repositories and open access to the evolving role of libraries, who are rapidly becoming more than just material purchasers and are actively involved in the production, distribution, and preservation of research.

8.3 OVERVIEW OF OPEN ACCESS MOVEMENT

Open Access began as more than one project. It evolved in reaction to issues with scholarly communication, particularly the growing expenses of journals and the constraints libraries faced when they were unable to continue paying annual increases in subscription fees. Many well-established publishers continued to rely on charging readers or their institutions for access when journals transitioned to online electronic publishing. Because digital distribution did not imply free access, this maintained the access issue even in the digital world.

Research articles should be freely accessible online without regard to readers' financial situation, according to a basic definition of open access (OA). According to StevanHarnad, open access (OA) is the free, instantaneous, and permanent internet availability of academic articles in their entirety. Harnad also made a compelling case for self-archiving in the 1990s, and the development of the open access movement is sometimes associated with his 1995 "subversive proposal." Major initiatives, like the Berlin Declaration and the Budapest Open Access Initiative (BOAI), helped the OA movement acquire international recognition and more precise terminology over time.

Because it explained how a new technology and an ancient custom came together, the BOAI is often regarded as a significant turning point. The internet, a new technology that allowed for global distribution, replaced the old practice of researchers publishing their work without receiving payment from publications. The BOAI further explained that open access (OA) refers to materials that are freely available on the public internet, meaning that users can read, download, copy, distribute, print, search, or link to the entire texts, as well as use them for any other legitimate purpose, without any technological, financial, or legal restrictions beyond those associated with basic internet access.

This approach was also endorsed by the Berlin Declaration, which noted that the internet can facilitate an interactive, global representation of human knowledge, including cultural heritage, that is accessible from anywhere in the globe. Additionally, it promoted the usage of repositories as a component of the open access environment and emphasized the need for OA contributions to be interoperable and publicly accessible. Because they prompted institutions to consider rules, repositories, and publication options, these developments collectively assisted OA in evolving from a theoretical concept to a realistic agenda.

The two primary approaches of the OA movement often referred to as Gold OA and Green OA. OA journals that employ a funding strategy that does not charge readers or their institutions for access are typically referred to as "Gold OA." The term "Green OA" describes a strategy in which authors self-archive their work in open access repositories, which may be institution or subject-based, after publishing it in a traditional journal. Because OA journals and repositories both expand the reach of research in various ways, many OA plans mixing the two approaches.

Subject repositories aided in demonstrating the potential of extensive self-archiving. One well-known example is arXiv, which started off as a collection of high energy physics preprints in 1991 and eventually expanded into a sizable library spanning several disciplines. In order to gather and distribute e-prints and other digital outputs produced by their scholars, numerous universities started constructing their own institutional repositories in the 2000s. Organizations focused on reforming scholarly communication, including SPARC, which sought to encourage new models that increase the dissemination of scholarly knowledge, also backed the movement.

8.4 CREATION AND MANAGEMENT OF INSTITUTIONAL REPOSITORIES

A digital compilation of outputs produced within a university or research facility is known as an institutional repository. Although some institutions also use repositories for teaching and learning resources, IRs are often created to offer Open Access to the institution's research output. According to a commonly used definition by Clifford Lynch, an IR is a collection of services that a university provides to its community for organizing, managing, and sharing digital content produced by the institution and its members. The organization is committed to stewardship, which includes long-term preservation, when necessary, as well as access or distribution. This description is helpful since it demonstrates that a repository is a service that requires long-term planning, personnel roles, and policies in addition to being a website for storage.

Because they facilitate access, discovery, and even preservation, institutional repositories are a component of the scholarly communication environment. Interoperability, or the capacity of repositories to provide metadata in a common manner so that other systems may harvest and index that metadata, is a crucial technological factor in why repositories cooperate. The Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH), which was created to gather metadata descriptions so that services can be constructed using metadata from numerous archives, is a popular protocol that supports this. To make it easier for search engines to locate repository content, OAI-PMH enables repositories to exchange bibliographic information, including author, title, date, institutional affiliation, and abstract.

Because repository metadata is publicly available online, search engines like Google and Google Scholar may index repository content, giving users access to a wide range of discovery pathways. Web search engines are a significant source of traffic to repositories,

according to studies and usage data cited in repository literature. This highlights the significance of web indexing for repository impact. This is one of the reasons that consistent practices and high-quality metadata are important, as even when the complete text is publicly accessible, poor metadata hinders finding.

8.4.1 Establishing a Repository for the Institution

A firm decision regarding the goal, scope, and user groups to be served is typically the first step in creating an IR. Since these outputs form the foundation of an institution's research visibility, many IRs concentrate on research outputs including peer-reviewed journal articles and conference proceedings. Theses and dissertations, which are significant because they represent original research that would not be widely disseminated through conventional publishing methods, are also frequently found in repositories. Additionally, depending on local capabilities and institutional aims, repositories may contain teaching materials, reports, presentations, research data, and other digital artifacts.

Software for repositories is an early practical option. EPrints and DSpace are frequently used systems, and repository literature frequently cites them as well-liked solutions that assisted numerous universities in creating repositories. DSpace and EPrints are the top software options for repositories according to assessment based on data from OpenDOAR. Because software impacts operations like deposit, metadata management, access control, preservation options, and interoperability capabilities, this is significant for planning.

Additionally, institutions must choose who will deposit content. It is typically less expensive to operate a repository that is primarily self-archived, meaning that researchers submit their own work, as opposed to one where all deposits are handled by library employees. However, self-archiving only functions effectively when researchers are motivated to deposit frequently, have clear instructions, and have easy-to-use deposit tools. Because rules help foster consistent deposit behavior, many institutions link repositories with open access policies or mandates that either compel or highly encourage researchers to deposit their work.

8.4.2 Workflows for Content Recruitment and Deposits

Installing a repository system won't be worth anything unless it has valuable content. Prioritizing important content categories is a popular strategy. Peer-reviewed journal articles, conference papers, and thesis are particularly popular because they are frequently requested and simple to describe using standard metadata. If the organization wishes to display a greater variety of intellectual output, repositories can also accommodate a greater range of content, such as training materials, book chapters, technical reports, and working papers. Even in cases where the full text cannot be made publicly available, such as when books are created for royalties and writers would rather

limit open access to the entire content, certain repository policies also involve keeping metadata.

The management of publisher and copyright policies is a significant component of workflow. The final accepted version (post-print) may not always be accessible to authors, or they may not know which version they can deposit. The self-archiving rules of publishers vary, and repository managers frequently use resources and guidelines like SHERPA RoMEO to learn what can be stored and under what circumstances. Because errors might result in takedown requests and deter future deposits, managing these concerns is essential for both legal compliance and fostering researcher trust.

8.4.3 Discoverability, Standards and Metadata

An item's title, author, date, abstract, keywords, and institutional affiliation are examples of its metadata. In order to make metadata interoperable, harvestable, and indexable, repositories provide it in standard ways. Because search engines and repository directories can effectively classify, filter, and search objects when metadata is rich and consistent, discovery is improved. Even if material is present, a repository with poor metadata makes it more difficult for users to locate objects.

Being included in directories like Open DOAR and ROAR is frequently advantageous for repositories. As a quality-assured listing of open access repositories, Open DOAR's staff gathers and assigns metadata to enable classification and analysis, facilitating broader repository use. SHERPA services is responsible for managing Open DOAR, an authoritative list of institutional and subject repositories that supports academic and research activity. In addition to end users, search services, alert services, and other tools that require accurate repository information can also benefit from this directory function.

Additionally, repository directories aid in illustrating geographic distribution and growth. Institutions can benchmark their repository selections with the use of Open DOAR records, which have been utilized in studies to analyze subject coverage, content categories, and software use among repositories. For instance, an analysis based on Open DOAR has revealed that a large number of repositories are multidisciplinary and that articles and theses are among the most frequently deposited content types. Open DOAR-based research have also provided examples of key repositories and their record counts for Indian institutions, highlighting the significance of repositories like Shodh Ganga, Krishi Kosh, and eGyan Kosh as institutional or national services.

8.4.4 Sustainability and Service Management

Since an IR is an ongoing service, sustainability over the long term is important. Stable content expansion, defined roles, and effective workflows that avoid staff overburden are all necessary for sustainability. As a result, many organizations establish positions like repository managers, who assist with deposits, advise writers on copyright and versions, and advertise the repository across departments. Academics may not automatically

deposit content, particularly when they are busy or unsure of what to do, therefore outreach and promotion are essential.

Services that assist authors and institutions in understanding usage and impact are also beneficial to repositories. By demonstrating how frequently content is downloaded or seen, usage reporting can inspire researchers by demonstrating that their work is being read. When metadata is accurate and consistent, repositories can also assist with assessment tasks, track research output, and assist in the creation of publishing lists, all of which can enhance institutional reporting.

8.5 BENEFITS AND CHALLENGES OF OPEN ACCESS

8.5.1 Benefits of Open Access / Institutional Repositories

- makes a university's research outputs more widely known.
- increases each author's potential for citation and the influence of their work.
- offers an organized presentation of the research and instructional activities conducted by the university.
- encourages the curation and digital preservation of academic works.
- provides an area for group projects and materials that are still in process.
- provides digital teaching materials to support instruction and learning.
- makes theses and dissertations publicly available.
- permits academic profiles and e-portfolios for students.
- supports the sharing and depositing of research data as mandated by funding organizations.
- promotes the reuse, transparency, and verification of research data.
- focuses on library financial constraints and exorbitant subscription fees.
- closes knowledge gaps by making access outside of affluent institutions possible.
- encourages more chances for learning and educational equality.
- allows for quicker distribution of findings and scholarly communication.
- promotes creativity in academic communication and publishing models.

8.5.2 Open Access and Institutional Repositories' Difficulties

- difficult copyright and licensing issues brought on by different publisher practices.
- Self-archiving rights may be restricted by copyright transfer agreements.
- Version restrictions and embargo periods are present.
- Authors have trouble finding the right post-print version.
- If self-archiving is erratic, the content flow will be inconsistent.

- A heavy reliance on library employees may result in delays and higher operating expenses.
- Balanced deposit strategies (assistance and self-archiving) are required.
- ongoing training and departmental involvement are necessary.
- problems with stable connectivity, accurate metadata, and quality control.
- A well-defined approach for digital preservation and sustainability is essential.
- Handling version control, unpublished works, and gray literature.
- Article Processing Charges (APCs) are a cost burden associated with Gold Open Access.
- When funding for APCs is inconsistent, equity issues arise.
- Infrastructure, policy administration, and staff time are obstacles for Green OA.
- Regular maintenance of software, information, and policies is required.
- reliance on indexing services and directories that need to be updated accurately.
- If repositories are not properly maintained, there is a risk of decreased usage and confidence.

w CHECK YOUR PROGRESS

Q 1: What is OAI-PMH, and why is it important for repositories?
Q 2: State two practical actions that improve repository sustainability.

8.6 LET US SUM UP

In particular, growing journal costs, constrained library budgets, and limitations imposed by conventional publication methods led to the development of Open Access as a solution to access issues in scientific communication. Key OA initiatives such as the BOAI and the Berlin Declaration helped define OA as free online access with broad reuse rights for lawful purposes and encouraged the use of repositories and open publishing models. Green OA (self-archiving in repositories) and Gold OA (OA journals) are frequently used to explain open access, and many institutions combine the two strategies.

In order to manage, distribute, and frequently preserve the digital outputs produced by their communities, universities and research institutes offer institutional repositories, which are digital collections and services. Because repositories publish metadata in standard ways, frequently utilizing OAI-PMH, and because online search engines can index their contents and list them in directories like OpenDOAR, they facilitate discovery and global access. Planning, software selection, metadata quality, content acquisition, copyright protection, and long-term processes that promote consistent deposits are all critical to an institutional repository's success.

The advantages of open access (OA) and repositories are evident, particularly the enhanced impact and exposure of research outputs, improved reader accessibility, and enhanced institutional capacity to monitor and curate research activities. However, there are drawbacks to open access as well, such as thecomplexity of copyright, the demand for consistent deposit behavior, the expense of maintaining repository services, and the need for quality control and sound governance. A practical OA approach views the repository as a long-term service that requires staff training, policy support, and ongoing development rather than as a one-time endeavour.

8.7 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1: OAI-PMH is a protocol that collects metadata descriptions of records so that metadata from multiple archives can be used to build services. It is significant because it facilitates interoperability, which enables repositories to consistently disclose metadata for indexing and harvesting.

Answer to Q 2: Creating a robust Open Access policy that promotes or mandates regular deposits and creating workflows that facilitate self-archiving so the repository can expand without requiring an excessive amount of staff labor are two ways to increase sustainability. Researchers can also deposit content and adhere to copyright regulations with the support of ongoing outreach and repository management activities.

8.8 FURTHER READING

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8.9 MODEL QUESTIONS

1. Describe how the open access movement grew as a result of growing journal subscription fees.
2. Describe an institutional repository and list the four categories of content that are often kept there.
3. In an institutional repository, list any four of the practical duties of a repository manager.
4. Describe the planning, software selection, deposit procedure, metadata, and sustainability of the creation and management of an institutional repository.
5. Give examples pertaining to institutional repositories to illustrate the advantages and difficulties of open access for writers, organizations, libraries, and readers.

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UNIT 9: LIBRARY NETWORKING AND CONSORTIUMS

UNIT STRUCTURE

9.1 Learning Objectives
9.2 Introduction
9.3 Interlibrary Loan Systems
9.4 Resource Sharing among Libraries
9.5 Collaborative Collection Development
9.6 Let Us Sum Up
9.7 Further Readings
9.8 Answers To Check Your Progress
9.9 Model Questions

9.1 LEARNING OBJECTIVES

After going through this unit, we will be able to,

- comprehend the significance and objectives of library networking and consortia.
- explain the notion of interlibrary loan systems
- explain the concept of resource sharing among libraries
- comprehend collaborative collection development.
- acknowledge the significance of collaboration in contemporary librarianship.

9.2 INTRODUCTION

Libraries have consistently endeavoured to furnish knowledge to their patrons. Historically, libraries endeavoured to amass extensive collections of books and journals to provide users with comprehensive access in a single location. Nonetheless, because to the swift expansion of information, escalating publication costs, and constrained budgets, it became unfeasible for any individual library to amass all materials. This circumstance resulted in the establishment of collaboration among libraries.

Library networking and consortia are contemporary approaches whereby libraries collaborate to exchange resources, services, and expertise. Libraries collaborate to provide consumers with a broader spectrum of knowledge, eliminating the need for each library to acquire every item independently. This collaboration conserves resources, minimizes redundancy, and enhances service quality.

A library network comprises a collection of libraries interconnected via communication technologies and shared systems. These networks facilitate the interchange of data, catalogs, and documents among libraries. A consortium is a formal assembly of libraries that collaborates to achieve common objectives, including collective procurement of electronic resources, subscription pooling, or price negotiations with publishers.

The advancement of computers, the internet, and digital databases has fortified these systems. Currently, networking and consortia are seen as integral components of library and information services. They prioritize access above ownership, indicating that it is more crucial for users to obtain knowledge than for the library to possess every resource.

This unit elucidates how interlibrary loans, resource sharing, and collaborative collection building enhance the operational efficacy of libraries within a connected environment. These platforms facilitate academic advancement while also fostering equitable access to information across institutions.

9.3 INTERLIBRARY LOAN SYSTEMS

Interlibrary Loan, referred to as ILL, is one of the most longstanding and significant types of collaboration among libraries. It is a service whereby a library procures books, articles, or other items from another library for its patrons. This solution guarantees that, even if a library lacks ownership of a specific document, it can still facilitate access for its users.

Historically, interlibrary loans were administered manually by correspondence, telephone communications, and printed documentation. The process was protracted and necessitated considerable time and effort. The advent of digital technologies, online catalogs, and electronic communication has rendered ILL systems more rapid and efficient. Users may now submit requests online, monitor their status, and obtain digital copies in numerous instances.

The objective of an interlibrary loan system is to broaden the accessibility of a library's collection. It diminishes the necessity for individual libraries to acquire rare or costly materials, facilitating inter-institutional exchange instead. This approach also accommodates smaller libraries that may possess limited financial resources.

Contemporary interlibrary borrowing systems rely on numerous critical components. A primary prerequisite is a union catalogue. A union catalogue is a consolidated inventory of the collections of various libraries. It enables librarians to ascertain the ownership of a particular object by a library. In the absence of such catalogues, the identification of materials becomes challenging.

A crucial element is the establishment of explicit policies and procedures. Libraries must reach consensus on loan durations, distribution mechanisms, copyright regulations, and material preservation. International organizations and professional entities have promulgated best practice recommendations for interlibrary lending and document delivery services, advocating for standardization and quality assurance.

Technology plays a key role. Electronic document distribution, scanning services, and integrated library management systems facilitate the reduction of delays. Numerous academic libraries currently employ automated interlibrary loan software that interfaces directly with catalogs and user accounts.
Nonetheless, obstacles persist. Variations in library rules, software compatibility challenges, license limitations for electronic materials, and staff training requirements all

impact productivity. Notwithstanding these issues, interlibrary lending services continue to be an essential element of library networking. They guarantee that knowledge transcends physical ownership, allowing users to access information outside the confines of their local library.

9.4 RESOURCE SHARING AMONG LIBRARIES

Resource sharing encompasses a more extensive concept than interlibrary borrowing. While interlibrary loan primarily concerns the borrowing and lending of materials, resource sharing encompasses several cooperative efforts, including shared cataloguing, joint subscriptions, collective storage, digital access, and staff expertise. It is predicated on the notion that no singular library can independently fulfil all user requirements.

The proliferation of information, exorbitant subscription costs, and constrained financial resources have compelled libraries to seek collaborative solutions. Resource sharing mitigates material duplication and enables libraries to invest in varied collections instead of reiterating the same titles. It also enhances the accessibility of rare and specialized materials.

A fundamental principle of resource sharing is the transition from ownership to access. Historically, libraries sought to possess every significant book or magazine. Currently, it is more pragmatic to facilitate access via networks and collaborations. This transformation is facilitated by digital technologies, online databases, and internet connectivity.

Resource sharing occurs in various domains:

- Union catalogues
- Cooperative collection development
- Library consortia
- Shared storage facilities
- Document delivery services
- Interlibrary loans

Union catalogues serve as the foundation for resource sharing. They furnish details regarding the library that possesses each item. Cooperative collection development enables libraries to collaboratively strategize their acquisitions, so enhancing subject coverage while minimizing redundant purchases. Consortia facilitate libraries in negotiating superior pricing and obtaining extensive electronic collections at diminished expenses.

The sharing of resources enhances the quality of service. Users acquire additional resources, librarians cultivate professional networks, and institutions enhance their scholarly standing. Library science research and instructional resources indicate that resource sharing is a fundamental principle of contemporary librarianship.

Notwithstanding its benefits, resource sharing necessitates strategic planning and robust infrastructure. Libraries must allocate resources for computers, networking infrastructure,

skilled personnel, and standardized software. Administrative assistance and explicit agreements are essential. Success of these systems is contingent upon cooperation and mutual trust.

9.5 COLLABORATIVE COLLECTION DEVELOPMENT

Collaborative Collection Development is a strategic and cooperative approach whereby two or more libraries jointly determine the materials they will acquire, preserve, or prioritize. Rather than each library acquiring identical books and journals, collaborating libraries allocate duties among themselves. The combined power of all libraries significantly surpasses that of any individual library.

The fundamental concept of collaborative collection development is efficiency and equilibrium. When libraries operate independently, excessive duplication of resources frequently occurs. Concurrently, certain significant themes may remain underdeveloped or entirely lacking. By collaborating, libraries can expand subject coverage, minimize redundant acquisitions, and guarantee patrons access to a more extensive and diversified repository of knowledge.

This method is especially beneficial in academic settings because to the diverse and evolving demands of research. Universities and colleges may focus on various subjects, allowing their libraries to develop robust subject collections accordingly. For instance, one library may emphasize social sciences, whereas another may enhance its science and technology section. Users thereafter obtain access to both collections via networks and agreements.

Collaborative collection development is intricately linked to library consortia. Consortia frequently negotiate electronic journal packages, e-book subscriptions, and database access for all member libraries. This collective bargaining results in cost reductions and increased accessibility. Research on university libraries indicates that collaborative collection building enables libraries to effectively manage diminishing resources and escalating prices while preserving high-quality collections.

Nonetheless, teamwork presents specific obstacles. Libraries may possess varying priorities, academic programs, or administrative requirements. Certain librarians may be concerned about relinquishing autonomy in selection decisions. Challenges may arise in determining financial contributions, license agreements, and long-term obligations. Consequently, effective communication, trust, and explicit agreements are necessary.

A significant aspect of collaborative collection creation is the transition from "ownership" to "access." Libraries progressively depend on communal digital platforms, remote databases, and collaborative storage solutions. Print retention agreements are more prevalent, with libraries committing to preserve specific materials, while others prioritize access above storage. This alleviates spatial issues and guarantees the enduring preservation of significant works.

In summary, collaborative collection development enhances the shared knowledge repository of institutions. It converts libraries from isolated entities into interconnected collaborators that enhance teaching, learning, and research on a larger scale.

CHECK YOUR PROGRESS

Q 1: Define Library Network.
Q 2: Define Library Consortium.
Q 3: Give example any two Indian library Networks.

9.6 LET US SUM UP

Library networking and consortia exemplify contemporary methods of collaboration among libraries. They address the escalating issues of information proliferation, fiscal constraints, and technical advancements. Libraries are interconnected by digital systems and communication channels, facilitating the interchange of catalogues, documents, and services. Interlibrary loan systems enable libraries to borrow and lend resources, hence enhancing the accessibility of local holdings. Resource sharing expands this concept to encompass union catalogues, consortia, document distribution, and collaborative infrastructure. Collaborative collection development enhances cooperation by cooperatively arranging purchases to minimize duplication and reinforce subject coverage. These solutions facilitate access rather than ownership, enhance cost efficiency, and elevate user pleasure. Simultaneously, they necessitate infrastructure, trained personnel, administrative assistance, and reciprocal confidence. When executed meticulously, library networking and consortia facilitate institutions in offering equitable and expansive access to knowledge, which is the core objective of librarianship.

9.7 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1: A library network is a formal, cooperative and interconnected system of two or more libraries that use communication technology to share resources, services and information.

Answer to Q 2: Library Consortium is a cooperative alliance where multiple libraries partner to pool their resources, expertise, and activities for a common good.

Answer to Q 3: INFLIBNET, DELNET.

9.8 FURTHER READING

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9.9 MODEL QUESTIONS

1. Examine the function of library consortia in facilitating resource sharing. Elucidate the various forms, advantages, and implementation challenges, citing Indian instances.
2. Discuss the concept of library networking and examine its principal uses in contemporary libraries.
3. What are the primary benefits for a member library within an e-resource consortium such as e-Shodh Sindhu?

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UNIT 10: RFID TECHNOLOGY IN LIBRARIES

UNIT STRUCTURE

10.1 Learning Objectives
10.2 Introduction
10.3 Applications of RFID in Library Management
10.4 RFID Implementation Considerations and Best Practices
10.5 Let Us Sum Up
10.6 Further Readings
10.7 Answers To Check Your Progress
10.8 Model Questions

10.1 LEARNING OBJECTIVES

After going through this unit, we will be able to,

- know about RFID technology, its importance, application
- know about some best use cases of RFID technologies.

10.2 INTRODUCTION

Radio Frequency Identification, abbreviated as RFID, is a technology that use radio waves for the automatic identification and tracking of items. RFID enables a computer system to identify an object without physical contact or direct line-of-sight scanning. This technology operates via diminutive electronic devices known as tags, which are affixed to items such as books, CDs, or other things. These tags retain digital information and transmit it to a reader via radio signals.

RFID has emerged as a significant advancement in libraries, facilitating automation and enhancing operational efficiency. Historically, libraries predominantly utilized barcodes for identification and security purposes. Barcodes necessitate direct scanning and manual manipulation, which can be inefficient and susceptible to inaccuracies. RFID mitigates this disadvantage by enabling the simultaneous reading of numerous things without necessitating physical touch or precise alignment. This capability conserves time for both library personnel and patrons.

Essential Elements of an RFID System

- Radio Frequency Identification Tag
  - Incorporates a microcontroller and a compact antenna.
  - Maintains electronic data regarding the item.
  - Affixed within books or other library resources.
- Radio Frequency Identification Reader
  - An apparatus that transmits and receives radio waves.

- Retrieves the information contained in RFID tags.
- Linked to the computer system.

- Antenna
  - Facilitates signal transmission between the tag and the reader.
  - Establishes the reading range and signal intensity.
- Server / Host System
  - Analyzes the information obtained from the reader.
  - Integrates with the library management software.
  - Modifies circulation and inventory records.

Collectively, these elements constitute a comprehensive system that facilitates the identification, tracking, and monitoring of library resources.

RFID technology extends beyond libraries. It is extensively utilized in sectors including transportation, healthcare, retail, and logistics. Nonetheless, its function in libraries is especially crucial due to the management of thousands or even millions of objects. Administering extensive collections manually can be challenging. RFID enhances this procedure with speed, precision, and convenience.

Another significant characteristic of RFID is that tags may be classified as passive or active. Passive tags lack an independent power source and derive energy from the reader's signal. They are more economical and frequently utilized in libraries. Active tags incorporate a battery and can transmit signals over extended distances; however, they are costlier and typically employed for tracking high-value assets. Many libraries favor passive tags due to their cost-effectiveness and appropriateness for book management.

RFID technology additionally facilitates self-service. Users can borrow and return books without enduring lengthy lines. This autonomy enhances user happiness and alleviates the workload for library personnel. Simultaneously, RFID improves security by activating alarms if an item exits the library without appropriate checkout. Consequently, RFID integrates identification, tracking, inventory management, and security into a unified system.

10.3 APPLICATIONS OF RFID IN LIBRARY MANAGEMENT

RFID technology has revolutionized library management by automating numerous regular tasks. Its uses are evident in circulation, security, inventory management, and user services. RFID facilitates swifter and more dependable operations, eliminating reliance on human recording and physical scanning.

A prevalent application is automated check-in and check-out. Self-service kiosks enable users to independently borrow or return books. The system scans the RFID tag embedded in the book and promptly updates the database. This procedure minimizes wait times and enhances consumer convenience. Simultaneously, staff members can concentrate on

more significant activities, such as user assistance and collection development, rather than monotonous circulation duties.

A significant application is in security and theft detection. RFID security gates are positioned near library exits. Should a book remain improperly issued, the system identifies the tag and activates an alarm. This system safeguards library resources without necessitating manual examination of each item. In contrast to conventional electromagnetic strips, RFID tags further retain identification data, enhancing their versatility.

Inventory management is a significant domain in which RFID demonstrates its advantages. Librarians can utilize handheld RFID readers to efficiently scan shelves without displacing books. The reader recognizes each item and verifies its proper placement. This procedure facilitates the identification of misplaced books and the efficient updating of inventory records. Previously, inventory verification required weeks; however, RFID significantly decreases this duration.

RFID additionally facilitates external book return stations. These stations may be situated outside the library edifice, enabling patrons to return books even during the library's closure. The system autonomously records the return and refreshes the account. This flexibility improves service accessibility and user satisfaction.

Supplementary applications encompass shelf management, tagging, automatic sorting, and user identification via RFID-enabled membership cards. Libraries implementing RFID frequently encounter enhanced workflows, less human error, and superior service quality.

10.4 RFID IMPLEMENTATION CONSIDERATIONS AND BEST PRACTICES

Despite the numerous benefits of RFID, libraries must meticulously strategize its adoption. The primary factor is expense. RFID systems necessitate investment in tags, readers, security gates, software, and maintenance. Small libraries may encounter difficulties with the initial expenditure. Consequently, budgetary preparation and incremental execution are frequently advised.

Another factor to consider is the interoperability with current library management software. RFID systems must seamlessly interface with catalog and circulation modules. Incompatibility between platforms may result in technical difficulties or data inconsistencies for the library. Open standards and vendor endorsement are pivotal in this context.

Privacy and ethical considerations are also significant. RFID tags retain identity information, and there exists a risk of exploitation if adequate protections are not implemented. Libraries usually prioritize user privacy, necessitating the assurance that personal reading behaviors are not monitored without authorization. Optimal procedures

encompass data minimization, information encryption, and adherence to professional ethical standards.

The training of library personnel is of similar significance. Staff members must comprehend the operation of RFID technology, resolve fundamental difficulties, and provide user assistance. Inadequate training hinders the full realization of RFID benefits. Patron awareness is essential to ensure users feel at ease utilizing self-service solutions.

Technical challenges include tag collision, reader collision, and frequency interference must be resolved. Libraries must select suitable frequencies and high-quality equipment to reduce errors. Routine maintenance and system updates constitute best practices.

Ultimately, libraries must assess long-term sustainability. RFID tags possess an extended lifespan; yet, equipment may necessitate enhancements. Strategizing for future scalability guarantees the system's efficacy over an extended period.

CHECK YOUR PROGRESS

Q 1: Define RFID technology.
Q 2: Identify two advantages of RFID technology in libraries.
Q 3: What is a self-service kiosk?

10.5 LET US SUM UP

RFID technology has enhanced efficiency and automation in libraries. It facilitates contactless identification, expedited circulation, enhanced security, and precise inventory control. RFID supersedes conventional barcode systems, enabling simultaneous processing of several products and diminishing manual labor. Applications like self-check kiosks, theft detection gates, handheld inventory scanners, and external return stations improve user experience and staff efficiency. Successful implementation necessitates meticulous planning, financial investment, privacy protections, personnel training, and technical compatibility. When implemented with appropriate best practices, RFID enhances library operations, rendering them more efficient, user-friendly, and technologically sophisticated.

10.6 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1: RFID (Radio Frequency Identification) is a technology that employs radio waves to autonomously identify and monitor objects using small electronic tags affixed to products. These tags include digital information that may be accessed by an RFID reader without requiring physical contact or a line of sight.

Answer to Q 2: Two advantages are:

i. It accelerates circulation processes, including the issuance and return of books.

ii. It enhances security by identifying unissued objects at exit gates.

Answer to Q 3: A self-check kiosk is an autonomous machine at the library that enables users to independently borrow or return books by scanning RFID tags, without the need for library personnel help.

10.7 FURTHER READING

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10.8 MODEL QUESTIONS

Q 1: Explain the components of an RFID system.
Q 2: Discuss the applications of RFID in library management.
Q 3: Describe the best practices for RFID implementation.

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UNIT 11: MOBILE APPLICATIONS FOR LIBRARIES

UNIT STRUCTURE

11.1 Learning Objectives
11.2 Introduction
11.3 Mobile-friendly Library Services
11.4 Development of Library Mobile Apps
11.5 Use Cases and, Examples of Library Mobile Applications
11.6 Let Us Sum Up
11.7 Further Readings
11.8 Answers To Check Your Progress
11.9 Model Questions

11.1 LEARNING OBJECTIVES

After going through this unit, we will be able to,

- learn about the concept of Mobile friendly library service, importance and features and some well-known examples of use case.
- basics phases of development of library mobile app.

11.2 INTRODUCTION

Smartphones now do everything from buying to talking to people, which has changed how people get information. Libraries have made this change to satisfy the needs of users who want to be able to access catalogs, accounts, and services at any time, especially because so many people across the world own mobile devices. A mobile app is a program that works on phones and tablets. It is usually available through shops like Google Play or the Apple App Store. Unlike webpages, mobile apps have built-in functionality like GPS or camera integration.

Around 2010, libraries started making or using mobile solutions to help with services like catalog searches and renewals. This was because users wanted quick access on the go. These apps make libraries more useful in a digital-first era by reducing the need for PCs and adding features like notifications and QR code scanning. There are problems with creation and upkeep, but the benefits of better user involvement and contactless services, especially during events like the COVID-19 epidemic, have sped up acceptance.

11.3 MOBILE-FRIENDLY LIBRARY SERVICES

Library services that work well on mobile devices entail redesigning and delivering library information, communication tools, and digital resources such that they work well on smartphones, tablets, and other handheld devices. Before, library websites and catalogs were mostly made for desktop computers. Now, because so many people use mobile internet, they expect to be able to access library services right away from anywhere. Because of this, libraries use adaptable web design, easy-to-use interfaces, light pages, and compatibility with different platforms so that users don't have any technological problems when they look for information. These services are very important for distance

education, e-learning, and self-directed learning, especially for students and researchers who use mobile devices a lot.

Mobile-friendly services don't just contain websites; they also include communication, alerts, and account management features that make things easier and more interesting for users.

Major library services that work on mobile devices:

Mobile OPAC (Online Public Access Catalogue): one can search for books, journals, and digital resources by keyword using a small screen interface. It normally shows short bibliographic records immediately and full details after you log in.

SMS and Push Alert Services: They send automatic reminders for due dates, reservation confirmations, new arrivals, and event announcements. This makes sure that messages are sent on time and that things are returned on time.

Mobile Reference Services: lets users ask inquiries through chat, email, or instant messaging and get immediate factual or directional help.

Mobile Database and E-Resource Access: Lets users use authentication systems to go to subscribing databases, institutional repositories, and open-access resources from anywhere.

News and Event Notifications: Tells users about library circulars, workshops, orientations, and competitions.

User Account and Circulation Services: Users can check out items, renew books, reserve resources, and sometimes pay fines online.

Advantages of Services That Work on Mobile Devices:

- Saves time and money on travel.
- Provides access that is tailored to each user and does not depend on their location.
- Encourages users to keep interacting.
- Makes information available anywhere and right away.
- Makes the library easier for digital users to find.

11.4 DEVELOPMENT OF LIBRARY MOBILE APP

The creation of a library mobile application is a systematic and purposeful endeavor, not merely the production of software. It adheres to the concepts of System Analysis and Design, ensuring that each phase aligns the final product with user requirements, technical viability, and financial sustainability. Libraries must judiciously combinecreativity with practicality, as app development necessitates technical proficiency, ongoing maintenance, and user-focused planning.

Essential Stages in Mobile Application Development:
A well-structured development cycle guarantees the mobile application remains pertinent, safe, and user-centric throughout time.

Phase of Planning

- **This is the foundational phase during which the library establishes its objectives and allocates resources.**
- **Establishment of a multidisciplinary team comprising librarians, IT personnel, and designers.**
- **Executing requirement elicitation via surveys, interviews, and feedback forms.**
- **Determining whether to develop a mobile website, native application, or hybrid application.**
- **Assessing budget, schedule, and anticipated results.**

Phase Two: Analysis

At this stage, the gathered data is assessed to determine:

- **Services commonly utilized by consumers.**
- **Levels of user satisfaction.**
- **Anticipated service standards.**
- **Cost-benefit analysis and return on investment.**

Phase of Design and Development

This phase converts concepts into a viable product.

- **Wireframing and Prototyping: Developing screen schematics to illustrate application structure and navigation.**
- **Choice of Platform:**
  - **Native Applications: Created independently for Android (Kotlin/Java) and iOS (Swift); superior performance and enhanced device integration.**
  - **Hybrid Applications: Developed utilizing frameworks such as React Native or Ionic; a singular codebase for various platforms, resulting in reduced expenses.**
  - **System Architecture: Comprises Front End (user interface), Back End Server (processing), and Database (data storage).**

Phase of Testing and Deployment

- **Functional testing to eliminate errors.**
- **Verification of device compatibility.**
- **Distributing the application in application marketplaces.**

5. Maintenance and Assessment Phase

- **Consistent updates and improvements to features.**

- **Monitoring analytics for user behaviour.**
- **Technical assistance and quality control.**

11.5 USE CASES AND, EXAMPLES OF LIBRARY MOBILE APPLICATIONS

Library mobile applications serve as cohesive digital portals that amalgamate many library services into a single portable interface. They are particularly adept at enhancing user engagement, aiding academic research, and enabling rapid communication. Mobile applications enable libraries to connect with users in remote locations, thereby expanding their service reach beyond physical limitations.

Common Functional Application are:

- **OPAC and Unified Search:** Conduct searches across both print and digital collections.
- **Personalization of E-Resources:** Save preferred books and journals as bookmarks.
- **Notifications and Announcements:** Automated notifications regarding library activity.
- **User Account Administration:** Monitor issue/return status, renewals, and fine payments.
- **Assistance and Instruction:** Comprehensive instructions and frequently asked questions for autonomous problem resolution.
- **Communication References:** Chat, email, voice call, and social media connections.
- **Navigation and Communication:** GPS-enabled directions, direct calling, and email functionalities.

Some examples of Mobile Applications for Indian Libraries:

1. OPAC Search and Resource Identification

A principal function of a library mobile application is to facilitate OPAC (Online Public Access Catalogue) search and discovery of library contents. Users can utilize the mobile application to search for books, journals, theses, e-books, and databases by employing keywords, author names, or subject headings. The mobile interface is streamlined, enabling users to swiftly access bibliographic information, availability status, and item location, even on a compact screen. This feature diminishes the necessity for physical catalog consulting and facilitates distant information access.

The Vikram Sarabhai Library App IIM Ahmedabad enables users to access library collections, research articles, and PhD dissertations straight from their cell phones. Students and researchers can verify availability prior to visiting the library, so conserving time and effort.

2. User Account Administration and Circulation Services

A significant use is the administration of personal library accounts and circulation operations. Users can log into their accounts using the mobile application to accomplish functions such as checking issued books, renewing due items, creating reservations, viewing borrowing history, and even paying overdue fees through integrated payment methods. This functionality promotes user autonomy and lowers wait times at the circulation desk. It enhances library efficiency by automating several regular transactions.

The IISER Bhopal Library Mobile App offers functionalities for online account management, book renewal, and notifications concerning due dates and penalties. Students receive notifications and can promptly renew materials without the necessity of visiting the circulation desk in person.

3. Communication, Reference, and Notification Services

Library mobile applications provide as platforms for communication and interaction. They provide immediate notifications, news updates, event announcements, and direct engagement with librarians via chat, email, or telephone services. This use case is particularly significant in academic settings where prompt communication regarding workshops, seminars, new arrivals, or service modifications is crucial. It enhances the connection between the library and its patrons by establishing a constant flow of information.

The IIM Libraries Consortium Mobile App consolidates announcements, consortium resources, publications, and communication links, enabling users to remain updated on library services and academic resources across various IIM campuses. Users can obtain notifications and access shared resources via a unified mobile interface.

4. Obstacles in Library Mobile Applications

While mobile applications provide considerable benefits, libraries face technical, financial, and managerial obstacles in their installation and upkeep. The variety of mobile devices, operating systems, and screen dimensions need ongoing adjustment. Moreover, safeguarding data security, user privacy, and system stability necessitates specialized skills and sustained financial support.

Principal Obstacles:

- Compatibility difficulties with platforms and devices.
- Constrained storage capacity and diminutive display limitations.
- Concerns regarding security and privacy.
- Financial constraints and resource distribution.
- Necessity for professional developers.
- Ongoing updates, promotion, and user awareness.

CHECK YOUR PROGRESS

Q 1: A mobile application is typically accessible via platforms such as …… or the Apple App Store.

Q 2: Libraries commenced the development of mobile solutions circa ……...

Q 3: Mobile applications can utilize inherent functionalities such as …….. or camera integration.

Q 4: Mobile-friendly services are crucial for ……., e-learning, and autonomous learning.

11.6 LET US SUM UP

Mobile technology has profoundly altered the manner in which libraries provide information and services. Due to the pervasive utilization of smartphones and tablets, libraries have transitioned from desktop-oriented systems to mobile-compatible platforms, enabling users to access catalogues, accounts, databases, and communication tools at any time and from any location. Mobile-compatible services encompass OPAC search, notifications, reference assistance, and remote account management, thereby augmenting convenience and user engagement. The creation of library mobile applications adheres to a methodical approach encompassing planning, analysis, design, testing, and maintenance to guarantee usability, security, and sustainability. These applications amalgamate several features, including resource discovery, notifications, and tailored access, into a singular portable interface. Despite problems such as budget constraints, technical compatibility, and data security, the advantages enhanced accessibility, expedited communication, and facilitation of remote learning supersede the limitations. Mobile library services enhance the significance of libraries in a digital-centric society by facilitating more flexible, interactive, and user-focused information delivery.

11.7 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1: Google Play Store.
Answer to Q 2: 2010.
Answer to Q 3: GPS.
Answer to Q 4: Distance Education.

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11.9 MODEL QUESTIONS

Q 1: What constitutes a mobile application?
Q 2: What design methodologies do libraries employ to enhance mobile-friendliness of their services?
Q 3: Identify two benefits of mobile-compatible library services.
Q 4: Discuss Mobile-Compatible Library Services
Q 5: Discuss the developmental phases of a library mobile application.

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UNIT 12: SOCIAL MEDIA AND LIBRARIES

UNIT STRUCTURE

12.1 Learning Objectives
12.2 Introduction
12.3 Utilizing Social Media for Library Promotion,
12.4 Engaging with Users on Social Media Platforms,
12.5 Social Media Policies and Guidelines for Libraries
12.6 Let Us Sum Up
12.7 Further Readings
12.8 Answers To Check Your Progress
12.9 Model Questions

12.1 LEARNING OBJECTIVES

After going through this unit, we will be able to,

- know about social media, its role in library activities
- learn about user engagement activities on social media
- guidelines and policies related to social media for libraries and information centre.

12.2 INTRODUCTION

Using social media to promote a library means using networked digital platforms in a planned, systematic way to let people know about the library's value, services, and resources in a deliberate and ongoing way. In this case, social media is not seen as an extra feature, but as a part of the library's communication and service system. Facebook, X (Twitter), Instagram, LinkedIn, and YouTube are all platforms that libraries can use to convey relevant information about their collections, programs, and facilities. They can also be used to offer interactive services like online reference, literacy campaigns, and virtual events that anyone can attend. Libraries may meet the demands of different user groups and offer flexible, user-centered access to information by customizing content for each medium and merging social channels with other tools like email newsletters, chatbots, and virtual reality experiences. At the same time, using analytics, user feedback, and clear institutional regulations wisely makes sure that promotional activities stay useful, ethical, and long-lasting. This makes social media a key tool for staying relevant, visible, and trusted in the digital age.

12.3 UTILIZING SOCIAL MEDIA FOR LIBRARY PROMOTION

The communication and service aspects of library work are both addressed by the use of social media for library promotion. Social media is a digital communication environment in

which libraries can engage with users, generate and distribute content, and contribute to virtual communities that prioritize information and education. Libraries can maintain providing announcements and fast updates, and publicize resources, collections, events, and activities by utilizing platforms such as Facebook, X (Twitter), Instagram, and LinkedIn.

Social media allows libraries to provide online reference services, promote reading and literacy, and conduct virtual programs such as book clubs, author talks, seminars, and other interactive events that are accessible from any location in terms of service delivery. Libraries can effectively reach a diverse range of users by aligning content with the assets of each medium, such as visual promotion on Instagram, brief news on X, and professional networking on LinkedIn. This is achieved through the use of multiple platforms.

In addition to conventional outreach, libraries can incorporate additional digital tools, such as email newsletters for direct communication, chatbots for instant reference and FAQs, and even virtual reality experiences for immersive tours or educational simulations, to enhance user engagement and complement social media activity. These channels can be utilized by academic and public libraries to market services, support online learning, gather feedback, and refine services in accordance with the expressed requirements and preferences of users.

Libraries can generate personalized recommendations using data on reading habits, collaborate with other institutions through online communities, and conduct surveys or polling to inform collection development and programming decisions, all of which are further supported by social networking functionalities. Collectively, these practices demonstrate that social media is not merely a promotional accessory, but a fundamental strategic instrument that enables libraries to maintain relevance, expand their reach, and offer user-centric, adaptable services in the digital era.

Frequent Services that are market using social media tools are:

- Current awareness services
- Library workshop and training
- New arrivals of books
- Selective Dissemination of information
- Library working hours
- Research tools and databases
- Library events like exhibitions.

Digital marketing strategies for library

Some of the strategies for digital marketing in libraries

- **Consistent Content Posting:** Users are kept informed and engaged by providing regular updates on new books, databases, services, and impending events.
- **Audience Segmentation:** Customizing posts to meet the needs of various user groups, including students, researchers, faculty, and community members.

- **Utilization of Visual and Multimedia Content:** Infographics, reels, virtual excursions, tutorials, and short videos are employed to enhance engagement and attention.
- **Analytics and Performance Monitoring:** Refining promotional strategies by utilizing platform insights and metrics (likes, shares, remarks, and reach).
- **Website and OPAC Integration:** Directly linking social media posts to the library website, catalogue, and e-resource portals to facilitate seamless access.
- **Email and Notification Campaigns:** The dissemination of newsletters, alerts, and reminders regarding services, renewals, and events.
- **Collaborations and Partnerships:** Establishing partnerships with academic departments, authors, influencers, or community organizations to expand one's audience.
- **User-Generated Content Promotion:** Fostering trust and authenticity by promoting user photos, testimonials, and reviews.
- **Interactive Engagement Methods:** Feedback forms, live streaming, polls, and Q&A sessions to enhance two-way communication.
- **Content Scheduling and Planning:** The process of creating a social media calendar to guarantee that promotional activities are balanced and expeditious.

12.4 ENGAGING WITH USERS ON SOCIAL MEDIA PLATFORMS

Interactive use of Facebook, X (Twitter), Instagram, YouTube, and similar tools can increase awareness of library services, strengthen users' emotional attachment, and result in increased levels of both virtual and physical library use.

The following are the primary methods by which libraries engage users on social media:

- Disseminating information regarding collections, services, and events with explicit calls to action (register, visit, comment, share).
- Organizing online events, including book clubs, author lectures, webinars, reading challenges, quizzes, and contests.
- Posting rich media, including photographs, short videos, reels, and live streams, to emphasize programs, spaces, and success stories.
- Utilizing chatbots, direct messages, replies, and remarks to promptly address inquiries and offer reference assistance.
- Co-creating content and fostering a community by soliciting user contributions (such as reviews, photographs, suggestions, and testimonials).

12.5 SOCIAL MEDIA POLICIES AND GUIDELINES FOR LIBRARIES

Policies for social media are important instruments for governance that help library systems set up, run, and control their presence on digital platforms. These kinds of policies set the limits and goals for using social media, make sure everyone knows what their role is, and make sure that staff members are polite and professional when they talk to customers online. A well-organized policy helps libraries be open and honest, safeguard

users' privacy, and deal with comments and behavior problems on social networks in the right way.

A library's social media policy usually includes

- **the library's goals for using social media**
- **a list of official social media accounts**
- **a list of staff members who are allowed to post**
- **a list of the types and frequency of posts that are expected, and**
- **rules for how employees should take part in official communications.**

Policies also set norms for how employees should act, how to deal with rude or improper comments, and how to use patron photos or personal information to protect privacy and get permission.

Apart from that, libraries need to make it clear when staff members are posting on behalf of the library and when they are using their own social media accounts. This division keeps the company and its workers from getting into legal and moral trouble, especially when it comes to free speech and workers' rights. Policies should not have too many rules that could stop employees from talking about working circumstances, but they should nonetheless stop bad or unprofessional behaviour. In general, detailed social media rules help library and information centres be accountable, follow the law, and use digital tools in a responsible way.

CHECK YOUR PROGRESS

Q 1: What are two important parts of library working that social media use deals with?
Q 2: Name two social media sites that were mentioned for promoting libraries.
Q 3: What kinds of help can chatbots give libraries?
Q 4: What are the benefits of having social media rules for libraries?

12.6 LET US SUM UP

Libraries now use social media as a key part of their strategy to help with both communication and service delivery. It lets libraries use platforms like Facebook, X (Twitter), Instagram, LinkedIn, YouTube, email, chatbots, and virtual reality to broadcast timely news, promote collections and events, and offer services like online reference, literacy promotion, and virtual programs. Libraries may reach different types of users, facilitate online learning, get feedback, and provide personalized suggestions by customizing content for each media. Online clubs, webinars, challenges, surveys, and user-generated content are all examples of interactive strategies that can make people more interested in the library and get them to utilize it more, both online and in person. At the same time, well-thought-out social media policies set goals, official accounts, staff duties, behavior standards, moderation rules, and privacy protections. This makes sure

that digital outreach stays professional, ethical, open, and legal, while also keeping users and staff safe.

12.7 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1: The part about communicating and the part about delivering services.

Answer to Q 2: Instagram and Facebook.

Answer to Q 3: They address common inquiries and offer rapid reference services.

Answer to Q 4: They set the rules for online behavior, make sure everyone knows their position, and make sure that online interactions are professional and moral.

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12.9 MODEL QUESTIONS

Q 1: How do libraries use different platforms to connect with different types of people?

Q 2: What other digital technologies, including social media, can libraries employ to get people more involved?
Q 3: What types of events may libraries plan and promote on social media?
Q 4: What are the main elements typically included in a library's social media policy?
Q 5: Discuss how using social media in an engaging way may make libraries more useful and help people get to know each other better.
Q 6: Discuss what social media policies do and what their most important parts are in making sure that libraries use social media in a responsible and legal way.

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UNIT 13: INFORMATION LITERACY AND ICT

UNIT STRUCTURE

13.1 Learning Objectives
13.2 Introduction
13.3 Introduction of ICT in Information Literacy Programme
13.4 Teaching Digital Skills and Critical Evaluation of Online Information
13.5 Assessing Information Literacy Programme
13.6 Assessing Information Literacy Competencies
13.7 Let Us Sum Up
13.8 Further Readings
13.9 Answers To Check Your Progress
13.10 Model Questions

13.1 LEARNING OBJECTIVES

After going through this unit, we will be able to,

- understand the concept, scope, and importance of ICT and Information Literacy and their interrelationship in the digital environment.
- apply digital skills, critical evaluation techniques, and assessment methods for effective information use and lifelong learning.

13.2 INTRODUCTION

In today's information society, the fast rise of digital technologies and online information has changed how knowledge is created, found, and shared. Libraries and schools are no longer just places where you may read books; they are instead dynamic information centers that combine technology with learning. Information Literacy (IL) is now an important skill that helps people figure out what information they need, find reliable sources, judge the reliability of information, and utilize it in a moral and responsible way. Information and Communication Technology (ICT) has also become a powerful tool that makes information services and instructional programs easier to find, use, and work with.

The merging of ICT with Information Literacy has opened up new ways to teach, learn, and do research. Digital platforms, online databases, multimedia technologies, and virtual learning environments give students quick access to knowledge from all over the world. But having so much knowledge also requires you to think critically, know how to use technology, and be cognizant of ethics. As facilitators and teachers, librarians and information specialists are very important in helping people to use digital spaces well. So, to help people become knowledgeable, independent, and lifelong learners in the knowledge economy, it's important to know how to integrate ICT, improve digital skills, use evaluation procedures, and use assessment strategies.

13.3 INTRODUCTION OF ICT IN INFORMATION LITERACY PROGRAMMES

Information and Communication Technology (ICT) plays a transformative role in the design and delivery of Information Literacy (IL) programmes in libraries and educational institutions. ICT refers to a broad range of digital tools and technologies such as computers, the internet, mobile devices, software applications, communication networks, and multimedia platforms that enable the creation, storage, retrieval, and dissemination of information. Information Literacy, meanwhile, is the set of abilities that empowers individuals to recognize their information needs and to locate, evaluate, organize, and use information effectively, efficiently, and ethically. The convergence of ICT and IL has become essential in the digital knowledge society, where information is abundant and rapidly evolving.

The concept of Information Literacy is grounded in global definitions provided by organizations such as UNESCO, ALA, and CILIP, which emphasize critical thinking, ethical use of information, and lifelong learning. Core components of IL include identifying information needs, accessing appropriate sources, evaluating credibility, and using information responsibly. ICT strengthens these competencies by providing digital platforms and tools that expand the reach and effectiveness of literacy instruction. In libraries, ICT infrastructure includes hardware (computers, servers, scanners), software (library management systems, databases), and network technologies that facilitate digital services and remote access.

Need of ICT for Information Literacy Programs

- Digital Information Explosion: There is so much information online that you need to know how to look for the proper information and judge its quality.
- Support for E-Learning & Distance Education: ICT enables access to IL training beyond physical library spaces.
- User Empowerment: Helps people find knowledge on their own and with confidence.
- Lifelong Learning: Encourages people to keep learning new things in school and at work
- Bridging the Digital Divide: Makes sure everyone has the same access to digital opportunities and information.
- Better Access Speed: Getting accurate and up-to-date information quickly.
- Global Connectivity: Links students to information resources and communities all across the world.
- Skill Development: Improves your digital, research, and critical thinking skills.

Methods of delivering ICT-based IL programmes include

- **Online tutorials:** one can access step-by-step guidance and recorded classes at any time.

- **Webinars & Virtual Workshops:** Live interactive training sessions using video conferencing tools.
- **Virtual Library Tours:** Digital programs that show one the library's resources and services.
- **Learning Management Systems:** (LMS) are structured courses that include exams, assignments, and discussion forums.
- **MOOCs**: Massive Open Online classes, are big open classes that anybody can take.
- **Multimedia Content:** Presentations, videos, podcasts, and infographics are all examples.
- **Blended learning Approach:** Using different platforms and medium to deliver the content.
- **Social Media Platforms**: Digital communities where you can share tips, tutorials, and news.

In this evolving environment, librarians and information professionals play a crucial role as educators, facilitators, digital curators, and technology mediators. They design learner-oriented modules, guide users in ethical information practices, and continuously update their own technological competencies. Best practices can be observed in academic library orientations, public library digital literacy campaigns, and institutional e-learning initiatives. Looking ahead, future trends such as artificial intelligence, chatbots, gamification, and personalized learning systems are expected to further reshape IL programmes. Overall, ICT significantly enhances the scope, accessibility, and effectiveness of Information Literacy, making it an indispensable pillar of modern library and information services.

13.4 TEACHING DIGITAL SKILLS AND CRITICAL EVALUATION OF ONLINE INFORMATION

Teaching digital skills and how to critically evaluate online content is now an important part of content Literacy programs in schools and libraries. In today's digital world, students have access to a lot of internet information that is not always reliable, useful, or of good quality. So, people need to know not only how to utilize digital tools but also how to assess if information is real, useful, and used in a moral way. Teaching people how to use technology helps them become confident, responsible, and independent learners in school, work, and social situations.

Digital skills are the mental and physical talents needed to use digital technologies well. In addition to basic computer abilities, these skills include how to act safely and responsibly online. Some of the most important digital abilities are:

- How to use a computer and a mobile device
- Looking things up on the internet and using advanced search strategies
- Using productivity applications including word processors, spreadsheets, and presentation software

- Email, tools for online communication, and cooperation
- Being aware of digital footprints, privacy, and cybersecurity
- How to use e-learning platforms and digital libraries

In addition to digital abilities, it's also crucial to be able to critically evaluate material found online. There are research articles, news sites, blogs, ads, and social media posts on the internet. Because of this, students need to be able to tell the difference between legitimate sources and content that is misleading or prejudiced. Evaluation skills let people think logically about knowledge before they accept or share it. Some of the most important factors for appraisal are:

- Authority: the author's or organization's trustworthiness
- Accuracy: It means having proof and being factually correct.
- Currency: how up-to-date the information is
- Purpose/Bias: what the content is meant to do
- Relevance: how well it meets the requirement for knowledge
- Reliability: means that you can trust the platform or publisher.

Role of Library and Information Centers (LICs)

- **Providing space, tools and services:** Library and Information Centers give the tools, space, and services needed to teach digital literacy well.
- **Access Providers:** Provide computers, Wi-Fi, digital databases, and multimedia tools.
- **Learning Spaces:** Set up digital labs, smart classrooms, and group work locations where students can practice.
- **Resource Hubs:** Keep up with institutional repositories, digital libraries, and hand-picked web resources.
- **Organizers of the program:** Hold orientation meetings, webinars, information literacy weeks, and training programs.
- **Support Systems:** Offer reference services, online help desks, and help for those doing research online.
- **Bridging the Digital Divide:** Make sure that kids from all kinds of socio-economic backgrounds have equal access.
- **Innovation Centers:** Use new technologies like AI search engines, virtual tours, and interactive tutorials.

13.5 ASSESSING INFORMATION LITERACY PROGRAMME

An Information Literacy (IL) program's assessment is an important part of quality control that helps librarians and teachers figure out how well the program accomplishes its goals and learning outcomes. It shows how successfully teaching helps students, fits with the goals of the school, and helps them do well in school. Programme assessment also helps make the case for IL instruction as a useful part of curriculum support, point out areas

where improvement is needed, and find strengths and weaknesses for future planning. There are two types of assessments: formative (ongoing during the program to enhance delivery) and summative (after the program is over to see how well it worked). Using more than one assessment instrument gives you a better overall picture of how well a program is working instead of just one.

What the Program Assessment is for:

- Check to see if the IL program fits with the goals of the institution.
- Check how well the design and delivery of instruction work overall.
- Find places where the content, resources, and teaching methods could be better.

- Show stakeholders (faculty, administration) how the program has worked.

Methods & Tools

- Surveys and questionnaires are ways to get feedback and opinions from learners.
- Tests before and after instruction measure how much students' knowledge and abilities have changed.
- Rubrics at the Program Level, make sure that all groups are evaluated the same way.
- Instructor Observations give qualitative information.
- Check the relevancy, currency, and alignment of the materials and activities.

Models and Frameworks

- The ACRL Framework helps plan learning outcomes and make sure they match up with tests.
- CIPP Evaluation Model (Context/Input/Process/Product) is an organized way to evaluate everything from planning to outcomes.

Benefits

- Supports decisions based on facts.
- Improves the quality and relevance of IL instruction.
- Makes the case for including IL in curricula stronger.
- Makes students happier and helps them do better.

13.6 ASSESSING INFORMATION LITERACY COMPETENCIES

To find out how good someone is at Information Literacy (IL) Competencies, you need to see how much they know, how skilled they are, and how they feel about finding information needs, finding the right sources, checking credibility, organizing information, and using it in a legal and moral way. Anunobi and Udem assert that information literacy proficiency encompasses more than basic information skills; it represents a comprehensive amalgamation of cognitive comprehension, practical capabilities, and a constructive attitude towards information utilization. Consequently, evaluation should encompass not

only technical search competencies but also critical thinking, ethical awareness, and problem-solving behaviors.

The evaluation of IL abilities is intricately associated with existing theoretical frameworks, like the SCONUL Seven Pillars, the Big Six Model, and Doyle's Attributes of an Information Literate Person, which together delineate the requisite demonstrations of an information-literate individual. These models assist evaluators in pinpointing quantifiable behaviors and performance metrics.

Information Literacy (IL) Models offer structured frameworks that assist learners in recognizing information requirements, conducting searches, assessing, organizing, and utilizing information responsibly. These approaches assist libraries and educational institutions in crafting instructional programs that cultivate problem-solving, critical thinking, and lifelong learning skills.

There are a few key popular Information Literacy models. Each one looks at a different part of how people behave with information, how they search for it, and how they build knowledge.

Kuhlthau's Search Process Model

This model shows the emotional and cognitive stages that a learner goes through when they are looking for information.

Six Stages:

- Initiation: Realizing the necessity and uncertainty
- Selection: Picking a subject and a method
- Exploration: Looking into information, generally with a lot of uncertainty
- Formulation: getting clear on your goals and building confidence
- Collection: Getting the right information
- Closure: Finishing the search and showing what you found

This concept stresses that looking for information is both mental and emotional.

The 8Ws Model (Annette Lamb)

A project-based exploratory methodology that promotes self-directed learning stages are:

- Watching,
- Wondering,
- Webbing,
- Wiggling,
- Weaving,
- Wrapping,
- Waving, and
- Wishing.

It is all about observing, asking questions, arranging, presenting, and evaluating oneself.

Jamie McKenzie's Model

This Points out three main parts:

- Prospecting: Looking for knowledge and ideas
- Interpreting: figuring out what knowledge means and how to use it
- Creating New Ideas: Coming up with new ideas and building knowledge

This model includes research cycles, which are the steps of inquiring, planning, gathering, sorting, synthesizing, assessing, and reporting.

Seven Faces of Information Literacy (Christine Bruce)

This describes IL as seven experienced perspectives instead of steps that go in order:

- Experience with IT
- Sources of Information Experience
- Experience with processing information
- Experience with information control
- Experience with building knowledge
- Experience with extending knowledge
- Experience of Wisdom

This paradigm puts a lot of emphasis on awareness, analysis, intuition, and moral values.

Sandra Hughes's Steps to Success in Research

It is a model focused on practical research that includes:

- Getting ready for research
- Looking at resources
- Getting information ready
- Moving Learning

The SAUCE Model

An abbreviation for "Setting, Acquiring, Using, Communicating, and Evaluating" information.

It stresses the importance of regularly reviewing results and clearly communicating them.

PLUSModel (James Herring)

PLUSConcentrates on four main points:

- Purpose: Set the need and keywords
- Location: Find and get to sources
- Use: Look at, write down, and share knowledge
- Self-Evaluation: Think about what you did and how to do it better.

The Big6 Skills Model (Eisenberg & Berkowitz)

This is a problem-solving model with six steps:

- Defining the Task
- Ways to look for information
- Where it is and how to get there
- How to Use Information
- Putting things together
- Review

Key Areas to Evaluate

- **Dimension of Knowledge**
  - Knowing when and why you need knowledge
  - Knowledge of sources and information structures
  - Understanding of moral and legal issues (such plagiarism and copyright)

- **Skill Level**
  - Ability to identify faults with information
  - Making a good search approach
  - Careful examination of sources
  - Organizing, synthesizing, and presenting information
- **The Attitude Dimension**
  - Being willing to look for correct information
  - Being responsible for using information ethically
  - A good attitude toward studying for life.

Indicators for Assessment

- Finding missing information
- Making plans and carrying out search strategies
- Checking the authority and relevancy of sources
- Professionally handling and presenting information
- Using information to make choices and solve problems

Therefore, evaluating IL abilities necessitates a thorough, behavior-oriented, and introspective methodology, guaranteeing that learners are proficient searchers as well as discerning, ethical, and informed information consumers.

CHECK YOUR PROGRESS

Q 1: Define Information Literacy.
Q 2: Full form of ICT

Q 3: Name the criterion for evaluating online information

13.7 LET US SUM UP

Information literacy and ICT work together to help people find, judge, and use information well in a digital environment that is changing quickly. Teaching digital skills, encouraging critical thinking about online sources, and evaluating both programs and skills are all ways to make sure that students learn well. Libraries and information centers are important support systems because they give people access to knowledge, training, and new ideas. Overall, ICT-enabled Information Literacy encourages people to study on their own, utilize information ethically, and keep learning throughout their lives in school and at work.

13.8 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1: Information literacy is the ability to find, judge, and use information in a way that is both useful and ethical.

Answer to Q 2: Information and Communication Technology

i. Authority: the author's or organization's trustworthiness
ii. Accuracy: It means having proof and being factually correct.
iii. Currency: how up-to-date the information is
iv. Purpose/Bias: what the content is meant to do
v. Relevance: how well it meets the requirement for knowledge
vi. Reliability means that you can trust the platform or publisher.

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13.10 MODEL QUESTIONS

Q 1: Discuss why ICT is important for Information Literacy programs.
Q 2: Write a letter on the digital abilities you need to use information well.
Q 3: What are the main ways to teach ICT-based IL programs?
Q 4: Discuss about how Library and Information Centers help people learn how to use technology.
Q 5: Explain the techniques and procedures used to evaluate Information Literacy programs and skills.

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UNIT 14: EMERGING TRENDS IN INFORMATION SERVICES

UNIT STRUCTURE

14.1 Learning Objectives
14.2 Introduction
14.3 Artificial Intelligence
14.4 Chatbots and virtual reference
14.5 Data Curation
14.6 Data Science
14.7 Data repositories
14.8 User experience (UX) design and Personalized services
14.9 Let Us Sum Up
14.10 Further Readings
14.11 Answers To Check Your Progress
14.12 Model Questions

14.1 LEARNING OBJECTIVES

After going through this unit, we will be able to,

- Learn about some emerging technologies used in libraries for its activities
- Learn about the concept of data curation, data science, role of data repositories in libraries
- Know about UX in libraries applications

14.2 INTRODUCTION

Libraries' information services have always changed with new technology, but right now, digital tools are changing very quickly. Data-intensive research is becoming more common these days. Users are looking for a personal touch online. Libraries are changing from being mostly a place to keep and lend books to becoming active players in finding new information, managing data, and learning online, thanks to new skills and tools. New trends including AI, conversational interfaces, data curation, data science services, research data repositories, and user experience design are changing how information services are planned and provided.

These changes don't replace the essential ideals of libraries, such fair access, privacy, intellectual freedom, and serving communities, but they do modify how these values are put into reality. For instance, recommendation algorithms can help people rapidly identify relevant information, but librarians also need to check for bias and explainability. Data repositories can also make research outputs more accessible, but they need to be built with long-term preservation and ethical use in mind. This course talks about some of the most important new trends in information services and how they may affect library work.

14.3 ARTIFICIAL INTELLIGENCE

Artificial intelligence is a branch of computer science that tries to make systems that can do things that usually need human intellect, such learning from data, interpreting language, identifying patterns, planning, or making choices. AI is not just one tool in libraries; it's a group of methods that may be used in discovery systems, back-end operations, and user-centric services. These methods include machine learning, natural language processing, recommendation systems, and knowledge graphs. These technologies are becoming more common in commercial library systems and in experimental projects in academic and research libraries all around the world.

AI can be seen in search and discovery, for example. Many modern discovery layers and digital library systems use machine learning-based ranking algorithms that learn from click data and other usage patterns to make search results better for diverse queries and groups of users. Natural language processing techniques can enable functionalities like automatic subject extraction, entity recognition, query expansion, and spell correction, facilitating users in articulating their information requirements more naturally and obtaining more pertinent results. Some systems build knowledge graphs that link authors, subjects, institutions, and publications. This lets you search and see how things are related in big collections.

AI is also being used to improve how libraries work. Automated or semi-automated metadata production is one example. In this case, algorithms pull titles, authors, keywords, and references from digital documents and offer subject headings or classification codes to cataloguers. Image recognition software can help you find and tag pictures in digitized collections, including maps, photographs, or historical documents. This makes them easier to find and use again. Predictive models can assist librarians plan acquisitions and preservation by finding resources that are anticipated to be in high demand, possible duplicate purchases, or those that may be at danger of loss.

Using AI in libraries also brings up crucial issues like privacy, fairness, accountability, and openness. When algorithms are trained on past usage or publishing data, they may show bias by favoring well-known authors, languages, or organizations and not giving enough attention to others. Libraries need to make rules and learn how to check AI systems, figure out how recommendations are made, and make sure that the data used for training is obtained and preserved in a way that follows privacy and ethical rules. A lot of writers say that AI should be seen of as a way to improve human knowledge in libraries, not as a way to replace professional judgment and service that is focused on the needs of the user.

14.4 CHATBOTS AND VIRTUAL REFERENCE

Chatbots and virtual reference systems are good examples of how AI and natural language processing can be used in front-line information services. A chatbot is a piece of software that can talk to people through text or speech. Most of the time, this happens through a

chat window on a website, a messaging app, or a voice assistant. Chatbots at libraries are meant to answer common inquiries, help users find services and resources, and even do simple chores like verifying opening hours, dealing with password issues, or proposing databases for specific subjects.

Chatbots that can answer questions at any time of day are now being added to virtual reference services, which started with email and real-time chat between users and librarians. For instance, a chatbot may help a user figure out how to search the catalog, put a hold on an item, or get to e-journals from off-campus by employing scripted conversations and pattern matching. More advanced systems utilize machine learning to sort user inquiries and find the right answers in a knowledge base. They can also forward more difficult questions to human librarians.

Chatbots are useful because they are always available, they answer common inquiries quickly, and they take some of the stress off of reference staff who have to deal with the same queries over and again. They can also gather information on common questions and problems users have, which helps librarians make guides, FAQs, and other instructional materials better. Chatbots do have some problems, though. They might not grasp what users want, give incomplete replies, or break down when users ask questions they weren't expecting. They also need to be carefully designed, trained on a regular basis, and clearly told what they can and can't do. A lot of writers say that virtual reference services should have both automated and human parts that work together in a clear way. This way, consumers can choose to talk to a person, and the system can switch over effortlessly when needed.

14.5 DATA CURATION

Data curation is a new field where libraries are playing a big role, especially in institutes that do a lot of research. It can be characterized as the active and continuing management of data across its life cycle, from generation and processing to storage, sharing, reuse and preservation, to ensure long term value and accessibility. Data curators help academics and other data producers organize, characterize, document, and store data in ways that make it easy for others to understand and use, even if they weren't part of the original effort.

In many fields, research funders and journals increasingly require that data that goes into publications be made available in open or restricted access repositories, together with the right documentation and metadata. Libraries are well-suited to help with this since they have experience creating metadata standards, running repositories, and teaching people how to organize material. Data curation services might help researchers write data management plans, choose the right file formats and naming conventions, define metadata schemas, choose the right repositories, anonymize sensitive data, and give datasets permanent identifiers like Digital Object Identifiers.

Data curation also includes making sure the data is of good quality and planning for its long-term storage. Curators might look at datasets to make sure they are comprehensive and consistent, make sure that codebooks and documentation are good enough, and make plans for storage and backup that will allow long-term preservation and future migration. Libraries that curate data frequently work closely with research offices, IT departments, and disciplinary data centers. These groups of people with different skills and knowledge work together to manage information. This effort promotes reproducible research, open science, and the extensive reutilization of data for novel inquiries and analyses.

14.6 DATA SCIENCE

Data science is a field that uses statistical analysis, computation, domain knowledge, and communication skills to get information and insights from big, complicated datasets. Libraries are getting involved with data science in two primary ways: by helping researchers in other fields who need a lot of data, and by using data science techniques on their own data to make services and operations better. This shows that libraries are starting to perceive data as more than just something to store; they are starting to see it as a source of evidence and new ideas.

Some academic libraries have set up data services or digital scholarship units to help researchers who need a lot of data. These units offer training, advice, and tools for analyzing and visualizing data. Researchers and students may be able to study programming languages like R or Python, use tools for machine learning and statistical analysis, and make dashboards and visualizations to share their results with these units. Librarians that provide these kinds of services frequently work alongside departments like computer science, statistics, or research computers. Their main job is to assist customers find, access, and manage data, as well as utilize it ethically.

One can utilize data science methods on usage logs, circulation records, search queries, link resolver data, and other operational datasets in the library itself to learn more about how users behave and how well resources work. For instance, clustering and segmentation methods can find groups of consumers who use things in the same way, and prediction models can help you guess how many people will want certain resources or services. Charts and dashboards that show data help managers keep an eye on important indicators, spot trends, and talk to stakeholders about the value and effect of library services.

Libraries using data science also bring up ethical questions about privacy and permission. This is because many operational databases have information about individual users and what they do. Libraries need to find a balance between the benefits of analytics and their duty to preserve users' privacy and keep data from being used in ways that are intrusive or unfair. To make sure that data science helps, not hurts, the trust that users have in libraries, there need to be clear rules, ways to keep data private, and ways to teach users.

14.7 DATA REPOSITORIES

Data repositories are specialized systems that store, organize, and facilitate access to digital datasets, typically emphasizing research data. They may be institutional, disciplinary, national, or thematic, serving as a crucial infrastructure component in open science and data-intensive research ecosystems. Libraries sometimes oversee or administer institutional data repositories, occasionally in conjunction with institutional publication repositories, while also providing guidance to scholars on appropriate external repositories within their discipline.

An effectively designed data repository offers functionalities for data submission, description, access regulation, discovery, and archiving. Depositors may upload datasets, provide metadata in accordance with established standards, associate datasets with pertinent papers, and designate licenses that stipulate reuse constraints. Users may search and navigate the repository, refine results by subject, technique, or funder, and download datasets or request access when limitations are in place. Persistent identifiers, like Digital Object Identifiers and handles, serve to furnish stable citations and facilitate the tracking of reuse and impact.

Libraries engaged in data repositories must confront technical, organizational, and policy issues. Technically, they require storage systems capable of managing extensive and diverse data kinds, including tabular data, pictures, software code, and multimedia, along with capabilities for integrity verification, version control, and format migration. They must establish protocols for submission review, metadata quality control, and user assistance, frequently using subject specialists to assess datasets and documentation. Policies must delineate the accepted data types, the duration of preservation, the access levels provided (such as open, limited, or embargoed), and the management of sensitive or personal data.

Data repositories enhance library services by increasing the visibility and reusability of research products, while also illustrating the libraries' involvement in the research lifecycle. They facilitate collaboration with external partners, including national data centers, publishers, and research infrastructures, while establishing libraries as reliable custodians of both data and publications.

14.8 USER EXPERIENCE (UX) DESIGN AND PERSONALIZED SERVICES

User experience design is a human-centered methodology for crafting systems and services that prioritizes users' demands, behaviors, emotions, and situations, aiming to render interactions meaningful, useable, and gratifying. Libraries employ UX methodologies, including interviews, observations, usability testing, journey mapping, and analytics, to comprehend user navigation within physical and digital environments, information-seeking behaviors, and perceptions of library services. This research provides insights that enhance the design and refinement of websites, discovery systems, educational materials, environments, and service procedures.

UX work underscores that libraries must not presume to understand user desires or behaviors; rather, they should collect evidence and iteratively test designs. Usability testing of a discovery interface may uncover that users overlook significant filters or misinterpret complicated search options, prompting designers to streamline layouts, modify labels, or alter default settings. Ethnographic approaches in physical environments may reveal how students utilize informal seating, power outlets, or signage, informing decisions regarding furniture, zoning, and services like group study rooms. This continual focus on user experience enables libraries to adapt in a dynamic context.

Personalized services are intricately linked to UX design, since they seek to customize information services according to individual user choices, histories, and situations. In digital contexts, personalization may encompass saved searches, notifications for new publications on chosen subjects, suggestions based on reading history, tailored dashboards, and adaptive learning resources. Certain library systems enable users to establish profiles that retain favored resources, preferred citation styles, or accessibility requirements, subsequently modifying interfaces and content accordingly.

Personalization can enhance the efficiency and engagement of services for users; however, it must be implemented in a manner that upholds privacy and grants consumers control over the utilization of their data. Libraries have a legacy of safeguarding reader confidentiality and may elect to restrict specific monitoring methods or offer customization as an optional feature rather than a standard setting. UX design in libraries encompasses usability, aesthetics, and ethical issues, including transparency regarding data gathering, explicit consent methods, and choices for anonymity when suitable.

CHECK YOUR PROGRESS

Q 1: What essential actions are encompassed in data curation services offered by libraries to facilitate research data management?

Q 2: What are the primary applications of AI-based technologies in enhancing search, discovery, and internal operations within libraries?

Q 3: What is the significance of institutional and discipline data repositories in facilitating open science and ensuring long-term access to research data?

14.7 LET US SUM UP

This topic has examined various developing trends that are transforming information services in libraries. Artificial intelligence is employed to improve search, recommendations, metadata generation, and internal processes, while prompting concerns over equity, transparency, and privacy. Chatbots and virtual reference systems provide 24/7 assistance to users, addressing routine inquiries and navigating digital services, supplemented by human experience.

The unit has emphasized the increasing significance of libraries in data-intensive scholarship via data curation, data science assistance, and the establishment of data repositories, all of which enhance open and reproducible research. Ultimately, it has

demonstrated how user experience design and tailored services enable libraries to comprehend and address customer demands more efficiently, while maintaining fundamental principles such as privacy and equitable access. Collectively, these trends demonstrate a transition towards more proactive, data-driven, and technologically advanced information services that establish libraries as vital collaborators in the digital knowledge ecosystem.

14.8 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q 1: AI-based tools in libraries enhance search and discovery via learning-based ranking, natural language processing for query assistance, and knowledge graphs, while also facilitating internal processes such as automated metadata extraction, image recognition in digitized collections, and predictive models for collection management.

Answer to Q 2: Data curation services encompass assisting researchers in formulating data management plans, providing guidance on file formats and nomenclature, devising and implementing metadata schemas, ensuring thorough documentation and quality assurance, selecting suitable repositories, anonymizing sensitive information, and strategizing for long-term storage and preservation.

Answer to Q 3: Institutional and disciplinary data repositories facilitate open science by offering structured, citable, and preserved access to datasets associated with publications, thereby enabling verification and reuse of research while ensuring the long-term availability of data through appropriate metadata, access controls, and preservation strategies.

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14.10 MODEL QUESTIONS

Q 1: Provide two examples of AI uses in library discovery systems and the advantages these applications offer to users.

Q 2: Discuss in what ways do chatbots and virtual reference services enhance each other in providing reference assistance in libraries?

Q 3: What are the primary reasons libraries are engaging in data curation and repository services?

Q 4: Examine the function of artificial intelligence in contemporary library information services, encompassing its primary uses, advantages, and ethical dilemmas, while elucidating the significance of human oversight.

Q 5: Explain the notions of data curation, data science assistance, and data repositories inside libraries, detailing their contributions to open science and the requisite skills and collaborations necessary for their sustainability.

Q 6: Discuss the ideas and methodologies of user experience design inside libraries, and evaluate how user experience and tailored services might enhance information services while preserving user privacy and trust.

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