Module-3 Library and Information Services

Unit-1: Traditional Library and Information Services

After studying this unit, students will be able to:

- *Understand the need and role of information services*
- *Learn about the nature and functions of information services*
- *Study about various types of information services*
- *Understand responsive and anticipatory information services*
- *Learn about value added information services*

Contents

3.1.1 Introduction

An important need for human development is to seek information, and today libraries have become more than the information centres. Libraries may also be considered as service centres. Libraries have evolved from being a closed store house of documents (data–centric) to being an open destination where users are catered with information according to their needs (user-centric). Over the years, the task of the librarian has transformed from being a caretaker of information to being an information professional, who manages a system of information in multiple formats. This information is disseminated through specifically designed services as per the users' demands.

One of the prime objectives of any library is to satisfy the needs of its users and library and information services are designed to achieve this. The obligation of a library to its users is to provide information services to support their educational and recreational needs. This demands well-planned information services and proper implementation. There are basically three categories of information sources, primary, secondary, and tertiary. The method of dissemination of information is also variable. The basic methods are of two types, one is to provide information to the user in response to an expressed demand (on demand or responsive services) and the other one is to anticipate user's needs and provide them the right information (anticipatory services). The main focus of this unit would be to focus on basic categories of information their, services, needs, functions and role of information service.

3.1.2 Information Services: Need and Role

Libraries fulfil the needs of the user communities by acquiring a wide variety of information sources of diverse nature and formats, storing and preserving these sources at a suitable location, and adding value to them by organizing for easy access. The next step is to connect the users with the resources by providing direct assistance to them. Libraries provide users with information resources and in some cases leads or refers them to other information sources. The difference between a source and a resource is that a source is a raw material whereas a resource is a processed product. Sources become resources when they become relevant for the user. It should be verified and the content should be enriched with proper storage and easy retrieval. The development of a system or mechanism to acquire required sources, providing uninterrupted access to users, managing it in an organized way and customizing the resources and providing information services as per the needs of the users are the basic functions carried out successfully by any well-managed library or information centre. Information services in a library are also focused on marketing its products to the potential user or the one who demands. Making the information products marketable is a challenge before any modern library. The trends in the information required by the users of different educational, economic, and social backgrounds are to be conducted in order to decide the nature and scope of information services a library or information centre intends to provide.

3.1.2.1 Reference and Information Services

To meet informational needs of the users, libraries provide a range of services referred to as Reference and Information Services. Reference service are concerned with direct personal assistance to the users seeking information. They cover services such as assistance to the users in the use of the library and its tools, assistance in searching and locating documents, ready reference, and long range reference service, literature search and compilation of bibliography.

On the other hand, information services are provided in anticipation of various needs of the users of libraries. The current awareness services, indexing, and abstracting service are included in this category. These services are provided to users when they ask for it. The factors which affect the nature of services depend on the information-seeking behaviour, the information needs, and the service expectations of the targeted community. There are a number of ways by which a library can provide information services including direct personal assistance or reference service and referral services where the user is directed to the source, reader's advisory services, document delivery services and many other services designed in anticipation of user needs such as current awareness services, Selective Dissemination of Information (SDI), etc. There are value added information services like information repackaging (particularly in the field of business and science), subject analysis and information analysis, citation analysis, abstracting, translation, etc.

3.1.3 Users' Approach to Information

The nature and functions of an information service depends on the information and requirements of the end user. A user needs information for accomplishing certain objectives. We may classify a user's approach to information as below:

i. **Everyday Approach:** This approach satisfies the daily information needs of the users. For example, Data on the property of a substance like colour of a substance.

ii. **Comprehensive or Exhaustive Approach:** The purpose may be to identify a research area or to formulate a research proposal of a given subject by the users. This approach facilitates a detailed study on the field of interest.

iii. **Current Approach:** This is the most essential approach to information for professionals and researchers. The user tries to keep abreast of what is being published from time to time in his/her area of specialization and in areas closely related to it. The knowledge about the latest advancements in the field of interest to keeps a professional up-to-date and also helps a researcher in avoiding duplication in research.

A library may device information services that are adequate to provide right information within the shortest time limit, keeping in mind the above approaches of information.

3.1.4 Types of Information Services

The variety and number of information services and products provided by modern libraries and information centres are quite large in the present era of information and knowledge explosion. The surge in knowledge creation and consumption happens in basic and interdisciplinary fields of technology, development, industry, marketing, trade and research and calls for an increase in personalized services.

Library and information services may be categorized as:

i. Responsive services or services on demand, and

ii. Anticipatory services

Responsive information services, also known as **passive information services**, are provided in response to the requests from the library users. **Anticipatory information services,** also known as **active information services** are provided in anticipation of the needs of the library users.

The following features and some of the important information services provided by libraries under these categories are discussed in the following sections

3.1.4.1 Responsive Information services

An information service provided in response to an expressed demand by the user is called a responsive or on demand information service. Here, the user requests an information professional to search and find out the specific information that he/she needs. A brief description of important responsive information services provided by a library is given below.

i. Reference Services

The concept of reference service was formulated in 1876 by Samuel Swett Green, librarian of Worcester Free Public Library in Massachusetts. In an article published in Library Journal, he advocated personal assistance and service by librarians to library readers. The purpose of reference service is to facilitate access to information. This is a highly personalized service, where the librarian interacts with the users in a one-to-one manner and provides access to the information. According to Dr. S. R. Ranganathan, "reference service is the establishing of contact between reader and book by personal service". The concept will get clearer when we understand the role of the library professional or the reference librarian, who delivers the reference service. Green's original paper suggested a reference librarian as the one who teaches people how to use the library resources, answers reader's questions, aids the reader in the selection of good books and promotes the library within the community.

Joan M. Reitz, in her "Dictionary of Library and Information Science" defined reference service as, "including but not limited to answering substantive questions, instructing users in the selection of appropriate tools and techniques for finding information, conducting searches on behalf of the patron, directing users to the location of library resources, assisting in the evaluation of information, referring patrons to resources outside the library when appropriate, keeping reference statistics, and participating in the development of the reference collection."

Reference services delivered by a library depend on the local situation, traditions,

kind of users, size, resources and the organizational and administrative philosophy followed by the library. The nature of service also varies from one type to another type of library. The reference services may be divided into three categories.

A. Basic services: There are several essential and minimum reference services that a library should perform. These include:

a) Provision of general information (e.g., queries like "where is periodical section?")

b) Provision of specific information (consulting the documents)

c) Assistance in the location and searching of documents (locating on the shelf and if not available, then searching in other places)

d) Assistance in the use of library catalogue

e) Assistance in the consultation of reference books, etc.

B. Services performed on regular basis: The reference services usually performed in a library are:

a) Readers' advisory service: This is the process of recommending sources to library users based on their needs/queries. The reference librarian chooses a source which may be a book, journal, database, or website based on his/her skills, expertise and the nature of user's query.

b) Inter-library loan and document delivery: Inter-library loan is the process of sharing materials between libraries. The libraries under a consortium or a mutual agreement may loan a physical item in original or a partial copy of it and deliver the same to the requesting library for a specific period of time based on certain established codes and copyright guidelines.

c) Reservation of documents: This service allows a user to reserve an item of the library that has been loaned out to another user. When the item is returned, the user who reserved the same is informed and allowed to borrow it.

d) User Education (instruction): User education deals with educating the user about the use of library facilities and services. In other words, this is a methodical approach to teach the users as to how to use the library effectively. There may be user education programmes on the general use of library and the use of library tools like catalogue, bibliographies, reference books, etc. Library orientation, which is given in the beginning (initiation of a freshman), is also a part of user education. But, user education is treated as a continuous service.

e) **Compilation of Bibliographies:** This service may be on demand or in anticipation. This service will significantly help students and researchers.

f) **Bibliographic verification and citations:** This is the process of reading, identifying, and interpreting citations to information sources, including books, manuscripts, journals, theses, web pages, or any other form of publication. During this process of verification, the reference librarian frequently finds other reference sources that cite the same publication, correct errors, and determines where to find the preferred information.

g) **Indexing and abstracting services:** This service is mostly performed by special libraries. The abstracts and indexes of acquired publications may be prepared locally at the library .The intended users can refer to these services to find the required information.

h) **Subject specialists:** Subject specialist reference librarians are now common in large and special libraries. They are specialists in specific subject fields or disciplines who select material for the collection as well as assist users with specialized research requirements. These service providers work closely with researchers and handle very complex questions.

i) **Ready reference:** This service is particularly important for public libraries, where factual answers to highly specific queries are provided. (e.g., "What is the population of New Delhi?").

j) **Library Tour:** This is a reference service given to a library visitor or a new member to understand the resources and services. The member is taken around the library under the guidance of a professional/instructor.

k) **Holding of library exhibitions:** Exhibitions and displays are important services to attract users' attention towards new additions or previously unknown resources.

l) **Issue of permits for library use:** This involves issuing of permits to non-members of the library to use the library for a certain period of time.

m) **Maintenance of clippings and vertical files:** Clippings prepared from newspapers, magazines and pamphlets and vertical files containing pamphlets, prospectuses, reports, press clippings, etc., are sources of information having special importance.

n) **Preparation of library publications:** Bringing out publications like handbooks, user guides/manuals, newsletters, bibliographies, indexing and abstracting documents, etc., and assisting other departments in their publishing activities, is an important reference service.

C. Services performed sometimes

These are information services not always provided by the library but only when the users demand. They are:

a) Display/list of current periodicals

b) Maintenance of special files

c) Reproduction of documents (Photocopying, CD/DVD writing, microfilming, etc.)

d) Translation service: Translation is a process of transforming precisely the information contents of the text from one language into another language.

ii. Referral Service

Referral service is referred to a prospective user of information source. The Concise Dictionary of Library and Information Science defines referral service as a "service which, if unable to provide the information required, refers the enquirer to another potential source or service". The distinction between a reference service and a referral service is that, in the former, the user is actually provided with the required document or information but in the latter (referral) the user is directed (referred to) the sources such as secondary publications, professional organizations, information units, research organizations or individual specialists. A referral service guides a user where to search for a resource which is presently not available in the library.

iii. Literature Search Services

Literature search service is an extension of reference service. The process of literature search starts with the library professional first understanding the nature, scope, depth and exact area of enquiry of the user by a user interview. Assessment of these indicators decides whether the search is for specific information, or for a few select references or for a comprehensive bibliographic information (mainly for research). This is followed by the formulation of a search strategy for searching different information sources. Knowledge of the subject area of search is beneficial for the librarian here. Traditionally, books, journals, theses, etc. and in modern parlance online databases, CD-ROM databases and web sites are considered as the most important sources for literature search service.

3.1.4.2 Anticipatory information Services

An information service provided for anticipating a user's needs is called an anticipatory information service. The important services under this category are given below:

i. Current Awareness Services (CAS)

The meaning of the term "current awareness" is the knowledge regarding recent

developments in a subject area of special interest to an individual. The process of current awareness function includes the reviewing of newly available resources relevant to the user community or pertinent to the programme of the organization and the selection and organization of individual items which must be brought to the attention of the user. The means for delivering this service varies depending upon the type of library. This service is concerned with the dissemination of latest information to a specialist to keep him/her up to date and well informed.

Finding relevant information has become more and more difficult for a professional, particularly in the field of science and technology. The exponential growth of scientific and technical information makes it impossible for the users to examine the information comprehensively. The need and relevance of CAS comes into effect at this point. The CAS enables the researchers to keep them up-to date and well informed. The information products delivered periodically by the libraries under CAS keep the researchers abreast of the recent developments in their field of study or work and save their valuable time. This is a perfect example of an anticipatory information service which draws a user's attention to latest trends/developments in a specific area of interest.

Current Awareness Services have two categories:

a. **CAS directed towards individuals or group of users:** This type of CAS includes communication of information to individuals or groups through informal conversation or by telephone or mobile phone; through electronic messages (SMS), messages sent on notification form, selective dissemination of information (SDI), selective dissemination of documents, routing of documents (periodicals), etc.

b. **CAS directed towards all users of the services:** This includes accession lists (new arrivals), bibliographies, indexing and abstracting services, literature surveys, bibliographic surveys, table of contents of periodicals, etc. The end products are current awareness bulletins which may include all the above elements.

The systematic ways to deliver a CAS are:

(i) reviewing or scanning of documents regularly and focusing on a desired subject.

(ii) selecting information and recording individual documents, and

(iii) sending notification to the users about items of information of their interest.

The selected information is recorded and delivered by suitable means, such as (i) telephone calls or personal visit by the library professional; (ii) Written messages sent

on notification forms or post to call at the reference desk; (iii) routing of periodicals, selective dissemination of documents and users; (iv) preparation and publishing of library bulletins; (v) display, and (vi) view data.

ii. Selective Dissemination of Information (SDI)

The concept of Selective Dissemination of Information was originally given by Hans Peter Luhn in 1958. Selective Dissemination of Information (SDI) is a highly personalized service. It is a method of supplying each user or a group of users with references of documents or abstracts relating to their pre-defined areas of interest selected from documents published recently/received during the period in question. This service saves the user the effort and time of having to scan through a number of publications, and to choose the documents of interest to him. The basic concept behind SDI is the matching of information/documents with the profile of each user or group of users with same interest. A user profile and document profile are two important components of the SDI service. Then the matching items are brought to the attention of the user. The same activity can be performed effectively with the help of a computer. Commercial mechanized SDI services are available in highly information rich fields like science and technology.

During the process of SDI, the `user profile' which comprises of a set of `key words' organised as meticulously as the 'system' permits, describe the subject of interest, in accordance with the keywords that appear on the documents. A document is selected when two key words coincide. In an automated environment, once a search profile of the user is created and saved, relevant information is sent to the researcher automatically (and the selected databases/catalogues are updated). The effectiveness of an SDI service depends on the completeness or comprehensiveness of the user profiles and the relevance of the information; which are to be matched with each other. The SDI is considered as one of the best current awareness services available at present.

3.1.5 Value-added Information Services

'Value-added' information services are those services which have an added value to the original, in order to make them more useful for the users. These are the services or products that are provided in a collated, refined and convenient form to make them readily usable by the users. These are different from services offered in routine manner and are treated as special.

Taylor suggested three advantages of value addition to the information services. These are:

i. Making choice easier, by labelling information and reducing noise;

ii. Classifying a situation by providing a new structure to information;

iii. Increasing the possibilities of better decisions by providing better quality, better formatted, and more precise information, adapted to the problem or situation.

Value added information services can be organised into the following groups:

i. **Selection and packaging:** This is the process of selection and integration of information from different sources (internal and external) and of varied kinds (bibliographic and numeric/factual or formal and informal) to get an enriched end product with an added value.

ii. **Subject analysis:** The added value by this service is based on the intellectual input of the analysis (by means of indexing, classifying, cataloguing, abstracting, etc.) makes the information easily accessible and more comprehensible.

iii. **Information analysis:** Information analysis is done for improving the authenticity and usability of information. This is done by specialists in the concerned subject areas, keeping in view the requirements of the potential users of the information. The process of information analysis includes selection, evaluation, validation, standardization, summarization and synthesis.

iv. **The user interface:** User interfaces are mechanisms built into information systems and services to enable the users to utilise these services in an effective manner. For example, user interfaces in an online bibliographic information retrieval system.

v. **Context setting:** Context setting, by its very nature, implies a particular context and a particular user need. This service is most relevant for inter-disciplinary areas where the significance and inter-relation among individual pieces of data are assessed. This data will be converted into information.

vi. **Information for innovation:** Innovation gives a winning edge to an organization. It is based on new ideas and new combination or interpretation of old ideas. The quality of processed information by an organization and information activities within it make their innovations fruitful.

vii. **Information rich environment:** This will keep communication among individuals and groups more relevant and accurate. Every time access to quality information supports good decision making and better management.

The main disadvantage of a value added information system or a service is its high cost of production and delivery, which may not be affordable to all users.

The advancements in the field of Information Technology have initiated a large number of online and digital information services. Many traditional information services may become non-relevant in future due to the exponential growth of new technologies and tools. We will discuss in detail the new trends in the field of information services in the next unit.

3.1.6 Summary

The primary objective of a library as a service organization is to satisfy the information needs of users, and the information services are designed to achieve this objective. The nature and scope of any information service depends on the user's approach to information. Information services are basically categorized into responsive or on-demand services and anticipatory services. Responsive services are provided in response to the demand by the user. Major responsive information services include, reference services, referral services, and literature search. Reference services may be categorized into: (i) basic services (e.g., Provision of general and specific information, assistance in locating the document, searching the library catalogue and using a reference source), (ii) services performed usually (e.g., readers' advisory service, inter-library loan and document delivery, reservation of documents, user education, compilation of bibliographies, bibliographic verification and citation, indexing and abstracting, subject specialists, ready reference, library tour, exhibitions, issue of library use permits, maintenance of clippings and vertical files, preparation of library publications, etc.), and (iii) services performed sometimes (e.g., display of current periodicals, special files, reproduction of documents , translation service, etc.). Referral services refer a user to the right source. An information service provided by anticipating a user's needs is called an anticipatory information service. Examples are: current awareness and Selective Dissemination of Information (SDI). Value added services are different from routine services, with the addition of something special which makes them more useful. The sudden growth of technology has changed the nature of library and information services tremendously, but their role in providing the right information to the needy users remains unquestioned.

3.1.7 Glossary

Abstracting services: Short summaries of articles of periodicals, collected and organized and brought out periodically for access.

Active service: Library staff provides the service in anticipation to keep the user well-informed.

CD-ROM: Compact Disc Read Only Memory.

Indexing services: Providing access to journal articles and such other documents through organized arrangement of entries of subject headings.

Passive service: Library staff waits for the user to approach them and make a demand.

Referral Service: A service which directs enquirers to an appropriate source for the information or data required.

Reference Service: A service that is concerned with direct personal assistance to the user seeking information.

Special Libraries: The libraries that are attached to R&D organizations to serve the specialists of the R&D organization, who are actively engaged in research in a particular subject or discipline.

User Education: Imparting formal training to users for using library and its resources.

3.1.8 Exercise

Short Answer Questions

1. Name the two basic types of information services.
2. Name the three basic categories of reference services.
3. What are the factors on which reference services provided by a library should depend?
4. What is an anticipatory information service?
5. Distinguish between Every day approach, Comprehensive approach and Current approach to information.
6. What is a responsive information service?
7. Define a reference service.
8. Distinguish between library orientation and user education.
9. Write a short note on 'referral services".
10. Write a short note on 'Current Awareness Service'.
11. How are the value added information services categorized?
12. Compare the advantages and disadvantages of value added information services.
13. Name the two types of Current Awareness Services.
14. Who set forth the concept of Selective Dissemination of Information?
15. What are 'value-added information services'?

Long Answer Questions

1. Explain the role and need of library information services.
2. How do the user approaches to information affect the information services? Discuss.
3. What is a responsive information service? Describe the major services under the category.
4. What is the role and importance of anticipatory information services in a library? Describe different types of Current Awareness Services.
5. Discuss about the value added information services and how are they categorized?

Module-3 Library and Information Services

Unit-2: Modern Library and Information Services

After studying this unit, students will be able to:

- *Understand the nature and scope of changes in the area of Library and Information Services*
- *Know about the components of Information and Communication Technologies (ICTs)*
- *Know the impact of ICTs on Library and Information services*
- *Study about the application of ICTs on delivering effective information services, viz. traditional and modern*
- *Learn about emerging trends and concepts in the area of Library and Information Services*
- *Understand the role of a modern Library Professional in providing information services in digital environment*

Contents

3.2.1 Introduction

The advent of technology in the last few decades, especially the revolutionary changes that have happened in the field of Information and Communication Technologies (ICTs) have reshaped the entire system of libraries and information centres. Application of computers in libraries, which began in late 1960s, followed by the universalization of library automation, marked the beginning of the trend of modernization in library and information management. Although, the primary function of a library or information centre remains the same, i.e., to acquire, organize and provide access to information to the user, the ways through which these tasks have been carried out have changed tremendously. The first decade of 21st century witnessed the emergence of internet as the most popular source of information, whereas the present decade sees a surge in the number of people accessing it, particularly using handheld devices. The role of a library has now been transformed from the sole authority and provider of stored information to a system which facilitates access to information available in any format from any internal and external source. Newer tools, technologies and concepts which enable access to and disseminate information have emerged. Their incorporation to provide better resources and services to the users has become the hallmark of library modernization. Integration of web 2.0 tools and the emergence of concepts like hybrid library, library commons, open data, etc. are some of the trends in this direction. The involvement of today's users in the creation of new information/content through various channels demands more open information platforms and library systems. Libraries have been developing or inventing new services as per the needs of the highly demanding present generation users. In the following sections of this unit, the impact of Information and Communication Technologies on library user services and the relevance of modern trends in the field are discussed along with a brief study on the changing roles of library professionals.

3.2.2 Impact of ICTs on Library and Information Science

Historically, the industrial revolution in the second half of the twentieth century spearheaded the transformation towards a technologically advanced society. Development of such a society needed unrestricted access to information, the most valuable resource and commodity. Creation, organization and access to information became the most important activity of nations who were eager to prosper. The research in the field of Information and Communication Technologies or ICTs resulted in the development of more products and services in all spheres of human life. The impact is more evident in service oriented sectors such as health, banking, education, transportation and libraries.

Let us primarily understand the two rather interchangeably used concepts, Information Technology (IT) and Information and Communication Technologies (ICTs) by studying two definitions. The first broader definition is by UNESCO whereas the second one,

oriented towards Library and Information Science, is by the American Library Association (ALA).

UNESCO defines Information and Communication Technologies (ICTs) as "the hardware and software that enable society to create, consolidate and communicate information in multimedia formats and for various purposes". It means, ICTs include both networks (fixed, wireless, satellite and broadcasting) and applications (internet, database management systems and multimedia tools).

The American Library Association (1983) defines Information Technology (IT) as "the application of computers and other technologies to the acquisition, organization, storage, retrieval and dissemination of information. The computers are used to process and store data, while telecommunications technology provides information communication tools, which make it possible for users to access databases and link them to other computer networks at different locations."

The impact of the ICT's on libraries and information centres is most felt by two basic fields. These are:

i. Management of information resources (library housekeeping operations), and

ii. Delivery of library and information services.

The execution of library housekeeping operations such as acquisition, cataloguing, circulation, serials control, etc. are now enabled by or based on a number of information and communication technologies. The most important one is the Integrated Library Management System (ILM's). Modern libraries now function in a completely networked and automated environment where every operation is done with the help of one or many of information or communication based tools or technologies.

When we think about the delivery of library and information services, it is nearly impossible to carry them out without the help of ICTs. Internet has become the most visible and dependable information gatherer and disseminator for a researcher as well as a layman. A user can now access information at any given time from any corner of the globe with the help of a number of devices and technologies. More and more libraries are redesigning their traditional services and devising new or innovative strategies to live up to the expectations of the users. Incorporation of new ICT based user services helps them to realize these efforts.

Application of ICTs in libraries is beneficial because it:

i. Facilitates effective control in libraries over the collection, in-house work flow and delivery of user services through Integrated Library Management System (ILM's).

ii. Provides speedy, round the clock and easy access to information in digital formats to users.

iii. Enables remote and flexible access to customized information to users as per their individual needs.

iv. Facilitates access to unlimited sources of information through networking and consortia.

3.2.2.1 Components of ICTs in Libraries

The information and communication technologies used in libraries may be categorized as below:

i. Computer Technology

ii. Communication Technology, and

iii. Reprographic, micrographic and printing technologies

Computer technology and its applications in libraries will be discussed in detail in later units. Some of the ICT's technologies that have direct or indirect applications in libraries are listed in Table 1.

Table 1: ICTs in Libraries

Computer Technologies	Communication Technologies	Reprographic, Micrographic and Printing Technologies
Hardware: Personal Computers Mini/Mainframe/Super Computers Handheld devices Storage: CD/DVD **Software:** System Software and Application Software Integrated Library Management System Digital Library Software Digitization Software e-learning Software	Audio Video Audio-visual Radio Cable Television Film Tele-text Video-text Telephone Cell/Mobile phone Smart Phones Fax (Telefacsimile) Tele-conferencing Networking (LAN,WAN)	Reprographic Micrographic Printing (traditional and modern) 3D Printing Scanners

Artificial Intelligence	Satellite	
Cloud Computing	Barcode	
Storage:	Smartcard	
ACD, VCD, DVD-ROM	RFID	
Flash Drives	Wireless	
E-Resources	Internet	
e-books	Email, Voice mail	
e-Journals	Instant Messaging (Chat)	
Databases (Bibliographic, Full text and multimedia)	Web 2.0/Social Media (Social Networking, Blogging, etc.)	
e-learning resources	Voice Over Internet Protocol (VOIP)	
Electronic Thesis and Dissertations (ETD)		
Library Consortia		

3.2.2.2 Impact of ICTs on Traditional Library Services

To understand the impact of ICTs on library and information services, let us first discuss some traditional or conventional library operations and services where the application of ICTs is predominant and has now become indispensable.

i. Integrated Library Management System

An Integrated Library Management System (ILMS) is also called as an Integrated Library System (ILS). An ILMS is an automated system to facilitate technical functions of a library These functions generally include circulation, acquisitions, serials control, cataloguing, etc. An ILMS usually consists of a relational database, software to interact with that database, and two graphical user interfaces, one each for staff and another for users. In most ILMSs, separate software functions into separate modules, each of them integrated with a unified interface. An ILMS improves the efficiency of internal library operations, facilitates interoperability of information systems and provides users with easy access to library resources and services. Some of the ILMs from India and abroad are LibSys, KOHA, Evergreen, VTLS, SOUL, e-Granthalaya, Sanjay, NewGenLib, etc.

ii. Online Public Access Catalogue (OPAC)

Online Public Access Catalogue (OPAC) is an online database of library resources which can be searched by the user to locate resources in a library or on the network of

a group of libraries. The early attempts to develop online library catalogues were made by the Ohio State University in 1975 and the Dallas Public Library in 1978, which gradually replaced the card catalogues. Later, the OPAC got included as an important module in the advanced Library Management Systems. OPAC is the primary user interface of an ILMS, where the user can search the entire library catalogue, easily and quickly, using one or more search criteria (e.g., author, title, key words, class number, subject, etc.). The results are displayed in various formats such as AACR-2 and MARC. An OPAC can also be accessed from a remote computer which is on a network (LAN/WAN). When a library OPAC is provided on internet, it is called Web OPAC, where the remote user can access the catalogue and avail certain services like online renewal, reservations, loan requests, etc. from anywhere in the world with a proper internet connectivity.

iii. Reference Service

Reference service is considered as one of the most important functions of any kind of library. In-person, by post and by phone are the three most conventionally followed methods for providing reference services. The impact of ICTs on reference service is apparent in the way it is delivered to users. ICT enabled reference services are primarily computer mediated online communication between the users and the library professionals and are popularly known as "virtual reference" or "digital reference". American Library Association defines virtual reference as a "reference service initiated electronically, often in real-time, where patrons employ computers or other Internet technologies to communicate with reference staff, without being physically present". They are of two types, (i) synchronous, or real-time communication, like online chat using Instant Messaging (IM), Voice over IP, co-browsing and videoconferencing, and (ii) asynchronous, where the communication is send and received at different times, like e-mail, (e.g. Ask a Librarian e-mail reference), web-forms and text messaging (SMS). There are virtual reference software packages which offer customized reference services as per individual library policies. Example: Question Point software by Online Computer Library Centre (OCLC).

i. Current Awareness Service (CAS)

Current Awareness Service keep the users up-to-date in their areas of concern. This may be any online or offline resources or services that provide regular updates to users on current literature in a research field of interest. Traditional CAS includes publication of current awareness bulletins and circulation of tables of contents. Internet and the proliferation of electronic databases initiated a number of ICT enabled CAS resources and services. Libraries and database or e-content producers/distributers have developed many services which include, (i) e-

newsletters or online newsletters/bulletins, (ii) e-mail alerts, (iii) Citation indexes, (iv) RSS (Rich Site Summary) feeds from websites and online databases, (v) Saved database searches (using pre-defined search strategies as per user needs), (vi) Online peer networks (e.g. ProQuest's Community of Science), (vii) List serves, (viii) Webzines/e-zines, and (ix) Weblogs/Blogs.

v. Selective Dissemination of Information (SDI)

SDI is a type of current awareness service which involves screening of documents and the selection of the exact information, tailored to meet the specific information needs of a user or a group of users in their area of specialization, and supply of it in a personalized form. Although the concept of SDI originated in 1950s, the service became more popular in the ICT era, where it is delivered with the help of computer programmes which match the pre-designed 'user profile' with the 'document/resource profile'. The SDI service is delivered the same way as CAS is provided.

vi. Bibliographic Service

Bibliographies are essentially lists of books or other material that can be organized by author, title or subject. They are used to identify and locate a document, and to select material for developing a collection. Manual compilation of a bibliography is a tedious task and requires continuous efforts to keep it up-to-date. Bibliographic databases available online or in electronic form on CD-ROMs elude these issues and offer more search options and display formats to the users. Conventional bibliographies deal with books only, whereas these databases are digital collections of references to published literature (journal and newspaper articles, conference proceedings, reports, patents, government and legal publications, etc.). Many databases provide web based natural language and full text searches with links to the original document. Examples for some online bibliographic databases are, ERIC (Educational Resources Information Centre) by the Institute of Education Sciences (US), INSPEC by the Institution of Engineering and Technology (US), LISTA (Library, Information Science and Technology Abstract) by EBSCO, etc.

vii. Union Catalogue and Inter Library Loan(ILL)

A union catalogue consists of holdings of a group or consortium of libraries. The basic objective of such a system is to facilitate sharing of resources. A union catalogue lists the holdings of each member library, which is connected either on a network or through the Internet. Search is carried over and the result is displayed on a single user interface. The provision of inter library loan is to transact between two member libraries to lend material to each other on a short-term basis, which can be established

only with the help of a standardized union catalogue. Digitization of library holdings and web OPACs speed up the process of interlibrary loans. Examples: WorldCat by Online Computer Library Centre (OCLC), COPAC (University of Manchester, U. K.), IndCat: Online Union Catalogue of Indian Universities by Information and Library Network (INFLIBNET), and Union Catalogue of Books by Developing Library Network (DELNET).

viii. Document Delivery Service

ICT based Document Delivery Services are now common in many libraries where the requested document is delivered to the client electronically (email). The user can search the web OPAC or the union catalogue available and order for the document and get it delivered. Examples for commercial document delivery services are, British Library Document Supply Service (BLDSS), where one can obtain documents (copies of documents, images, soundtracks, etc.) online and through Science Direct.

ix. Audio Visual Services

The extent of changes in the field of audio and video (multimedia) technologies enable libraries to handle the resources more effectively in providing better service to users. Media libraries and other libraries that have collection of images, audio, films, pictures, etc. make it accessible to patrons by using latest available technologies. Multimedia resources are now stored on intranet or publically on internet and kept accessible to users. A number of hardware and software applications are used to deliver these resources.

x. Library Extension Services

Extension services are programmes or activities carried out by a library to reach out to the users who might otherwise be unaware of the resources and services. Traditional library extension services include library orientation, library tour, fairs, exhibitions, campaigns, publicity, reading clubs/groups, celebration of events, mobile library services, publications (newsletter/bulletins/guides), etc. Advent of ICT tools and technologies has made many of the library extension services more attractive and effective. Web 2.0 tools like blogs, wikis, social networks, etc. are extensively used to publicize library resources and activities. Virtual tour to the sections of the library is now a regular feature on many advanced library websites. Many libraries publish e-newsletters or e-magazines. Library orientation programmes and information literacy sessions are conducted with the help of online tools and applications.

The above discussion clearly underlines the impact of information and communication technologies on almost all traditional library services. The influence is so comprehensive that without ICT it is impossible to deliver any library services so effectively for the information needs of the users.

3.2.3 Modern Library and Information Services

Modern library and information services have been profoundly affected by the emergence of a large number of information and communication technologies and tools. Exponential growth of digital/electronic information spearheaded creation of new information products which in turn demanded new user services. The rise of Internet as a gigantic store house of information has set challenges as well as opportunities before the libraries and information centres. Web based information services take prominence as the quantity of global population which has access to Internet increases day by day. The changing preferences of today's users from print to digital/online and real-time information tend the libraries and information centres to redesign their traditional services by incorporating web based tools or developing innovative services based on these technologies.

Modern trends in library and information services can be listed under three categories:

i. Web-based library and information services

ii. Services to electronic/digital/web resources, and

iii. Services to local/internal digital resources

The features of the various fast developing library services will be discussed in the following sections.

3.2.3.1 Web-based Library and Information Services

'Web' is a synonymous and popular term of World Wide Web (WWW) or Internet. The traditional method of offering library and information services has changed greatly in recent years because of the development and applications of new technology, especially the Internet and Web Technologies. The demands and expectations of users have also changed considerably. In the changed scenario, the academic libraries in India are offering new web-based library services to satisfy the users.

For this unit, "Web –based library services means library services provided using Internet as medium and library website as a gateway with the help of integrated library management systems (Madhusudhan, Nagabhushanam 2012)". In simple words, web-based library services that are modified versions of existing services and technology-driven library services (Arora, 2001). The history of web-based library and information services began in 1960s by the introduction of computers in libraries for information processing, which resulted in the creation of bibliographic databases like MEDLARS in 1963, BLAISE (British Library Automated Information Service), and the formation of online library networks, like OCLC.

In the following sections, some of the major web-based library and information services will be discussed.

i. Library Web Portals

A library web portal is a website that offers access to a broad range of information resources and services, such as online catalogues, e-journals, databases, information on new additions, programmes, etc. It acts as a gateway to the libraries web/online resources and services. Web portals have replaced the earlier static library websites, which had limited features, and now have become more interactive and user-friendly.

ii. Web OPAC and Next Generation Catalogues

Web OPAC is an Online Public Access Catalogue made available on the web. It offers the user with a 24x7 access to the library catalogue. The user can search the library catalogue and find the availability of library holdings. Simple and advanced search options are available and many of the webOPACs offer online renewal and reservation facilities to the members. A Next Generation Catalogue, also termed as Catalogue 2.0, is a single point of entry for all the library information. Here, 'information' refers to all library resources, including all bibliographic information on printed books, journals, multimedia documents but also links to full text electronic databases, digital archives, and any other library resources. These new generation catalogues use federated search engines for this one-stop searching. The users are directed to electronic and printed resources which are linked together on a single interface. Other features of the next generation catalogues are, state of the art web-interface, which is intuitive and visually appealing, enriched content (images of book covers, CD cases, book summaries, tables of contents, reviews, etc.), faceted navigation(which allow users to narrow down the search by facets, like, authors, dates, types of material, subjects, location, etc.), simple keyword search box (like popular search engines, e.g., Google) instead of controlled vocabulary, and options for advanced search, relevancy (ranking of resources using many criteria like circulation statistics, comments received, etc.), "Did you mean…?" (Spell checking of search entries and recommending other search queries), recommendations and related materials (suggestions to related materials), user contributions (ratings, reviews, comments and tagging by the users) and RSS Feeds (which give updates about new acquisitions and search updates).

Examples for Next Generation OPACs: Voyager ILS by Ex Libris, EBSCO Discovery Service (proprietary), Evergreen, Invenio, KOHA (open source).

iii. Bulletin Board Services and ListServes

A 'bulletin board' is a public discussion area where users can post messages without sending them to anyone's personal e-mail address, which can be viewed by anyone who enters the area. The entry to the area may be restricted by invitation or be kept

open. Bulletin boards are also known as forums or newsgroups. Announcements regarding library resources and activities, information on special collections, etc. can be displayed over here. These electronic bulletin boards are linked to library websites for general users and special groups.

Listserves are topic or subject oriented online forums, where messages are communicated through e-mail. These are basically discussion forums which deal with topics on academic or professional interests. One who subscribes to the listserve can send and receive emails, the process that is controlled by a programme, hosted by the parent organization/authorized individual, for example, Become a Reading Butterfly!

iv. Subject Gateways

A gateway is defined as a facility that allows easier access to network based resources in a given subject area. Subject Gateways provide high quality evaluated web resources. These act like clearing houses to quality information selected by subject experts. Basic objective of any subject gateway is to help users to locate high quality information resources available on the Internet. These are user searchable metadata databases with hyperlinks to specific information. Search may be with keywords or subject headings.

Examples: INFOPORT (INFLIBNET Subject Gateway for Indian Electronic-Resources), ipl2: Internet Public Library (IPL) and the Librarians' Internet Index (LII) (http://www.ipl.org/), INTUTE (Social Science Information Gateway), covering social science resources and OMNI (Organizing Medical Networked Information) covering medical resources.

v. Web based Current Awareness Service

Libraries offer web based CAS primarily through e-mails. Individual and customized email alerts are provided to the users on their area of special interest about new acquisitions of documents, table of contents of journals or new web resources available on the Internet. Many publishers also provide journal alerting service.

Example: Journal Alerting Service by Oxford University Press, Journal Table of Contents Service (tic TOCs) by JISC, National Archives, UK.

vi. Online Question and Answer Service

Web-based question and answer service is an asynchronous system that uses a web form to receive requests (questions) and responses (answers) which are sent via email to the enquirer. 'Ask a Librarian' service provided by libraries is an example for a Question and Answering Service. This is also considered as a part of the digital reference service. Example: Ask ERIC (U.S.).

ix. Webcasting

Webcasting is the method of broadcasting live audio and video in real-time, to audiences all over the world via the Internet. It is 'broadcasting' over Internet. Streaming media technology is used here to distribute a single content simultaneously to multiple viewers/listeners. There is no need to download the content before viewing. A webcast may either be distributed live or on demand. In the area of LIS, Library of Congress (LoC) offers webcasts of audio and video resources like talks on history, performing arts, culture, science and technology, through its web page for webcasts.

vii. Web based Reference Services

Providing web based reference services to users, who are sitting anywhere in the world in a 24x7 mode is now popular in many libraries. Access to in-house electronic reference sources and external digital resources like database and online reference websites, provided in a mediated way is the base of such services. Web based reference services include:

a) **Reference websites:** These are websites that exclusively provide reference information like Britannica online (http://www.britannica.com), Encyclopedia.com (http://www.encyclopedia.com/), Infoplease (http://www.infoplease.com), Oxford English Dictionary (http://www.oed.com/).

b) **Online Reader's Advisory Service:** The recommendations and review of the book titles and other resources by experts are posted on the library website. A search features allow the visitors to search for reviews of specific titles/resources and an online form permits the readers to submit their own review for publication on the site. Additional information on local book talks and book club is also provided with links to web sites of interest to readers.

c) **Online Instruction Service:** Bibliographic instruction to new members is provided in an online way using web based tools and technologies. Instructional videos on the use of OPAC, resources, etc. are made available online which can be viewed/ listened by the users.

3.2.3.2 Services to access web resources

Modern libraries largely depend on web resources (also termed as electronic/digital resources) to provide up-to-date information. Almost all digital information resources are now available on a networked (internal or internet) environment. Providing access to these resources in the library or remotely on a network is one of the main services of a library. Web resources have many advantages over traditional print resources. Some are:

a) Web resources can be interlinked and hence users get comprehensive information (e.g., journal articles can be hyperlinked with their own reference sources, external indexing/abstracting databases and other web resources).

b) Anytime anywhere access: Digital/web resources can be accessed 24x7 and from anywhere, may be on an internal network or on internet using a remote login facility.

c) Web/digital resources save the time of the user, physical space in a library and are easy to maintain.

Main library and information services which are intended to provide access to various web based information resources will be discussed in this section.

i. E-Books and other Downloadable Media

Merriam Webster's Dictionary defines an E-book as "a book that is read on a computer or other electronic devices. It is a book composed in or converted to digital format for display on a computer screen or a handheld device

Fig 3.2.1: An E-reader

Encyclopaedia Britannica categorizes the method of distribution of e-books on the Internet as: (i) downloadable files that can be read offline, (ii) as live web pages that must be read online, or (iii) as web pages that are cached by a web browser for reading offline. e-books may be downloaded or accessed in a closed (proprietary) system, where the buyer or the library has to purchase the e-book from the publisher/distributer under the Digital Rights Management (DRM) Policy. Example: Amazon Kindle, Apple iBooks, etc. In an open system, e-book files may exist in only one place, but anyone can access and download the files (whether for purchase or free download), because their metadata are freely available and can be freely shared. Examples: Catalogues created in the Open Publication Distribution System (OPDS,

part of the Internet Archive's BookServer Project) and the Project Gutenberg. E-books can be read on any electronic device with a software to display their given file format. Most common e-book file formats include EPUB, (an open standard for e-books created by the International Digital Publishing Forum (IDPF)), e- Reader (Palm Digital Media), iBook (Apple), AZW (Amazon), LIT (Microsoft), PDF (Portable Document Format by Adobe), ODF (Open Document Format), MOBI (MobiPocket), etc. e-book reading devices include dedicated e-Readers, personal computers, mobile (smart) phones, hand held devices like tablet computers, and consoles attached to televisions or other screens.

The other downloadable media to which modern libraries provide access to users are:

a) **Audio Books:** access to downloadable audio books (e.g. Audible.com, Amazon Prime)

b) **Music:** access to downloadable music (e.g. Freegalmusic, Napster, Spotify, Shazam)

c) **Digital Magazines (digital newsstand):** access to magazines in their digital form (e.g. Zinio, GTxcel)

d) **Movies:** streaming movie service to access, films, documentaries and other video contents (e.g. Indieflix, Netflix, HuluPlus, YouTube)

e) **News:** access to newspaper databases (eg: Worldcrunch)

f) **Learning Resources:** e-versions of test preparatory materials, guides, handouts, etc. (e.g. Thomson Gale)

ii. Online Database

A database (e-database) is an organized collection of information, of a particular subject or multi-disciplinary subject areas; that can be searched and retrieved electronically with the help of searchable elements or fields. A single database may refer to a specific type or a variety of sources, including periodical articles, books, government documents, industry reports, conference proceedings, newspaper items, films, video recordings etc. A database may be dedicated to a single subject or cover several subjects. The contents may be updated in a daily/weekly/monthly manner. Libraries, based on their user needs, subscribe to these database through information retrieval service providers or database vendors/publishers. As the contents of library database are sourced from experts and professionals on the field, they are more reliable than the information that is available on some websites. Primarily, database can be: (i) Full-text database (compilations of documents or other information in the form of database in which the complete text of each referenced document like journal articles, conference proceedings, etc. is available for online viewing, printing, or

downloading), e.g., Academic Search Premier, JSTOR, Science Direct, and (ii) Bibliographic databases (databases of bibliographic records or citation information), e. g., LISTA, MEDLINE.

Database have three categories based on the scope of the subject area they cover. They are:

a) General interest (multi-disciplinary) database: consist of information from several subject areas and disciplines. E.g., JSTOR, Academic Search Complete, Project MUSE

b) Discipline-specific databases: consist of materials from related subject areas. E.g., SocINDEX (sociology research database), SPORT Discuss (sport medicine and related fields).

c) Subject-specific databases: provide in-depth information on a specific subject. E.g., Ethnic News Watch (ethnic, minority, and native press content), PsycINFO (behavioural science and mental health).

Libraries provide in-house and remote access to subscribed databases to their members. To reduce the huge subscription cost, libraries form consortia share the resources among them. INDEST (Indian Digital Library of Engineering, Science and Technology), and INFLIBNET are two examples for such library e-journal consortia. Another method to provide access to e-journals is through Aggregator services, which offer searchable databases of contents of e-journals from several publishers, and links to journal site for full text. E.g., Emerald, J-Gate.

iii. Other web-based resources

Other important web-based resources to which libraries provide access are:

a) Electronic Theses and Dissertations (ETDs)

Many Universities and research organizations in India and abroad are now digitizing their thesis and dissertations and make them available on internet for public access. One global initiative is Networked Digital Library of Theses and Dissertations (NDLTD). Indian Digital repositories of Theses and Dissertations include that of Indian Institute of Science, Bangalore, India and 'Sodhganga' at INFLIBNET Centre.

b) Open Educational Resources and other Course Materials

According to UNESCO, Open Educational Resources (OERs) are any type of educational material that are in the public domain or introduced with an open license. The nature of these open materials means that anyone can legally and

freely copy, use, adapt and re-share them. OERs range from textbooks to curricula, syllabi, lecture notes, assignments, tests, projects, audio, video and animation. Examples of this include MIT Open Courseware Project, World Bank Open Knowledge Repository, Open Yale Courses and NROER (National Repository or Open Educational Resources) by NCERT.

Other digital learning repositories which provide teaching and learning resources on the web include ERIC (Education Resources Information Center, USA), NDLR (National Digital Learning Resources, Ireland).

3.2.3.3 Services to access local/internal digital resources

Many libraries are developing their digital collection of documents like institutional repositories and archives of historically important documents and are making them available on intranet and on the Internet. The main digital services are:

i. Institutional Repositories

An institutional repository (IR) is an electronic archive of the scientific and scholarly output of an institution, particularly an institution, which has been stored in a searchable digital format and which can be retrieved for later use. The contents deposited in IRs include: (i) Electronic Theses and Dissertations; (ii) Conference papers and Proceedings; (iii) Preprints and post prints of journal articles; (iv) Books and Research Datasets; (v) Working papers and Reports; (vi) Teaching and Learning objects; and (vii) multimedia collections. DSpace and E-Prints are the most common software used for developing IRs. IRs make the institutional outputs open to the world. Open Access IRs around the world can be accessed at the Directory of (Academic) Open Access Repositories (Open DOAR) and Registry of Open Access Repositories (ROAR) websites. Indian examples include Dyuti (Cochin University of Science and Technology), Open Access Repository of Indian Institute of Science Research Publications (ePrints@IISC), etc.

ii. Online Exhibitions

An online exhibition or virtual exhibition or online gallery is a web based service provided by libraries, museums and archives where an exhibition of digital artefacts (photographs, paintings, documents, etc. normally owned by the institution) is conducted online. It may be viewed or visited by anyone irrespective of time and physical location. Advantages of an online exhibition over the physical one include a wider reach to the audience, saves production costs, solves conservation/ preservation problems, creates a durable online record and provides anytime-anywhere access.

Examples: American Treasures of the Library of Congress, Latin American Business History by Harvard Library, Online Gallery of British Library, Columbia University Library Online Exhibitions.

iii. Web Archiving Service

Jinfang Niu (2012) describes web archiving as 'the process of gathering up data that has been recorded on the World Wide Web, storing it, ensuring the data is preserved in an archive, and making the collected data available for future research. Like the management of many other kinds of information resources, the workflow of web archiving includes appraisal and selection, acquisition, organization and storage, description and access.' Web archiving services are getting prominence, as in many occasions, the web has become the sole medium for communication, sharing and collaboration between organizations and individuals and the information published on a website may be the only place where it is available. Websites are now important records for organizations and individuals that are to be preserved for reference and posterity. The dynamic nature of the websites also warrants their preservation. Web archivists use automated tools (or web crawler softwares) to collect or harvest websites. Web crawlers go across the web and into the websites to copy and save the needed information. These archived websites are organized and made available to the users for online access. Many of the national libraries are now archiving the culturally important and country specific web contents. Proprietary web archiving software services are being utilized by companies to archive their own web content for business, heritage, regulatory, or legal purposes. The largest non-profit web archiving service available is the Internet Archive (https://archive.org/).

Examples for Library web archives:

- **Legal Deposit UK Web Archive:** Developed by the British Library with millions of websites obtained through an annual archiving of the entire UK domain. This was enabled by the non-print legal deposit regulations introduced by the U K Government in 2013. This archive is only accessed internally through computers on premises controlled by the library.
- **The UK Open Web Archive:** This is a smaller collection of selected websites archived by the British Library. Selected websites will continue to be added to this open access collection, again with the permission of website owners. It is available online.
- **The Australian Government Web Archive (AGWA):** A web archiving initiative of the National Library of Australia (formerly known as PANDORA).
- **The Library of Congress Web Archives (LCWA):** The early development project for LoCWeb archives was called MINERVA.

3.2.4 Emerging Trends in Library and Information Services

As discussed above, new concepts are emerging in the field of library and information science. Let us understand some important emerging trends in the area of library and information services.

i. Mobile Applications for Libraries

There is an exponential growth in the number of users, particularly in developing countries, who access internet on their mobile devices, especially on smart phones. As in the case of e-commerce and entertainment industries, modern libraries are also using mobile technologies to reach out to these customers who are on the move. For that, mobile/cellular phone based applications and services are designed and incorporated by libraries. Mobile services are "typically (and often implicitly) understood as services that make use of mobile devices and/or mobile networks". Mobile based library services include:

a) Mobile interface to library website: Mobile optimized library website homepages

b) Mobile interface to library catalogue

c) Mobile reference service: Access to mobile interfaces of important reference sources like Encyclopaedia Britannica

d) Downloadable e-books and audio books on mobile

Fig 3.2.2: Mobile website homepage of Riverside Libraries, University of California

e) Mobile interfaces to e-journal and other databases

f) SMS notification services: Circulation (reminder, renewal, reservation), Current awareness, SDI, Content alerts, catalogue enquiries, SMS reference services, etc.

Some libraries also developed Mobile Apps which help the users to access library services. These apps need to be downloaded and installed in the user's mobile/handheld device. E.g., BARD Mobile (National Library Service for the Blind and Physically Handicapped (NLS), Indian Law Mobile Library etc.

ii. Application of Cloud Computing in Libraries

Merriam-Webster's Dictionary defines cloud computing as "the practice of storing regularly used computer data on multiple servers that can be accessed through the Internet". There are three service models of cloud computing services: (i) Infrastructure as a Service (IaaS), (ii) Platform as a Service (PaaS), and (iii) Software as a Service ((SaaS). Types of cloud deployment models include: (i) Private Cloud (ii) Community Cloud (iii) Public Cloud, and (iv) Hybrid Cloud. Cloud computing technologies are used in libraries to:

a) develop cloud based digital libraries/repositories (e.g. DURACLOUD)

b) share searchable library data

c) host websites

d) search scholarly content (e.g., Knimbus Knowledge Cloud)

e) store files (e.g., Dropbox, Google Doc, SkyDrive)

f) build networks with other libraries and people

g) support library automation through cloud based acquisition, cataloguing and processing services and hosting the entire data on the cloud which will cut down the costs for hardware and maintenance. (e.g., ExLibris, OSS Labs)

3.2.5 Roles, Skills and Competencies of Library Professionals

The roles to be performed by a library professional are multifaceted. Same are detailed here.

The traditional role of a library professional are that of a custodian who selects, organizes and provides access to print and other media, a guide who assists users in selecting and evaluating the information sources, and a public relations personnel who maintains good relations with the management, customers and other libraries and outside organizations. The core skills traditionally associated with librarians or information professionals to perform these roles include information handling skills (like cataloguing, classification,

indexing), training and facilitating skills, (like user education, instruction, referencing), evaluation skills (like evaluation of resources and services) and concern for the customer. All these conventional skills have been applied in a different way in a highly digitized and networked environment by a modern librarian or an information scientist/professional. The need of a librarian as a facilitator, rather than a custodian, with search skills, abilities to analyse and evaluate resources and match needs with sources, has become more essential since the availability of huge amount of unverified information over the web.

Some of the key roles of Library and Information professional should perform:

i. Providing leadership and expertise in the design, development and management of knowledge based information systems.

ii. Developing policies or participating in its development for ensuring total or selective access to information sources and services.

iii. Building and managing library collections consisting of print, digital and web based information resources, as per the user needs.

iv. Facilitating access to digital information systems, repositories, networks, and consortiums.

v. Acting as a technology application leader who works with other members of the information management team to design and evaluate systems for information access that meet user needs.

vi. Acting as a business manager who negotiates with publishers or aggregators for the most advantageous license agreements for e-journals and databases.

vii. Educating and assisting the users to help them to make the optimum use of the available information resources (online tutorials, web based instruction, etc.).

viii. Collaborating with users, librarians, IT people and the outside society.

ix. Promoting and marketing the library information resources and services.

x. Developing the library website/web interface and managing its content.

The key skills and competencies a Library and Information professional are:

i. **Personal Skills:** Personal skills can be defined as appropriate attitudes, values and personal traits. These include being analytical, creative, technical, flexible, reflective, able to deal with a range of users, detective-like, adaptable, responsive to others' needs, enthusiastic and self-motivated.

ii. **Generic Skills:** Generic skills can be defined as the general skills which cut through disciplines which include information literacy, communication, critical thinking, teamwork, ethics and social responsibility, problem solving and leadership.

iii. **Professional Skills:** The basic disciplinary knowledge relates to the professional's knowledge of information resources, access, technology and management, and the ability to use this knowledge as a basis for providing the highest quality information services. There are four major competencies, each augmented with specific professional skills: (a) Managing Information Organizations, (b) Managing Information Resources, (c) Managing Information Services, and (d) Applying Information Tools and Technologies.

3.2.6 Summary

The impact of Information and Communication Technologies (ICTs) on library and information services is tremendous. Two basic areas where modern libraries hugely depend on ICTs are the management of information resources and the delivery of information services. The ICTs used in libraries may be categorized into computer technology, communication technology, and reprographic, micrographic and printing technologies. The application of ICTs on traditional library services like integrated library management systems, Online Public Access Catalogue (OPAC), Reference Services, Current Awareness Service (CAS), Selective Dissemination of Information (SDI), Bibliographic service, Union Catalogue and Inter Library Loan, document delivery services, audio visual services and library extension services are discussed in detail with examples. Modern trends in library and information services may be discussed under three categories, viz. web-based library and information services, services to access electronic/digital/web resources, and services to access local/internal digital resources. Web-based library and information services include- access to internet, library web portals, Web OPAC and Next Generation Catalogues, Bulletin Board Services and ListServes, Subject Gateways, Web based Current Awareness Service, Online Question and Answering Service, Webcasting, and Web based Reference Services. Services to access web resources include facilitating access to e-books and other downloadable media, online databases, and other web based resources such as electronic thesis and dissertations (ETDS) and open educational resources and other course materials. Services to access local/internal digital resources include institutional repositories, online exhibitions, and web archiving service. The unit also discusses emerging trends in Library and information services like application of mobiles and cloud computing in libraries. In the final section, the roles and skills of library professionals in providing modern information services was discussed in detail.

3.2.7 Glossary

Database: It is a collection of records with details of different data items which may be numeric, textual or image-based. It is usually searchable.

Digital Rights Management (DRM): DRM is a file-encryption and access-control system that locks e-books both to a customer's identity and to specific software controlled by the company.

ICT: Information and Communication Technologies

Information literacy: It is defined as a set of abilities enabling individuals to identify when information is needed and have the capacity to locate, evaluate and use effectively the needed information. In simple words, it means teaching the users how to access the card catalogue or OPAC, print resources, and retrieve information from online databases.

Internet: It is a worldwide network of interconnected computer networks connected together using recognized standards to enable electronic communication and the exchange of information.

OPAC: Online Public Access Catalogue

Web OPAC: An OPAC, which is provided on the web and can be accessed from anywhere with the help of Internet.

3.2.8 Exercise

Short Answer Type Questions

1. List the benefits of the application of ICTs in libraries.
2. List the categories of modern trends in library and information services.
3. State the advantages of OPAC.
4. List the advantages of computerized library services.
5. What are the major web-based library and information services?
6. Explain briefly the Online Electronic Databases.
7. Define Subject Gateways.
8. Enumerate the traditional roles of a library professional.

Long Answer Type Questions

1. Discuss the three components of ICTs in libraries.
2. Explain the impact of ICTs on library and information services
3. Discuss the impact of ICTs on traditional library services.
4. Explain the web based reference services.
5. Describe the role of the librarian in the Internet age.
6. Discuss the Application of Cloud Computing in Libraries
7. Discuss the key roles, skills and competencies of library and information professional.