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National Open University
School of Social Sciences

Block

3

INFORMATION SERVICES

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BLOCK 3   INFORMATION SERVICES

Introduction

In Block 3 of this course, we will discuss about the variety of information services which libraries and information centres are providing to meet the information needs of various categories of users. This Block consists of the following 3 units:

Unit 8   Information Services: An Overview

Unit 9   Types of Services: Reference Service, CAS, etc.

Unit 10   Literature Search and Database Services

Unit 8 begins with the concept of information, its meaning and how it differs from other terms like data and knowledge. Then a brief account of the process of generation of information is provided. The information that is generated is required by various groups of people at different levels for various purposes. The Unit discusses the information needs of different groups of people and the purpose(s) for which information is required by them. Four types of information needs are identified viz. current, exhaustive, everyday, and catching-up information needs. This Unit provides an overview of various information services provided by the libraries and information centres to meet these information needs. Responsive information services such as reference service, referral service, literature search and compilation of subject bibliographies and document delivery service are described, followed by anticipatory information services like current awareness services, indexing and abstracting services and value-added services. The Internet and the World Wide Web have revolutionised the ways of accessing and sharing information. This Unit discusses how libraries are taking initiative in using this technology to offer customised web-based information services to the library users.

Unit 9 deals with the details of reference and information services offered by libraries and information centres. This Unit traces the development of reference and information services, bringing out the differences between them. Different aspects of reference service viz. need, function, type and its organisation and management are discussed. The advancement in ICT has led to the provision of virtual reference service by the libraries. It also discusses how libraries are using this technology to provide virtual reference service. An insight is provided on the use of the Internet as a reference tool along with its advantages as well as limitations. Amongst information services, different types of current awareness services (CAS) including selective dissemination of information (SDI) services, indexing and abstracting services and value-added services are described. Current awareness services and SDI services are two important services offered by the libraries since long. This Unit discusses the recent trends in the provision of these services using ICT. The advent of e-resources has introduced a new aspect of CAS. Libraries can now deliver links to full-text journals and articles within journals. With this facility the researcher can get access to full-text journal on her/his personal computer and get it printed on her/his desk-top. Many libraries have joined e-journal consortia to have access to computerised databases as well as access to full-text e-journals for their users. This Unit further discusses various electronic CASs offered by the present day libraries like new books alerts, table-of-content alerts, citation alerts, subject alerts, web page alerts, conference alerts, etc.

Unit 10 deals with important services such as literature search and database services. In literature search, the methods and techniques of literature search, in response to varying information needs of the users are described. It further discusses the different steps in compilation of subject bibliography, using manual as well as online resources. In database services, types and range of services offered by producers of indexing and abstracting periodicals, publishers of primary periodical, aggregators, digital libraries, initiators of open-access e-journals, and institutional repositories are covered with examples. This Unit also highlights the emerging trends in database services.

UNIT 8   INFORMATION SERVICES: AN OVERVIEW

Structure

8.0   Objectives

8.1   Introduction

8.2   Information and Knowledge – Definition

8.3   Need for Information

8.4   Types of Information Needs

    8.4.1   Current Information Needs

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    8.4.4   Catching-up Information Needs

8.5   Library and Information Services

    8.5.1   Responsive Information Services

    8.5.2   Anticipatory Information Services

    8.5.3   Web-based or Internet-based Services

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8.9   References and Further Reading

8.0   OBJECTIVES

This Unit discusses the concepts of data, information and knowledge, need for information and types of user's information needs. It also provides an overview of different types of services offered by the libraries and information centres. Further, it elaborates the impact of Information and Communication Technologies (ICTs) on the library and information services and explains how libraries and information centres can cope with this changing environment.

After reading this Unit, you will be able to:

- explain the concepts of data, information and knowledge;

- identify the information needs of different groups of users;

- categorise the types of information needs;

- explain the types of services library can offer to meet these information needs; and

- discuss the influence of information technology on the provision of information services.

8.1   INTRODUCTION

We are living in the information age. Information is crucial for all our day-to-day activities. It is generated from all kinds of human activities and achievements. Both individuals and organisations are involved in the creation of information.

R&D organisations, for instance, carry out research and generate new information. Government organisations through their diverse activities, such as governance, administration, census and surveys, generate new information. Individuals, like researchers, inventors, innovators, discoverers, thinkers, authors, planners and policy makers, judges, etc. are all involved in the task of generating information. The information, thus generated, is processed and recorded in a variety of sources and formats, and is made available for public use. Large amount of information is created every year in the form of print, films, electronic and optical storage media and is disseminated through various channels like print, telephone, radio, television and Internet. Printed information is available in a variety of **primary sources** (like periodicals, theses, research reports, patents, standards, etc.), **secondary sources** (like indexing and abstracting periodicals, books, dictionaries, encyclopaedias, handbooks, etc.) and **tertiary sources** (like directories, bibliography of bibliographies, guide books, etc.). Electronic information is available for all the print versions in the form of **e-resources**, such as e-books, e-journals, etc. Libraries systematically collect, process, store and disseminate this recorded knowledge and information to their users. In this Unit you will study about information, need for information, and types of services libraries are generally providing to meet these information needs.

8.2 INFORMATION AND KNOWLEDGE – DEFINITION

According to Oxford English Dictionary the first known historical meaning of word 'information' in English was "act of informing, or giving form or shape to the mind, as in education, instruction or training."

Online Dictionary of Library and Information Science defines information and knowledge as follows:

Information – "**Data** presented in a readily comprehensible form to which **meaning** has been attributed within the context of its use. In a more dynamic sense, **information** is a message conveyed by the use of a medium of **communication** or expression. Whether, a specific message is information or not depends in part on the subjective perception of person receiving it. More correctly, all the facts, conclusions, ideas and creative works of human intellect and imagination, that have been communicated formally or informally, in any form is information."

Knowledge – "**Information** that has been comprehended and evaluated in the light of experience and incorporated into the knower's intellectual understanding of a subject. In other words **knowledge** is the **information**, one has acquired through learning or experience."

Communication – Communication is a process of transferring **information** from one entity to another. Communication is commonly defined as "the interchange of thoughts, opinions or information by speech, writing or signs." Communication can be perceived as a two-way process in which there is exchange of thoughts, feelings or ideas towards mutually accepted goal or direction (en.wikipedia.org).

Telecommunication – The transfer of **information** from one physical location to another by electronic means. The term telecommunication refers to both analog

and digital communication, including voice and video. Data communication refers only to digital communication.

The above definitions illustrate that information is a term with many meanings depending on context and is closely related to such concepts as meaning, knowledge, instruction, data, and communication. In terms of communication, information is a message that is received and understood. In terms of data, it can be defined as a collection of facts from which conclusions can be drawn. There are many other aspects of information, since it is knowledge acquired through study, experience or instruction.

Even though information and data are used interchangeably, they are actually different. Data are sets of unrelated information or facts and as such of no use until they are properly evaluated. Upon evaluation, once there is significant relation between data and they show some relevance, then they are converted into information. Now the same data can be used for different purposes. Thus, when the data convey some information, they are useful and considered to be information.

We all know that knowledge is information that one has acquired through learning and experience. At times, knowledge and information are used synonymously. For instance, we refer to a library, a storehouse of knowledge, because it stores documents which contain information and knowledge.

In nutshell, we can say, data (which are one or more pieces of information or facts or observations), when processed, manipulated and organised into a meaningful guide to form the basis for further action, study or research, are known as information whereas knowledge refers to practical use of information. While information can be transported, stored and shared without any difficulty, same cannot be said about knowledge. For instance, a scientist conducts a scientific experiment and prepares a detailed report explaining the findings of her/his experiment. Now, a third person reading the results will have information about the experiment, but the person who conducted the experiment will have knowledge about it. Thus, information becomes knowledge when it is analysed, linked to other information and compared to what is already known.

Self Check Exercise

Note: i)   Write your answer in the space given below.

ii)   Check your answer with the answers given at the end of this Unit.

1)   Distinguish between data, information and knowledge.

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8.3 NEED FOR INFORMATION

Information is crucial for all our activities. We need it for education, research, employment, entertainment, healthcare, problem solving and life long learning. Information is a vital resource for socio-economic development of a country. Accessibility of latest scientific, technical, developmental and commercial information, gives a country economic, technological and political advantage over other countries.

Everybody needs information for some purpose or other. Students need information to supplement their textbooks studies and for project work; teachers need information for teaching and research; professionals (doctors, engineers, lawyers, consultants, etc.) need information to pursue their careers efficiently and planners and policy makers need information to frame policies and plans as well as to take correct decisions. Researchers (scientists, technologists, social scientists, etc.) need information to keep up-to-date in their area of research, to find out new areas of research, to avoid duplication of research efforts and to solve any problem they encounter while carrying out research. Researchers are the most extensive users of information and knowledge. As a matter of fact, most of the earlier library and information services were designed keeping in view their information requirements.

8.4 TYPES OF INFORMATION NEEDS

A large number of user surveys have been conducted to find out information requirements of different categories of library users. Such studies show, information needs vary from person to person, and a particular person may have different needs at different points in time, depending upon her/his nature of work, place of work, etc. These surveys, in general, have identified four types of information needs of users which are: current information needs, exhaustive information needs, everyday information needs, and catching-up information needs.

8.4.1 Current Information Needs

When users need information to keep themselves up-to-date with the latest developments in their area of interest on a regular basis, the need is known as current information need. Here, users do not need specific information, but need to regularly keep themselves abreast of information not only in their own area of interest but also of developments that may affect their work. For instance, people in the corporate sector need to know on regular basis, about the market and their competitors, latest innovations in the product development and how to do business.

8.4.2 Exhaustive Information Needs

When user wants to have information on a particular subject as exhaustive as possible, the need is known as exhaustive information need. This need is an occasional one and is expected mainly from the researchers. A researcher, before starting research on a particular topic, surveys the literature published in that area as comprehensively as possible, with a view to select new area for her/his research as well as to avoid duplication of research effort. The exhaustive

information need also arises when the researcher is reporting her/his research findings, in order to compare her/his research results with the results of earlier studies.

8.4.3 Everyday Information Needs

This need is for a specific piece of information which users require, generally in their day-to-day work related activities. For instance, a scientist working on an experiment wants to know melting or boiling point of a particular compound. This need is basically for factual information which may range from how to spell a word or find a telephone number of an industry or to know the name and address of a managing director of a corporate house.

8.4.4 Catching-up Information Needs

This need arises when a user, who is not conversant with a particular subject field, requires an account of overall development of that subject in short and most comprehensible form. This type of need is grouped as catching-up information need. It arises when a scientist or technologist conducts research on a multidisciplinary project. S/he may be an expert in one of the disciplines, but to catch-up with other disciplines, which fall within the purview of the current project, s/he requires a brief overview of those disciplines in simple and understandable form.

Apart from the four types of information needs mentioned above, there are two more types of information needs of users which a good library system can fulfil. These needs are **General Reading Needs** and a **Need for Informal Information** which help users to improve the work they do. Both these needs, when fulfilled, help in personal development of the user.

Libraries form a vital part of world's system of information storage and retrieval. Libraries of all types, like academic, public or special libraries, acquire, organise, store, retrieve and disseminate information according to the needs of users. They make available through books, journals, films, recordings and other media, the knowledge that has been accumulated through ages. People from all walks of life including students, teachers, researchers, professionals, business executives, government officials use library resources to meet their information requirements.

Self Check Exercise

Note: i) Write your answers in the space given below.

  ii) Check your answers with the answers given at the end of this Unit.

2) Distinguish between 'Everyday Information Need' and 'Current Information Need'.

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3) Differentiate between 'Exhaustive Information Need' and 'Catching-up Information Need'.

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8.5   LIBRARY AND INFORMATION SERVICES

Libraries build their collections tailored to the needs and goals of the organisation they serve. Viewed historically, the library's role of making materials available ranks among the most important contributions ever made to human culture and technology. Libraries have long stored materials that enable ideas, knowledge and experiences to be passed on from generation to generation. Without this line of communication, cultural and technological developments would not be as advanced as they are today. In day-to-day life, the library materials serve as important resources in education, work and recreation of millions of people. To the students, the library is a place where they can find information that help them to carry out their school or college work. It is also a place where they can pursue knowledge outside their classrooms and beyond their textbooks. Professional people rely on materials in special library for information they need for their work. Before going to a court for a legal case, a lawyer may spend hours in a law library finding and studying cases to prepare for arguments. Doctors use medical libraries to obtain information they need in order to treat unusual and complicated cases. Many business executives also find materials in the library to be of great value for their work.

Present day libraries have extended library services far beyond making materials available. They offer many forms of assistance to library users, which can broadly be grouped as Reference and Information Services. These services promote the use of library material, connect the users with the library resources and meet the information requirements of the users. These services can be broadly divided into two groups:

a) **Responsive Information Service:** The service that is provided in response to a specific request.

b) **Anticipatory Information Service:** The service that is provided in anticipation of some need.

8.5.1   Responsive Information Services

Responsive information services (also known as *passive information services*) are provided in response to a request from the users. The request may come from the user in person, over the telephone, through correspondence, or via e-mail. Requests may be for finding general information about the library, its layout, how to become a member, how to use catalogue, or for finding answer to a particular question or getting a particular document from the library. These services can be broadly categorised as follows:

1) Provision of general information

2) Reference service

    i) Ready reference service

    ii) Long range reference service

3) Literature search and compiling a subject bibliography

4) Assistance in the use of library collection and library tools

5) Document delivery service

6) Referral service

1) **Provision of General Information**

General information is sought by a user, who visits the library for the first time. Such readers need directional guidance in the use of library such as general layout of the library, where current issues of periodicals are displayed or the location of reference and textbooks section of the library or where is the computer terminal for searching information on OPAC (Online Public Access Catalogue) of the library if there is one, etc. Such type of directional guidance is frequently provided by the libraries. Schools, college and university libraries normally offer 'user orientation' or 'user education' programmes for the new entrants. These programmes are organised for new students every year in the beginning of the academic session. The contents of these programmes cover: objectives of the library and its organisation, collections of the library and its location, catalogue of the library and how to use it, general rules and procedures of the library, lending and borrowing facilities, reference and information services, etc. User initiation programme may be in the form of a lecture by the librarian followed by a tour of the library. Some libraries prepare audio/visual kits for this purpose, other libraries distribute library brochures containing all the information. Whatever may be the format of these programmes, basic objective is the same i.e. to introduce the library and its services to the new user.

2) **Reference Service**

According to Ranganathan "Reference service is the process of establishing contact between a reader and his documents in a personal way". Reference service is also considered as a personal service which is provided in response to the request from the users. Requests may be for locating answers to fact finding questions, literature search for solving a research problem or for compiling a bibliography, or for general help. To provide the service the librarian may utilise the resources available in the library as well as available outside the library. Basic aim is to make the information available to the user as early as possible. Depending upon the requirement, librarian may give information or the document containing the information. Basic services under this category are ready reference service and long range reference service.

    i) **Ready Reference Service or Short Range Reference Service**

This service is concerned with providing answers to fact finding questions, such as what, where, who, when, and how type. What is the population of India? Where is Nile River located? Who discovered telephone? When will next total solar eclipse occur? How many bones

are there in a human being? Where can I find a biography of Nobel Laureate Amartya Sen? The required information can be easily located in standard reference books like dictionaries, encyclopaedias, yearbooks, almanacs, gazetteers, biographical sources, etc. The time required to answer these queries is very short ranging from a few minutes to half an hour. Ninety per cent of such queries are simple to handle. That is why this service is known as ready reference service or short range reference service. Only 5 to 10 per cent of the queries may take hours of research to find the answer. Percentage of ready reference questions, handled by libraries differ from library to library. In one study it was found that 60 per cent of the questions asked in a public library were of ready reference type. Request for background information made up other 40 per cent of the queries. In academic and special libraries, such questions may range from 30 to 60 per cent of the total. Ready reference service is not limited to users, who visit the library to ask question. Many libraries offer remote assistance via telephone, e-mail. Librarians are also creating websites, answer archives and links to answers to "Frequently Asked Questions (FAQ)." These all are designed to anticipate user's questions and help users to find information independently. Ready reference service satisfies everyday information needs of the users.

ii) **Long Range Reference Service**

This service is generally provided to a specialist who is seeking information for research work or to solve a particular problem. Information sought may be too specialised in nature, it may be too recent, it may be related to earlier period, or it may be in another language. This type of service is more common in special libraries. The request may come from a professor, a business executive, a professional, or R&D personnel. In long range reference service, information is searched in several sources like printed sources, electronic sources, organisations as well as informal sources. In case information is not available in local library the sources of other libraries are explored and material is borrowed on interlibrary loan. Since wide range of sources are consulted to provide this service, the time taken is much longer than the ready reference service. Moreover, in ready reference service data or facts are provided, while in long range reference service documents, periodicals or reports containing information are provided. Sometimes information selected from various sources is analysed, evaluated, synthesised and repackaged to suit the information requirement of the user.

3) **Literature Search and Compiling a Subject Bibliography**

Another very important responsive service offered by a library is to compile subject bibliographies on request. Sometimes such bibliographies are compiled on regular basis or in anticipation of user's needs. At times bibliographies are compiled on special occasions, such as during seminars and workshops, to provide the latest literature on the subject. University and special libraries offer this service more frequently than the public library. Compilation of bibliography will be dealt in detail in **Unit 10** of this course. Long range reference service, literature search and bibliographies meet the current as well as exhaustive information needs of the users.

4)   **Assistance in the Use of Library Collection and Library Tools**

Assistance in the use of library collection and library tools (such as catalogue including OPAC, reference books, online databases, etc.) is provided to the user so that s/he may be able to use the library more profitably. To provide this service it is important that the reference librarian should have positive attitude towards the profession. S/he should be friendly in nature and willing to help the user. S/he should be professionally competent to establish rapport with the user. Positive attitudes not only enhance the image of the library but also encourage the library user to approach the library staff without any hesitation and with confidence. Such services form part of promotional activities and encourage the use of library material as well as library services.

5)   **Document Delivery Service**

Document Delivery Service (DDS) is concerned with the supply of document(s) to the users on demand, either in original or its copy in print or non-print form. Most of the information services such as current awareness service, selective dissemination of information (SDI) service, indexing and abstracting service, literature search service, etc. are aimed at guiding the user to the document where required information is available. On the other hand, DDS actually locates the required document and deliver it to the user. Earlier, DDS was mainly concerned with "lending" a document to the user for a specified period of time, if the publication is not available within the library, then borrowing it from other libraries on interlibrary loan and lending it to the user. With the introduction of xerography in mid 1950s and large scale use of photocopier in the libraries by 1970s, documents could be duplicated and given permanently to the users. The libraries started using photocopier for supply of copies of documents, particularly of journal articles and parts of books. The advent of ICTs (Information Communication Technologies) in 1980s, made it possible to store the documents in electronic form and send the same electronically over long distances via telecommunication networks almost instantly. Now, many libraries and information centres are using this technology for delivery of documents to their users. With the availability of full-text electronic journals and e-books on the Internet, many publishers and aggregators, have started offering online ordering and instantaneous delivery of the books and articles of journals. User can request an item directly from the publisher and receive the article at the location of her/his choice. At present, database producers, commercial online vendors, commercial publishers, and e-journal service providers are also offering DDS on payment basis. DDS is one of the back up services of the library.

6)   **Referral Service**

When users are referred to the sources where the required information is available, the service is called referral service. Referral service does not provide users with the document or information needed by them, but directs them to the sources of information where required information will be available. The source may be either a document, an organisation or an individual. In traditional library services, the service is offered mainly from sources available in-house. In referral service the sources may vary from recorded sources of information to informal sources like individuals, specialists and experts from other organisations.

Self Check Exercise

Note: i) Write your answer in the space given below.

ii) Check your answer with the answers given at the end of this Unit.

4) What do you understand by responsive information services? Enumerate the types of services offered under this category.

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8.5.2 Anticipatory Information Services

Anticipatory information services are provided to library users in anticipation of their demands for such services. These services are also called *active information services*. The need for such services was felt mainly due to: i) Exponential growth of published literature, particularly in the field of science and technology; ii) Interdisciplinary nature of frontline areas of research, resulting in scattering of information in different disciplines; and iii) Publications of research results in different types of sources (like primary research periodicals, research reports, conference proceedings, dissertations, etc.), languages as well as in different formats (like print or electronic). As a consequence of the growth in volume, diversity, and complexity of information sources, scientists, technologists, researchers and managers faced problems in accessing information and in keeping themselves abreast of the latest developments in their fields of interest. To solve this problem, the libraries, particularly, scientific and technical libraries started providing information services to the users, mainly to the researchers. Now, not only S&T libraries, but all kinds of libraries and information/documentation centres, are offering some form of anticipatory information service, depending upon the needs of their clients. To provide these services, user's information needs are assessed and then services are designed accordingly. Initially, the service is provided on trial basis and when response is satisfactory then the service is regularised. Generally, following types of anticipatory services are offered:

i)   Current Awareness Type

ii) Condensation Type

iii) Readers Advisory Service

iv) Information Literacy Training

i)   **Current Awareness Type**

To keep the users abreast of the current developments in their respective fields of interest current awareness types of services are offered to the users. This involves scanning the newly available documents in print as well as in non-print form, selecting items relevant to the needs of individual or group of users, recording them and disseminating to the users on a regular basis. Current awareness type of services meet the current information needs of the users. Types of services provided under this category are:

- Accession List/ Current Awareness List/ Documentation Bulletin
- Title Announcement Service/ Contents-by-Journal Service
- Selective Dissemination of Information
- Research-in-Progress Bulletin
- Newspaper Clipping Service

Accession list covers the latest books acquired by the library. Accession list is brought out either fortnightly or monthly. Some libraries regularly display the latest books in the library after accessioning. Current awareness list and documentation bulletin cover list of articles of latest journals or other sources of current information received by the library. In contents-by-journal service, content pages of the newly received journals are duplicated and circulated to the users for keeping them abreast of the latest articles published in their fields of interest. Sometimes currently received journals are circulated to the researchers. Selective dissemination of information service is a personalised current awareness service, where newly received items of information are matched with user's area of interest and only those items are selected and disseminated to the user which matches the user's interest. This service is normally a computerised service. Research-in-progress bulletin is another type of current awareness service which provides information on the on-going research projects in various research institutions in a country or in the world. Such type of publications are generally brought out by a parent body which funds or controls a group of research organisations like CSIR (**C**ouncil of **S**cientific and **I**ndustrial **R**esearch), ICMR (**I**ndian **C**ouncil of **M**edical **R**esearch), ICAR (**I**ndian **C**ouncil of **A**gricultural **R**esearch), etc. In newspaper clipping service, libraries provide important news items of interest published in national and international newspapers and magazines, to the organisation periodically such as daily or weekly. Newspaper clipping service is quite common in media libraries and libraries of government departments, industrial organisations, and financial institutions.

ii) **Condensation Type**

In this type of service, contents of the documents are condensed or summarised along with bibliographical details of the document. This enables the user to identify the basic contents of the document quickly and determine its relevance to their interest. At times, a well prepared abstract serves as a substitute for the document. The types of services under this category are indexing services, abstracting services, digest services and other value-added services. Basic process involved in indexing and abstracting service is 'analysis of information'. In indexing service it is 'analysis of the subject' and in abstracting service it is 'analysis of the contents.' In both these services no critical evaluation is carried out of the basic contents of the documents. The resultant product is factual, non-critical or non-evaluative. In digest service, information is collected from various sources, it is properly evaluated, analysed and consolidated to prepare a digest. Analysis and consolidation of information is done keeping in view the specialised requirements of the users. Different types of digests are prepared, tailored to the needs of different categories of users e.g. users at managerial, supervisory, technician or operator level. Abstracting, indexing, and digests services meet current as well as exhaustive information needs of the users whereas some value-added services like state-of-the-art reports, reviews, market reports, etc. meet the catching-up information needs of the users. You will study in detail about these services in **Unit 9** of this course.

iii) Readers Advisory Service

This service deals with providing reading guidance to individuals. Aim of this service is to motivate the readers to use the library and inculcate good reading habits in them. School children require this kind of service very much. Such a service is more often offered in school and public library. This service helps the readers to select right books for educational and recreational purposes. This type of service meets general reading needs of the users and helps in personal development of the users.

iv) Information Literacy Training

Information literacy training has been known by many different names such as library orientation, user assistance, bibliographic instruction, user education, and information skills training. Library orientation is concerned with acquainting new users to the library, such as objectives of the library and its organisation, collection of the library and its location, general rules and procedures of the library and reference and information services of the library. User assistance refers to helping an individual rather than a group. Bibliographic instructions concentrate on mechanics of using particular resources. User education or information skills training connotes an educational activity, which is concerned with motivating the user and developing a skill in the user to find and search information independently for study, research and recreational purposes. Information literacy skills concentrate on cognitive and transferable skills such as problem solving, evaluation, and communication skills. Chartered Institute of Library and Information Professionals (United Kingdom), defines information literacy as:

'Information literacy is knowing when and why you need information, where to find it, and how to evaluate, use and communicate it in ethical manner.'

National Forum on Information Literacy, Inc. (U.S.A), defines it as:

'Information literacy is the ability to know, when there is need for information, to be able to identify, locate, evaluate and effectively use that information for issue or problem in hand.'

An information literate should have the ability to:

- understand the need for information;
- identify resources available;
- find information;
- evaluate the results;
- work with or exploit the results;
- communicate and share the findings; and
- manage the findings.

UNESCO is strongly advocating the building of knowledge societies where the power of information and communication helps people to access the knowledge they need to improve their daily lives and achieve their full potential. In this context, information literacy is important as a means to empower people from all walks of life to seek, evaluate, use and create information effectively, to achieve their personal, social, occupational and educational goals. The rise of information

revolution has led to information becoming a producer of wealth. This revolution has increased the importance of being able to access and utilise information from a variety of sources including information published electronically. Various studied have shown that information literacy level of students entering higher education is low. They have basic knowledge of several simple tools and documents, but they lack understanding of other more specialised sources like scholarly journals, databases, thesaurus, etc. They also lack the knowledge of basic principles of copyright or to have a critical approach to information. Hence, information literacy training is mandatory if students are to perform at the expected level in higher education. Well planned information literacy training programmes ensure that each user is able to access and use all the available quality information efficiently and effectively regardless of its form, both in library and on the Internet.

Details of why information literacy is essential for library staff as well as for library users and types of information literacy programmes required to be conducted by the libraries for various categories of users, will be covered in **Unit 11** of this course.

Self Check Exercise

Note: i) Write your answer in the space given below.

ii) Check your answer with the answers given at the end of this Unit.

5) What factors led to the provision of 'anticipatory information services' by the libraries? Enumerate the types of services offered under this category.

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8.5.3 Web-based or Internet-based Services

Internet and the World Wide Web (WWW) have introduced new and powerful ways of finding and sharing information. Many people use the terms Internet and WWW interchangeably, but in fact the two terms are not synonymous. The Internet and the Web are two separate but related terms. The Internet is a collection of interlinked computer networks which when accessed from individual computer, gives user the ability to find information located on any computer linked to one of the networks. The Internet connects millions of computers together globally, forming a network in which any computer can communicate with any other computer as long as they are connected to the Internet. The information that travels over the Internet does so via a variety of languages called protocols.

The WWW or simply the Web is a way of accessing information over the medium of the Internet. The Web uses HTTP (Hyper Text Transfer Protocol) to transmit data. The Web also utilises browsers such as Internet Explorer or Netscape Navigator to access Web documents. HTTP defines how messages are formatted and transmitted, and what action web servers and browsers should take in response

to various commands. For example when you enter a URL (like http://www.niscair.res.in/) in your browser, this actually sends a command to the web server directing it to fetch and transmit the requested web page. The web documents are called web pages that are linked to each other via hyperlinks. Web pages are formatted in a mark up language called HTML (Hyper Text Markup Language) that supports links to other documents, as well as graphics, audio or video files. The Web is just one of the ways that information can be disseminated over the Internet. Thus, the Internet, not the Web, is used for e-mail, Usenet newsgroups, instant messaging and FTP (**F**ile **T**ransfer **P**rotocol).(http://www.webopedia.com).

The Internet and the Web technology has changed the way people communicate, interact, acquire and share knowledge. Growing number of people rely on the Internet for information they need. With further advancements in the Internet and communication technology Web 2.0 has evolved which provide dynamic, interactive and collaborative platform for the users to exchange information and knowledge. In Web 1.0 environment, users read what others wrote. However, now Web 2.0 facilitates users to express their views and publish them online through services like blogs and wikis. In other words, migration from Web 1.0 to Web 2.0 is essentially characterised by movement from "read-only' to 'read-and-write web, (Arora 2009).

The users of today, particularly young people, are relying and accessing information very differently. They lead media saturated lives and use the Internet more than the libraries. They use portable devices and access information from homes, from workplace, from restaurants, indeed from anywhere. They think they can find all knowledge via Google or Yahoo. The Wikipedia provides free knowledge on every topic. With this information now being readily available from an individual's own computer, the role that the library traditionally played in aspects of information provision is being questioned and doubts are cast about whether it has a future. In other words, users value convenience and do not have strong incentives to use library sources. It is high time that libraries need to think competitive environment around them and take initiative to take library sources to the user, since ease of access and principle of least effort play a part in the choice of information source. Earlier users built workflow around libraries. Now, libraries should build services around user workflow if they want to survive. Many libraries have taken initiative and are using available technologies to offer improved, customer driven services to their users.

The types of services offered are:

i)   **Library Website:** A Web presence is very important for the library to reach its users. With library's website on the Internet, users can search library sources using OPAC (Online Public Access Catalogue) from anywhere and at anytime. They need not visit or wait for the opening and closing hours of the library. Users can reserve particular publication, make suggestions for purchase of a particular publication, online renew the borrowed books and many more things without visiting the library. Many libraries are offering reference services in an online mode where users can communicate with the librarian as they would do in face-to-face reference context. Many libraries offer online chat facility, provide links to OPAC of other libraries which are useful for their patrons. Libraries are also providing online access

to union catalogue of books, conference proceedings, theses and dissertations, etc. of the participating libraries which users can search remotely.

ii) **Access to Databases:** An increasing number of bibliographic, numeric and full-text databases are available on the Internet. Indexing and abstracting databases like Chemical Abstracts, Biological Abstracts, Index Medicus, COMPENDEX, and INSPEC, etc. are all available on the Web with added functionality and features. Depending upon the needs of the users library can provide access to these databases. You will study in detail about these databases and their services in **Unit 10** of this course.

iii) **Access to e-Journals:** Electronic journals or e-journals are those journals which are prepared and distributed electronically. Several traditional journals are now being published both in print as well as on the Web. Libraries are joining e-journal consortia to provide access to full-text e-journals to their clients. Some of the examples are JCCC@UGC-INFONET Consortium and CSIR e-Journal Consortium. You will study about these consortia in **Unit 10** of this course.

iv) **Access to Courseware:** There is a wide variety of interactive multimedia courseware resources available on the Internet for learning as well for developing multimedia for teaching purposes. Depending upon the needs of its users, library may provide access to some of these coursewares. Some examples of courseware available on the Internet from India are:

e-Gyankosh: It is a National Digital Repository developed by Indira Gandhi National Open University (IGNOU).The repository supports learning resources in different formats such as self instructional study material, audio/visual programmes, and archives of radio and television based-live interactive sessions on the Web. The entire course material of different courses offered by the university has been digitised and made available to the students through e-Gyankosh. The repository offers anytime access to its collection to the academic community.

National Programme on Technology Enhanced Learning (NPTEL): Seven Indian Institutes of Technology (IITs) and Indian Institute of Sciences (IISs) have developed curricula-based video and web courses in different branches of engineering. The objective of NPTEL programme is to enhance the quality of engineering education in the country. In the first phase of the project, supplementary contents for 125 web courses in engineering/science and humanities have been developed. Each course contains materials that can be covered in 40 or more lectures. In addition 135 courses have been developed in video format. Here each course comprises about 40 or more lectures of one hour duration. Goggle and YouTube are supporting NPTEL distribution. Video lectures can be directly accessed at http://youtube.com/iit.

Nation Science Digital Library (NSDL): As a part of 10th Five Year Plan Network Project of Council of Scientific and Industrial Research, NSDL is providing free curriculum base contents to the undergraduate students of science in India on the Web. The course contents have been written and vetted by eminent faculty members from different universities and colleges.

8.6 SUMMARY

In this Unit, we have discussed the concept of data, information and knowledge. We have also explained variant nature of information, how it is generated and communicated and described the importance of information for individuals in every field of human activity be it education, research, entertainment, employment, problem solving or for life long learning. Different types of information needs of the users have been highlighted. We have described the types of services offered by the libraries and information centres to fulfil these needs. The Internet and the World Wide Web have revolutionised the ways of accessing and sharing information. The Unit also discusses how libraries are taking initiative in using this technology to offer customer driven improved services to their users.

8.7 ANSWERS TO SELF CHECK EXERCISES

1) **Data:** Even though information and data are used interchangeably, they are actually different. Data are sets of unrelated information, facts or statistics and as such of no use until they are properly evaluated. Upon evaluation, once there is significant relation between data and they show some relevance, then they are converted into information.

   Knowledge: Information that has been comprehended and evaluated in the light of experience and incorporated into the knower's intellectual understanding of a subject. In other words **knowledge** is the **information**, one has acquired through learning or experience.

   Information: Information is a term with many meanings depending on the context and is closely related to concepts such as knowledge, instruction, data, and communication. In terms of communication, information is a message received and understood. In terms of data, it can be defined as a collection of facts from which conclusion can be drawn. There are many other aspects of information, since it is knowledge acquired through study or experience or instruction.

   In nutshell, we can say, data (which are one or more pieces of information or facts or observations), when processed, manipulated and organised into a meaningful guide to form a basis for further action, study or research, is known as information whereas knowledge refers to practical use of information. While information can be transported, stored or shared without any difficulty, same cannot be said about knowledge. For instance, a scientist conducts a scientific experiment and prepares a detailed report explaining the findings of her/his experiment. Now, a third person reading the results will have information about the experiment, but the person who conducted the experiment will have knowledge about it. Thus, information becomes knowledge when it is analysed, linked to other information and compared to what is already known.

2) When users want to keep themselves abreast of latest developments in their area of interest on regular basis, the need is known as current information need. Here, users do not need specific information but they keep track of the latest developments not only in their own area of interest but also in the related areas, whose development may affect their work. Everyday information need is need for specific piece of information which users require, generally in their day-to-day working.

3) When user wants to know all the information published on a subject area or a topic, the need is known as exhaustive need for information. This need is an occasional one and is required mainly by the researchers, for starting a research on a topic or while reporting their research findings, in order to compare their research results with earlier studies. This requires exhaustive search of published literature on that subject or topic whereas in caching-up information need one needs to have a brief overview of a subject or a topic in short and most comprehensible form. This need arises when a scientist or an engineer conducts a research on multidisciplinary project. S/he may be an expert in one of the disciplines, but is not conversant with other disciplines which fall within the purview of the current project. So, s/he needs to have a brief overview of those disciplines in short and convenient form to catch-up with the trends.

4) Responsive information services (also known as passive information services) are provided in response to the request from the users. The request may come from the user in person, over the telephone, through correspondence, or via e-mail or Internet. These services can be broadly categorised as follows:

   i) Provision of general information

   ii) Reference service

      a) Ready reference service

      b) Long range reference service

   iii) Literature search and compiling a subject bibliography

   iv) Assistance in the use of library collection and library tools

   v) Document delivery service

   vi) Referral service.

5) Anticipatory information services are provided to the library users in anticipation of their demands for such services. These services are also called active information services. The need for such services was felt mainly due to: i) Exponential growth of published literature, particularly in the field of science and technology; ii) Interdisciplinary nature of frontline areas of research, resulting in scattering of information in different disciplines; and iii) Publications of research results in different types of sources (like primary research periodicals, research reports, conference proceedings, dissertations, etc.), languages as well as in different formats (like print or electronic). Generally following types of services are offered under anticipatory information services:

   i) Current Awareness Type

      a) Accession List/ Current Awareness List/ Documentation Bulletin

      b) Title Announcement Service/ Contents-by-Journal Service

      c) Selective Dissemination of Information

      d) Research-in-Progress Bulletin

      e) Newspaper Clipping Service

ii)   Condensation Type

    a)   Abstracting Service

    b)   Indexing Service

    c)   Digest Service

iii)   Other Value-added Services

    a)   Readers Advisory Service

    b)   Information Literacy Training

8.8   KEYWORDS

Blog	:	Short for web log, a frequently updated website about a particular topic that contains dated entries in reverse chronological order i.e. with newest entries at the top.
Consortium	:	A consortium is an association of two or more individuals, companies, organisations or governments with the objectives of participating in a common activity or pooling their resources for a achieving a common goal.
Google	:	It is a web search engine owned by Google Inc. and is most used search engine on the web.
Instant Messaging	:	Instant Messaging is a form of real-time direct text-based communication between two or more people who are online simultaneously.
Newsgroup	:	A Newsgroup is a group of people who post messages about a single subject on a computer network.
RSS	:	Really Simple Syndication (RSS) is a format for publishing Web contents. It is used for sending timely information and updates to people who subscribe to it. For example, RSS feeds of Times of India Newspaper.
Wikipedia	:	It is a multilingual, web-based free content encyclopaedia. Wikipedia is written collaboratively by an international group of volunteers. There are more than 85,000 active contributors working on more than 14,000,000 articles in more than 260 languages.
Wikis	:	It is a website that allows multiple users to create, modify and organise Web contents in collaborative manner.

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UNIT 9 TYPES OF SERVICES: REFERENCE SERVICE, CAS, ETC.

Structure

9.0 OBJECTIVES

In Unit 8 of this Block you have learnt about the information needs of library users and types of services libraries are providing to fulfil these needs. In this Unit, you will learn about the reference and information services offered by libraries and information centres and the impact of information communication technology on the provision of these services.

After reading this Unit, you will be able to:

- discuss the development of reference and information service;

- differentiate between reference and information service;

- describe the importance of Internet as a reference tool;

- identify different types of current awareness services;

- discuss different types of condensation services like abstracts, digests and other value-added services; and

- comprehend the impact of ICT and web technology on the provision of these services.

9.1 INTRODUCTION

The library functions that are common to all types of libraries are acquisition, organisation, storage, and retrieval of recorded public knowledge. Earlier, libraries were regarded as mere storehouse of knowledge and books were meant for

preservation. Librarians acted as mere custodians of this knowledge and had no role in promoting the use of library collection by the users. Users were expected to use the library on their own. Librarians concentrated more on the collection and maintenance of library material rather than promoting its use.

Now, present day modern libraries are considered as service institutions. They not only acquire, organise, store, retrieve and disseminate the library material but actively encourage and promote its use among the users. They offer many forms of assistance to library users, which can broadly be grouped as reference and information services. These services promote the use of library material, connect the users with the library resources and meet their information requirements.

In this Unit, you will study the origin, growth and development of reference and information services, the difference between them and range of services offered under each category.

9.2 REFERENCE SERVICE – MEANING AND DEFINITION

To provide a precise definition of reference service is rather difficult. However, let's discuss some of the formal definitions that have appeared in library science literature from time to time. According to American Library Association's Glossary of Library Terms, "Reference Service is that phase of library work which is directly concerned with assistance to readers seeking information and in using the resources of library in study and research." According to Margaret Hutchins "Reference work include the direct personal aid within the library to persons in search of information for whatever purpose, and also various other library activities especially aimed at making information as easily available as possible. Selecting and organizing materials with this end in view is an important part of reference work as their interpretation to the individual reader." Ranganathan defines it as "Personal service to each reader in helping him to find documents, answering his interest most pin-pointedly, exhaustively and expeditiously." He further says, "To provide the right book to the right reader, in the right personal way."

According to William Katz, The reference service, defined by function can be divided into two categories: direct and indirect.

Direct category includes:

a)   Reference and information service. Under this category personal assistance is provided to the user in pursuit of information.

b)   Formal and informal instructions are given in the use of library and information centres and their resources.

Indirect category includes:

a)   Selection of material needed for reference service.

b)   Reference administration i.e. organisation and administration of reference service.

c)   Interlibrary loan.

d)   Evaluation of reference section.

e)   Miscellaneous tasks such as photocopying, filing, checking in material, maintaining records and other tasks of reference department from budgeting to preparing reports and publicity material.

According to Grieg Aspnes "the ultimate theoretical (and practical) goal of any reference library or information center must be to supply its users with all the information and only the information, they need at the lowest possible cost."

The above definitions suggest that the reference service in the library is any assistance provided by library staff to users seeking information. It covers direct services such as searching for information, providing directional guidance, helping in research, etc. and indirect services like selection and maintenance of reference material, preparation of guides and aids to the use of library material, etc.

9.2.1   Reference Service – Origin, Growth and Development

Though informal help to the users in the use of libraries has been provided by the libraries since long, the concept of organised reference service can be traced back to the end of 19th century in public libraries in USA. The public libraries were the first ones to initiate reference service in an organised manner. Main driving force behind this initiative was justification of public funds utilised by the public libraries. The public library financed by public funds had to justify its existence to those who supported it. The librarians therefore had real incentives to look for new ways to demonstrate the utility of their libraries to the authorities. These values they appraised in terms of library use and the services offered. In 1876, at the first conference of the American Library Association, Samuel S. Green, Librarian of Worcester, Massachusetts, Free Public Library presented a paper titled 'Personal relations between librarians and readers'. He emphasised that furnishing readers with catalogue and reference tools was not sufficient and insisted that 'interpreting these instruments to public by personal guidance must follow'.

By the end of 19th century and early 20th century the concept of reference service was gradually accepted and implemented by American libraries. The leading advocates of this concept along with Samuel S. Green were Poole, Winsor and Melvil Dewey. In 1883, the first full time reference position was established at Boston Public Library and in 1891 the term 'reference work' appeared for the first time in the index to the Library Journal.

In the years that followed, the libraries, public as well as academic, slowly set up reference department, established reference collection, designated one or more library staff to fulfil reference functions which included assisting users in the use of library collection, providing answers to fact finding questions and helping readers to make the best selection from the recorded knowledge.

In India, the credit for setting up full fledged reference service goes to S.R. Ranganathan in Madras University Library in 1930.

The emergence of reference service changed the role of a library from mere storehouse of knowledge to that of an educational institution and the role of a

librarian from mere custodian of recorded knowledge to that of a facilitator and promoter of the use of knowledge for the benefit of the library users.

Growth and subsequent development of reference service was based mainly on four objectives, namely, i) to assist the library users, ii) to develop the role of a library as an educational institution, iii) to help users to make best selection from the universe of recorded knowledge, and iv) to justify the existence of the library by demonstrating its use to the authorities who provided financial support.

Services covered under this category included assistance in the use of library and its tools, assistance in searching and locating documents, ready reference and long range reference service, literature search and compilation of bibliography, document delivery service, referral service, etc. Most of the services provided under this category were of responsive type i.e. the service provided in response to the request from the user.

9.2.2 Information Service – Origin, Growth and Development

Twentieth century witnessed the industrial revolution, tremendous increase in R&D activities in the areas of science and technology and special library movement. Increase in R&D activity resulted in exponential growth of recorded knowledge. Advent of computers and communication technologies, though, helped in organisation, storage, retrieval, and dissemination of information, but increased the complexity of information sources. Scientists and technologists, due to sheer amount of information and complexity of information sources, found it difficult to keep track of published knowledge in their respective fields. To solve this problem, libraries, particularly scientific and technical libraries, expanded the scope of reference service. These libraries not only provided reference service on demand, but started collecting and organising the latest published knowledge on users field of specialisation in anticipation, and bringing to their notice on a regular basis. This service was known as information service. Aim of the service was to keep users well informed and up-to-date in their field of specialisation. To begin with, the service was provided by one of the scientists of the research team of the laboratory, since s/he knew the research area as well as had the subject background. Later, library personnel started providing the service. Subsequently, particularly in special libraries, reference service broadened its scope from mere assistance in the location of books and journals and the provision of simple factual information from limited collection of reference books, to analysis, evaluation, reorganisation and repackaging of information drawn from a variety of sources in order to present it in a form which would be most useful to their users. The professionals in special library and information centres attached to R&D organisations had subject background as well as expertise in information searching. They started providing value-added services to their users. The availability of online bibliographic databases like MEDLARS/MEDLINE, Chemical Abstracts, Biological Abstracts, INSPEC, and many more in almost all disciplines of knowledge, made it possible for them to search these databases online and provide indepth services to their users. The information services which were provided covered current awareness services, abstracting services, value-added services like technical digests, etc. Most of the services provided under this category were anticipatory in nature.

9.2.3 Reference Service vs. Information Service

In literature the terms reference service and information service are used synonymously. Some experts refer them as two different kinds of services. The differences are enumerated as follows:

Sr. No	Reference Service	Information Service
1.	Traditional service	Non-traditional service
2	Emphasis to provide documents	Emphasis to provide information
3	User is given the material or directed to locate the material	Attempt is made to provide exact information
4	Aim is to instruct the user	Less concerned towards instructing the user
5	Service provided on demand	Service provided in anticipation
6	Passive service: library staff waits for the user to approach and make demand	Active service: library staff does not wait for the user to come but provide service to keep user well informed

Viewed historically, information service is an amplification of reference service and is concerned with providing information, rather than documents, to the users. Information services were developed mainly to meet the information needs of research scientists and technologists. Reference service is concerned with direct, personal assistance to the library users seeking information whereas information service is provided in anticipation of various needs of the users of library and information centres.

Self Check Exercise

Note: i) Write your answer in the space given below.

ii) Check your answer with the answers given at the end of this Unit.

1) What is reference service? Differentiate between reference service and information service.

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9.3 TYPES OF SERVICES

The reference and information services that libraries offer can be broadly categorised into two groups:

a) Responsive Information Services: The service that is provided in response to a specific request by the user.

b) Anticipatory Information Services: The service that is provided in anticipation of some need.

9.4   RESPONSIVE INFORMATION SERVICES

Responsive information services (also known as *passive information services*) are provided in response to the requests from the users. The request may come from the users in person, over the telephone, through correspondence, or via e-mail. The technology now allows users to submit their requests to the library at any time from any place in the world. In an effort to reach the users accessing the library via their computers, many libraries and library consortia are extending their reference service to include virtual reference. Virtual reference is a reference service initiated electronically, often in real time, where users employ computers or Internet technology to communicate with reference staff, without being physically present. Communication channels used frequently in virtual reference are chat, videoconferencing, Voice over IP, co-browsing, e-mail, and instant messaging.

Based upon the type of requests or queries, the services offered in the library can be broadly categorised as follows:

- Provision of general information

- Reference Service

    o   Ready Reference Service

    o   Long Range Reference Service

- Assistance in searching and locating documents

- Literature search and compiling a bibliography

- Assistance in the use of library tools such as catalogue including OPAC, reference books, online databases, etc.

- Document Delivery Service

- Referral Service

You have been already provided with an overview of the above mentioned services in Unit 8 of this course. In this Unit, we will elaborate only on some of these services such as ready reference service, long range reference service and impact of technology on these services.

9.4.1   Reference Service

Reference service is a personal service which is provided in response to the requests from the users. Requests may be for directional guidance, locating answers to fact finding questions, literature search for solving a research problem, or for general help. To provide the service, the librarian may utilise the resources available in the library as well as those available outside the library. Basic aim is to make the information available to the user as early as possible. Depending upon the requirement, librarian may give the information itself or the documents containing information.

i)   **Ready Reference Service or Short Range Reference Service**

This service is concerned with providing answers to fact finding questions, such as what, where, who, when and how. The requested information can be easily located in standard reference books like dictionaries, encyclopaedias, yearbooks,

almanacs, directories, etc. Time taken to answer these queries is very short ranging from a few minutes to half an hour. That is why this service is known as ready reference service or short range reference service. Ninety per cent of these queries are simple to handle. Only five to ten per cent of the queries may take hours of search to find the answer.

Given below are some of the examples of type of queries and the reference sources where you can find the answers:

Sr. No.	Type of Queries	Corresponding Examples	Type of Reference Sources
1	Language e.g. meaning, spelling, pronunciation, etymology of words	How do I pronounce a word 'Schedule'? Is there a better word for 'nice'? Is 'juggernaut' an English word?	Language dictionaries, Thesauri.
2	Background information of a topic	When was world war II declared? Who were primary political personalities involved in the war? How did the war come to an end?	General encyclopaedia.
3	Trends	What developments took place in the field of 'Information Technology' last year?	Yearbook.
4	General facts, astronomical data, etc.	What is the Earth's distance from Sun? Dates of eclipses of the sun and moon in 2008. Major world events in the year 1909.	Almanac.
5	Places	What countries surround Austria? What is the present name of the country 'Burma'? Where is 'Sofia' located?	Geographical sources like Maps, Atlas, and Gazetteers.
6	People	What is the birth place of Sir C.V. Raman?	Biographical sources, Encyclopaedias.
7	Organisations	Names and addresses of scientific research institutions in India. Names and addresses of universities in India.	Directories.
8	Current events	News summary of terrorists attacks in Mumbai in 2008.	News digest services like Asian Recorder.
9	Statistical information	Domestic production of petroleum products in India in 2006.	Statistical sources, Government sources.
10	Facts, formulae, diagrams	Properties of pure aluminium.	Handbooks.
11	Activities	How to grow a 'Bonsai tree'?	Manuals.

ii) Internet as a Reference Tool

Though, standard reference books maintained by the reference department in the library provide answers to most of the ready reference types of queries but, the most enticing and omnipresent reference tool that has emerged in the twentieth century is the Internet. The usage of the Internet was limited till the advent of the World Wide Web or Web in 1990s. The emergence of the Web and Internet service providers (like America On Line and CompuServe in 1995), offering Internet services to masses, resulted in phenomenal increase in the Internet usage in the world. World's Internet usage statistics shows over 2 billion Internet users (http://www.internetworldstats.com/). According to a survey conducted by the Internet and Mobile Association of India, there are at present 46 million (as on September 2011) mobile Internet users in India as against 2 million Internet users in the year 2000 (http://www.iamai.in).

Most of the print reference sources are available online on the Internet. Online sources provide updated contents, more advanced search options, download and print options. Many reference sources provide free access to their contents on the Internet. For instance Infoplease.com (http://www.infoplease.com) provides free access to encyclopaedia, almanac, dictionary and biographies. Most of the publishers of reference books also offer online access to their publications on the Web to the libraries who purchase their publications. Online access charges differ from publisher to publisher.

Advantages of using Internet as a reference tool are as follows:

Easy access: The number of answers the Internet provides in fraction of a second is amazing. In normal search to get so many answers from diverse sources would take hours of effort. The Internet provides access to universe of information any time from anywhere.

Currency: The Internet resources are more up-to-date than their print versions. Print version of Statesman's' Yearbook is published annually, while its online version updates its news column daily.

Multimedia: Apart from textual information, the Internet offers audio, visual and video information. Kids' online resources provide access to complete Merriam-Webster collegiate dictionary and thesaurus free and searchable with definitions and audio pronunciations (http://www.merriam-webster.com) (http://www.kidsolr.com/reference). In some areas of research audio/visual information adds to the process of learning. The Internet has the capability to provide textual, audio/visual and video information in hypermedia format where links are provided in the web pages to move from one format to another. Grolier Multimedia Encyclopedia online is one of the examples in this category.

Interactive: The Internet has the capability to be interactive. Discussion groups, e-mail, newsletters, on-going comments pages are possible so that information dialogue can be created. Q&A NJ in New Jersey, AskaLibrarian in Florida and AskNow in California are examples of interactive reference on the Internet.

Multiple users: Information through the net is accessible to multiple users at the same time whereas print source can be used only by a single user at a time.

Despite the above listed advantages, the Internet is still not considered a full-fledged reference source because of its inherent limitations which are as follows:

Limitations

Lack of quality control: Anyone can write anything, from anywhere in the world and leave it for any amount of time for any one to read on the Internet. In print publications on the other hand there is built in mechanism for quality control. For example, in scholarly journals each article is reviewed by peer group and edited thoroughly before it is published.

Burden of evaluation: Because of the lack of quality control, the onus of evaluating websites falls on the user herself/himself. Since user is accustomed to accept all printed material as valid information, using information available on the Internet without evaluation may lead to pitfalls.

Full-text information is not free: Full-text information, like full-text e-journals, is not always free for the Internet users. Quality research articles are mostly found in expensive subscription databases.

Volatility: With contents being added, modified, deleted constantly on the websites, make the websites volatile. It becomes imperative to constantly check the quality of website and its contents before using it for research purposes. At times some websites disappear suddenly or change their domain name making it difficult to trace them. This does not happen with print publications, their contents remain static and publication can be safely cited.

Self Check Exercise

Note: i)   Write your answer in the space given below.

ii)   Check your answer with the answers given at the end of this Unit.

2)   Though the Internet is an omnipresent reference tool, why it is not considered a full-fledged reference source?

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iii) **Long Range Reference Service**

Long range reference service is generally provided to a specialist who is seeking information for research, for delivering a lecture or for solving particular problem. Information sought may be too specialised in nature, it may be too recent, it may be related to another period, or it may be in particular language. The request may come from a professor, a business executive, a government official, a decision maker, or R&D personnel. Depending upon the query, information may be searched in several sources including printed as well as electronic sources. At times, organisational and informal sources are also tapped to provide desired information. Since, to provide this type of service, wide range of sources are consulted, time taken to provide the service is much longer than the ready

reference service. That is why this service is known as long range reference service.

For a topic like 'Trends in the development of high temperature superconductors' the required information may be of highly specialised in nature. Information sought may involve an opinion or point of view on a particular topic like 'Can Yoga be associated with religion?'. Information sought may require search in research periodicals, for a topic like 'Recent R&D efforts in combating global warming.' User may be requiring different views on a particular problem or a topic, like 'Repercussions of racially motivated attacks on Indian students in Australia' or 'Marxism vs. Communism.' Sometimes information sought may be too recent in nature for which informal sources may be consulted like experts in the field. At times, information sought may be in foreign language sources for which translation service is to be arranged. As the name indicates immediate answers cannot be provided in long range reference service. Depending upon the queries, it may take an hour or two to a week's time to provide information. In ready reference service data or facts are provided, while in long range reference service documents, periodicals, or reports containing information are provided. Sometimes information selected from various sources is analysed, evaluated, synthesised and repackaged to suit the information requirements of the particular user.

To handle such long range and at times, intricate reference questions, there are certain set procedures and practices which are generally followed so that the search for the query is in the right direction and collected information is acceptable to the user. The foremost and the most important step here is to have personal dialogue with the user. Personal interaction with the user is known as 'Reference Interview.' A reference interview will help to know the query thoroughly, the purpose for which information is sought, background of the user, and type of information sources required. The rest of the steps are similar to those followed in literature search, which you will be studying in detail in Unit 10 of this course.

iv) **Virtual Reference Service**

According to Machine Assisted Reference Section (MARS) of the Reference and User Services Association (RUSA) of the American Library Association, **Virtual Reference Service** is reference service initiated electronically, often in real-time, when users employ computers or other Internet technology to communicate with reference staff, without being present physically. Communication channel used frequently in virtual reference are chat, videoconferencing, Voice over IP, co-browsing, e-mail or instant messaging.

Virtual reference service is also referred as digital reference, e-reference, online reference and remote access reference. While telephonic reference service has long been accepted and practiced in the libraries to respond to remote users' requests, virtual reference service has been relatively a recent phenomenon.

The increasing availability of the Internet and electronic resources have been the major factors which lead to the implementation of virtual reference service that can be accessed electronically by remote users. Present day libraries are making available variety of electronic sources like online catalogues, indexes, abstracts, digitised collections, e-journals and full-text databases, through their websites. The availability of the electronic sources via remote access requires that users

should be assisted by the library to use these sources effectively. There has been a steady decline in the in-house use of library as more number of users are using personal computers with the Internet access from home, workplace or cyber café. This has prompted librarians to explore alternative approaches for interacting with their users. They have started offering virtual reference service.

The virtual reference service, in general sense, can be defined as delivery of reference service via the Internet to library users who are outside the physical confines of the library. Current primary modes of delivery for virtual reference service are e-mail, electronic forums and real-time chat communication. E-mail reference has been the most heavily used type of virtual reference service. Here, user sends the library an e-mail reference query, supplying whatever information s/he feels is necessary. The librarian may reply by e-mail, phone, fax or letter, etc. E-mail reference service suffers from a number of drawbacks which are as follows:

- E-mail does not offer instantaneous response as the Internet users normally expect from the the Web.

- It is difficult to conduct any kind of reference interview using e-mail. If question needs clarification, it may take three or more exchanges over a few days to find out what user really wants.

- E-mail reference places most of the burden of answering the question on the reference librarian whereas in in-house reference, the librarian works with the user to find the answer instead of doing all the work for her/him.

In real-time chat communication users and librarian send short written messages back and forth instantly. Chat software (like CompuServ' Instant Messenger) allows librarian to create a setting where interaction with the user is live (real-time) but limited to written exchange of information. Through a series of short messages librarian gets to know the user's requirement. Some chat programmes offer an open virtual reference room where one or more user can enter at a time and exchange messages with the librarian. **Advantages** of using chat online reference are as follows:

- It is like live reference. Librarian can talk to user directly.

- Librarian can conduct a reference interview on the spot by exchanging series of short messages to get better idea of what the user wants.

- It eliminates the problem of mishearing what is said.

- It is helpful for those with hearing or speaking impairment.

- User can save text of chat session and refer to it later.

Disadvantages of chat software are as follows:

- In chat reference, librarian can write and explain to the user to go to a specific address on the Web to find information, but can't actually take her/him there or be with her/him through a database search whereas it is possible with in-house reference service.

- More time consuming than voice communication, because librarian has to type everything out. Spelling and typing errors also might creep in.

- User might not have that much patience as s/he expects everything to be instant, efficient and convenient.

- If user logs off prematurely, it may not be immediately apparent to the librarian, specially if s/he is busy looking for required information in relevant sources.

Some of the limitations of the general chat softwares have been solved by '**Virtual Reference Softwares**'. These softwares are modification of 'Web-based Contact Centre Software' specifically designed to make online reference services easy, quick and cost effective. Currently more than 30 versions of virtual reference software are in use. The new softwares are constantly being introduced and existing products are being refined. Some of the commercial virtual reference softwares are QuestionPoint, Virtual Reference Toolkit, 24×7 Reference, Convey System, Docutek, etc.

These Virtual Reference Softwares, in addition to fully supported chat module offer many other facilities like:

- 24×7 technical support;

- Online training for librarians;

- Private and secure communication between users and librarians;

- Complete session transcripts, including URLs are e-mailed to both the user and librarians at the end of each session. A copy of the transcript is also stored in the system database for future reference and analysis;

- Queuing features which let users and librarians to know how many people are waiting to be helped;

- Push technologies allowing librarians to send web pages directly to users' desktops;

- Co-browsing facilities, allowing users and librarians to search through a database, catalogue or website simultaneously. This facility allows librarian to teach online more easily;

- Conference facilities allowing the librarian to conduct a group instruction;

- Customisation of software;

- Generating weekly statistical reports;

- Ability to transfer questions to the participating libraries in the network in real-time, for shared and collaborative virtual reference service; and

- Provide multilingual services e.g. QuestionPoint offers services in 20 languages.

Many libraries provide virtual reference service on stand alone basis. Some libraries provide this service on collaborative basis to ease the impact of software cost and staffing for extended hours. On an international level, Library of Congress and OCLC (Online Computer Library Center), Ohio launched collaborative virtual reference service using QuestionPoint software, as a pilot project in the year 2000. Presently, QuestionPoint service (formerly known as Collaborative Digital Reference Service), is one of the largest and most geographically distributed collaborative virtual reference service in the world. More than 260 libraries of all types in 21 countries are using QuestionPoint virtual reference service. There

are several benefits associated with collaboration. The first is the ability to offer virtual reference service on time share basis. For instance, an Australian/New Zealand – U.S. collaboration offers 24×7 service without staffing nights in either location. Because of 12 hours difference in the time zone, each location can cover the other's night hours. Second is automatic building of a database of all questions and answers, thus providing re-use possibilities, and options for self service by users. QuestionPoint cooperative virtual reference supports multilingual reference transaction. It has Question and Answer knowledge base that is carefully reviewed and maintained by cooperative contributors.

As collaborative virtual reference services continue to evolve, the need was felt for some guidelines and standards for operating these services. Official guidelines and policies for collaborative virtual reference service have started appearing. The prominent groups involved in creating virtual reference guidelines are International Federation of Library Associations and Institutions (IFLA), Virtual Reference Desk (VRD), National Information Standards Organization (NISO), and Machine Assisted Reference Section (MARS) of Reference and User Services Association (RUSA) of American Library Association. In addition, the QuestionPoint service has issued member guidelines.

Virtual reference service offers users a convenient, high tech way to connect with library's information professionals. This service is well suited for getting quick facts, verifying references to published sources, finding how to search for needed information in a database or on the Web or getting advice for in-depth searching.

Limitations of Virtual Reference Service

- The cost of the software is high;

- Once purchased, the reference staff has to be trained to use the software. Few reference librarians have experience with chat, instant messaging, web collaboration or any other methods of working live online;

- More time required to answer the question than that in face-to-face reference service. The average chat question takes 10-15 minutes to answer; and

- The queries that rely on in-depth consultations from a variety of sources prove difficult for librarian to communicate effectively through virtual reference service.

Self Check Exercise

Note: i) Write your answer in the space given below.

ii) Check your answer with the answers given at the end of this Unit.

3) What is virtual reference service?

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9.5 ANTICIPATORY INFORMATION SERVICES

Anticipatory information services are provided to library users in anticipation of demand for such services. These services are also called *active information services*. The need for such services was felt mainly due to: i) exponential growth of published literature, particularly in the field of science and technology; ii) interdisciplinary nature of frontline areas of research, resulting in scattering of information in different disciplines; and iii) publication of research results in different types of sources as well as in different formats. As a consequence of the growth in volume, diversity, and complexity of the information sources, scientists, technologists, researchers and managers faced problems in accessing information and in keeping themselves abreast of the latest developments in their areas of interest. To solve this problem, the libraries, particularly scientific and technical libraries, started providing information services to the users, particularly to the researchers. Now, not only S&T libraries, but all kinds of libraries and information/documentation centres, are offering some form of anticipatory information service, depending upon the needs of their clients.

To provide these services, user's information needs are assessed and then services are designed accordingly. Initially, the service is provided on trial basis and when response is satisfactory then service is regularised. The following types of services are offered:

- Current Awareness Type

- Condensation Type

- Readers Advisory Service

- Information Literacy

- Web-based or Internet-based services

You have been provided an overview of above mentioned services in Unit 8 of this course. In this section we will elaborate on current awareness type and condensation type of services.

9.5.1 Current Awareness Type

Current awareness type of services are provided to keep users abreast of current developments in their respective field of interest. This involves scanning newly available documents in print as well in non-print form, selecting items relevant to the needs of individual or group of users, recording and disseminating them to the users on regular basis. Current awareness service (CAS) is an ongoing service that enables one to monitor new information on regular basis. Current awareness type of services meets the current information needs of the users.

Characteristics of Current Awareness Service

- The purpose of this service is to alert the user about recent developments in her/his area of interest as early as possible.

- Since time is the major factor in the preparation of this type of publication, it generally contains list of journal articles, book titles, etc. with no annotations or abstracts.

- The presentation of items of information is such that it facilitates scanning.

- It has newspaper type approach, hence, the entire list is meant for scanning.

- The service is not confined to a very specific narrow subject area but covers a broad area in a particular subject discipline.

- Since the list is not meant for permanent use, therefore, no attempt is made to do extensive indexing etc.

Types of Services

Types of services offered under this category are:

- Accession List / Current Awareness List/Documentation Bulletin

- Title Announcement Service/Contents-by-Journal Service

- Selective Dissemination of Information

- Research-in-Progress Bulletin

- Newspaper Clipping Service

i) **Accession List/ Current Awareness List/Documentation Bulletin**

These types of current awareness services are most commonly offered by libraries. Accession list basically covers latest books acquired by the library. Apart from displaying the latest publication in the library, accession list is brought out regularly (fortnightly or monthly) to inform the users about the latest additions to the library. In documentation bulletin or current awareness list, primary journals and other sources of current information received in the library are scanned, bibliographical details of journal articles and other items of interest are noted down, classified or grouped under broad or narrow subject headings and circulated to the users at periodic intervals.

ii) **Title Announcement Service/Contents-by-Journal Service**

In a research environment, there is constant need to note new research findings that would stimulate or contradict or point towards more productive direction of research for the researchers. New research results are published in primary research periodicals, in dissertations and presented in the conferences, etc. Primary research periodical is the most preferred medium used by the researchers to communicate their research findings and keep themselves abreast of the latest developments in their area of research. Researchers, therefore, look forward to access latest published journals in their area of interest. To meet these information needs of researchers, current awareness type of service is provided by the library, documentation centre or commercial publishers. In **Title Announcement Service** articles of required journals are selected and arranged under broad subject headings or classified with full bibliographical details and disseminated to the users periodically as print publication or e-publication. This helps the user to know what latest has been published in her/his subject area of interest.

Another type of CAS is **Contents-by-Journal Service** or Table-of-Contents (TOC) service. Here, contents pages of latest journals in broad subject area (like chemical sciences, physical sciences, life sciences, etc.) are duplicated, arranged journal wise and disseminated to the users as a regular service. As stated earlier, primary research journals are a predominant medium for communicating new information, this type of service helps the users to know of the recent articles published in their journals of interest. Another reason behind offering contents-by-journal service is the fact that users tend to value certain journals very high

and look forward to browsing through issues of these journals as soon as they are published. The contents page service enables them to know the titles of articles published in their journals of interest. This type of CAS service is quickest and cheapest to be produced by the library. This involves photocopying of the table-of-contents of latest journals received in the library, duplicating them and circulating to the researchers weekly, fortnightly or monthly as required. 'Current Contents' produced by Institute of Scientific Information is an example of commercial CAS service. Current Contents are produced in seven broad subject areas like Life Sciences, Clinical Medicine, Social and Behavioral Sciences, Arts and Humanities, Engineering, Computing and Technology, Agricultural, Biological and Environmental Sciences, and Physical, Chemical and Earth Sciences.

Disadvantages of CAS

• Contents-by-Journal service has certain disadvantages. In this service user generally browses contents pages of journals of her/his interest only, so s/he misses out other articles which may be useful to her/him but are present in other journals. This is not the case with title announcement service, where articles of same subject from different journals are brought together under a common subject heading or classification scheme.

• User has to scan the entire list to find articles which may be useful to her/him, as the service is based on broad subject area.

• Since this type of service is based on only titles of the articles without an annotation or an abstract, it is at times difficult to determine the relevance of the article.

Some of the above mentioned disadvantages of CAS are solved by Selective Dissemination of Information (SDI) service, electronic CASs and other condensation services provided by the present day libraries, commercial publishers, and database producers in an electronic environment.

iii) Selective Dissemination of Information (SDI) Service

SDI service is based on the concept of personal service. It is directed towards individuals or a research group working on the same research project in an organisation. It is a personalised current awareness service, where newly received items of information are matched with user's interest profile, only those items are selected which match with the user's profile, and are notified to the user on regular basis. The concept of SDI service was put forth by a computer scientist, H. P. Luhn in 1961. According to him "SDI service is that service within an organization which concerns itself with machine-assisted channeling of new items of information from various sources to those points within the organization where the probability of usefulness in connection with current work of interest is high."

SDI service started when computers were used for handling information in the mid 1960s. Indexing and abstracting services first used computers to print their paper products. They created computerised files on magnetic tapes that were interpreted by computers and printed their products. These computerised files could be read by computers for other purposes also. Companies and Goverment agencies developed computer software that could manipulate information on these tapes in new ways. This software allowed searching the computerised files

called databases for indexed terms or group of terms on the computer and retrieve articles bearing these terms. Libraries started using these databases to provide different services to their users including SDI service.

SDI system comprises six components viz. user profile, document database, matching mechanism, notification, feedback mechanism, and modification of the profiles.

User Profile: To provide SDI service first user's profile is created. The expression of user interest as a combination of subject and non-subject terms is called user profile. Here, user is asked to specify her/his subject interest, names of persons and organisations whose work relate to her/his field of interest and details of some articles s/he found most useful in her/his current area of research. This information is used to select terms which specify user interest most precisely. The terms to describe user's interest are drawn from the same indexing vocabulary that is used by the document database.

Document Database: It is a computerised file containing recent documents with complete bibliographical details along with the terms representing subject content of the documents. The terms chosen to describe document contents are usually drawn from a thesaurus i.e. controlled vocabulary.

Matching Mechanism: At fixed intervals, which may be weekly or fortnightly, user profile and document profile are compared by a software system. As per the instructions, whenever a close match is observed between the user profile and the document record, the details of both the records are noted by the system.

Notification: Each individual user is sent notification from the system whenever a close match is observed between her/his profile and document record. The notification is sent to alert the user about the recent items of her/his research interest added to the document database. It may include citation of the documents or citations with abstracts or keywords.

Feedback Mechanism: Most important feature of SDI system is its feedback mechanism. Here, user assesses the relevance and usefulness of the items received by her/him through the system and provides regular feedback.

Modification of Profiles: Feedback from the users is analysed and if required the user profile is modified or readjusted.

The title announcement service and contents-by-journal service are subject oriented services. They are on broad subject area and serve several individuals. Here, each individual has to browse through the entire list to select the items of her/his interest whereas SDI service, which is oriented towards user's current research interest, provides only those items which are most useful to the user. This type of service not only saves the efforts and time of the busy researcher, but also ensures all relevant items of information are brought to her/his notice as quickly as possible.

iv)   **Research-in-Progress Bulletins**

Types of current awareness services we have discussed so far alert the users about recently published information in their subject areas of interest. Research-in-Progress type of publication is another type of CAS which provides information

on the current R&D (research and development) activities in various research institutions in a country or in the world. Such type of publication or a database provides details of on-going research projects in an institution, names of principal and associate researchers of each research project, funds and sources of funds of the project, duration of the project and special equipment in use, if any. In addition, it provides a brief description of the progress of the project. Such types of publications are generally brought out by a parent body which funds or controls a group of research organisations like CSIR, ICMR, ICAR, etc. Details of the projects are provided by the R&D institutions under that parent body. For example, Department of Science and Technology (DST) provides year wise details of R&D research projects in S&T approved for funding by the Department on its website. DST has also brought out computerised database of intramural R&D projects in S&T institutions in India in the year 2000 and the database was updated in the year 2005. The work was carried out by NISCAIR with the financial support from DST. Similarly, ICMR (Indian Council of Medical Research) has Online Searchable Project Information System which provides details of extramural research projects funded by ICMR. The database is searchable by subject, title of the project, name of the investigator, name of the institute and the year of grant. ICMR has also brought out a publication entitled 'An overview of international collaborative projects in biomedical research'. The publication provides details of research projects approved for funding by HMSC (Health Ministry's Screening Committee, Ministry of Health and Family Welfare, Govt. of India) from 2000 to 2007 for international collaboration of biomedical research. Another example of research-in-progress service is CARIS (Current Agricultural Research Information System) of Food and Agriculture Organization (FAO), which is international in its scope. It covers ongoing research projects in agricultural sciences and technology in 240 national, international and intergovernmental organisations in the world, who are members of AGRIS (Agricultural Research Information System) of FAO. Research-in-progress type of services, besides providing current awareness, have several other benefits also as stated below:

- Assist the researcher to contact experts as well as institutions currently working in her/his area of research;

- Help the researchers in exploring the priority areas of research;

- Avoid duplication of research efforts; and

- Help planners and policy makers to identify areas of research for funding purposes.

v) **Newspaper Clipping Service**

Newspapers since their inception in 1700s have been playing a significant role in keeping the public well informed on the recent happenings around the world. Newspapers carry useful information for everyone, from housewives to the top officials of corporate houses as well as government organisations. Being aware of the importance of newspapers, libraries and documentation centres have been providing information services based on newspapers. One such service is newspaper clipping service. Under this service, libraries provide important news items of interest published in national and international newspapers, to the organisation. To provide the service, selected newspapers are scanned everyday and news items that are important for the organisation are selected, cut and pasted

on plain paper or card. Each news item is assigned a subject heading or class number. At periodic intervals, e.g. daily or weekly, these news items (called clippings) are arranged by subject headings or class number and circulated to the users. In small organisations the clippings themselves are circulated to the key people in the organisation. In large organisation with more number of people, news clippings are duplicated and disseminated to the users in the form of a bulletin. Newspaper clipping service is quite common in media libraries and libraries of government departments, industrial organisations and financial institutions.

E-News Clipping Service

Earlier, entire process of preparation and dissemination of newspaper clipping service was carried out manually. Nowadays, the service is provided electronically by many libraries, information centres and commercial operators using ICT and web technologies. This has improved the access, delivery and searching of clippings in a web environment. A number of softwares are available for providing this service. For example, National Informatics Centre (NIC) library has developed new application software called "NewsNIC" for providing e-news clipping service. The software provides a web-based full-text access to news items using web interface. MCIT (Ministry of Communication and Information Technology) libraries are using this software to provide e-news service online to their clients staying in different parts of the country. News items covered in the service are related to information technology, telecommunication, and ICT. The software is available free to all organisations of government, semi-government and public sector undertaking. There are several commercial e-news clipping service providers at national as well as at international level. In India, 'Indianmediaclearing' (www.indianmediaclearing.com/) offers news monitoring and clipping service. It monitors Indian print media, electronic media (TV), websites and e-papers and provide services. At international level "CyberAlert 4.0" offers worldwide press clipping service in 50 plus languages. CyberAlert monitors 42,000 plus online newspapers, magazines, trade journals, wire services, TV networks and new media to provide service.

vi)   Current Awareness Services- Recent Trends

Current awareness services like table-of-contents (TOC) and SDI services have been a regular feature in S&T libraries since long. Now corporate and academic libraries have also started providing these services as basic services to their researchers and educators.

Earlier, through these services, libraries were alerting the users about most relevant recent articles published in their area of research. It was the responsibility of the researcher to follow up and request for the copy of the article s/he would like to read.

With the introduction of automated library systems, libraries using serial check in systems started providing issue alerting services and table-of-contents services to their users through electronic means. Even online database vendors like DIALOG, OVID, BRS have introduced SDI services. These services allowed subscribers to store journal titles and keywords to receive a monthly online notification service. These two trends allowed libraries to build 'profile' of journal titles and send the table-of-contents electronically to each user located in different

buildings over the campus networks. This has greatly improved CAS. In the last few years libraries have moved to a web-based environment for providing their information retrieval services. Current trend is to build a custom library portal that utilises e-resource registries which include detailed information about e-resources, how to access them and provide links to these e-resources, for example, links to full-text electronic journals. The advent of e-resource registries has introduced an entirely new aspect of CAS. Libraries can now deliver links to full-text journals and articles within journals. Providing these full-text links is one of the most important trends in CAS. With this facility researcher can get access to full-text journal on her/his personal computer, browse through the article and if found useful, can get it printed. Many libraries have joined e-journal consortia to have access to computerised databases as well as access to full-text journals for their users. Many journal publishers, database producers, aggregators, subscription agents are offering scholarly full-text e-journals services for library consortia. Some of the examples of e-journal consortia and gateways operating in India are UGC-INFONET Digital Library Consortium, CSIR-E-journal Consortium, INDEST-AICTE Consortium, and MCIT Library Consortium. Other electronic CASs offered by the libraries to their remote users are new books alerts, table-of-contents alerts, citation alerts, subject alerts, web page alerts, conference alerts and many more. The mode of delivery is through e-mail, RSS feeds and other electronic means.

Self Check Exercise

Note: i)   Write your answer in the space given below.

ii)   Check your answer with the answers given at the end of this Unit.

4)   What do you understand by current awareness type of services? Mention their characteristics and types of services provided under this category.

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9.5.2   Condensation Type

In this type of service, the contents of the current literature on a required subject field are condensed or summarised along with full bibliographical details of the document. This enables the user to identify the basic contents of the document quickly and determine its relevance to her/his research area of interest. At times, a well prepared summary or abstract serves as a substitute for the document. This saves time of a busy user. Types of services under this category are:

•   Abstracting service

•   Digest service

•   Other value-added information services

i) **Abstracting Service**

This service is concerned with providing abstracts of recently published journal articles, research reports, papers of conference proceedings, patents, standards, and dissertations along with full bibliographical details of each item. The service sometimes covers current as well as earlier published literature depending upon the needs of the users. Since the abstract provides concise summary of the entire contents of the document, it enables the user to determine its relevance and helps her/him to decide whether to read whole document or not. Library professionals with subject knowledge prepare the abstracts. These days commercial abstracting services are available in most of the disciplines and all of them are in machine-readable form. Libraries search the requisite databases and provide the service and supplement it with in-house resources. Commercial indexing and abstracting services systematically scan the current primary literature (like periodicals, conference proceedings, research reports, etc.) on a particular subject field, select the relevant items, index or summarise each item, and arrange them in a helpful sequence for location and identification of individual item. These services are provided at regular intervals like weekly, fortnightly or monthly. Such services have extensive indexing system to facilitate searching. Current issues meet the current awareness needs of the users. When in print form, annual, five-year or ten-year accumulation of indexes was carried out for retrospective searching. Now, most of these indexing and abstracting services are available in machine-readable form and merging of earlier records and new records have become possible. For example, Library and information Science Abstracts (LISA), a fortnightly international abstracting and indexing service published since 1969, was earlier a print publication. Now in database form, it covers all the records (343,293 as of August 2011) from 1969 till date. Update frequency of the database is every two weeks, with more than 500 records added per update. The database is searchable online on the Web with advanced searching capability of 17 indexed fields. Such type of indexing and abstracting services are of permanent nature and can be used for current as well as retrospective searches. Hence, these services serve current as well as exhaustive information needs of the users.

ii) **Digest Service**

This service is generally provided by the libraries of industries, corporate houses and commercial organisations. The latest scientific, technical, marketing and commercial information is essential for the growth of industries. The people in an industry, corporate houses and commercial organisations require information on new products, machinery, manufacturing processes, management techniques, etc. to keep themselves abreast of latest developments in their areas of interest. However the exponential growth and proliferation of new information in wide range of sources and in diverse formats make it difficult for technical workers and executives in these enterprises to keep track of the latest developments in product design, manufacturing processes, management techniques and market trends. To meet these information requirements, digest service is provided.

The digest service is an information service which selects, evaluates and condenses information gathered from different sources, arranges it systematically under headings and subheadings to facilitate quick reference and disseminates to the personnel of an enterprise. According to Guha "digest is actually a fuller representation of a document, rewritten for a purpose or suit the requirements of different people, but intended to serve as a complete substitute for the original

document". The digests are prepared either on demand or in anticipation for quick and ready reference with subject scope spanning from literacy to science and technology. The digests covering science, technology and management aspects are called technical digests. Technical digests are useful sources of information for managerial and technical workers in an industry. Different categories of workers in an industry require different types of information. Top managerial personnel require product-oriented information such as technical, commercial and marketing information. Middle/supervisory level managers require information on problem solving, decision making and on new production processes/techniques which can maximise production. Workers/operators require information on solving technical problems and new ideas and processes which can help them in day-to-day working. Three different types of digests are prepared for top management, for middle/supervisory management and for workers/ operators, keeping in mind their different information requirements. A well planned technical digest service not only saves time of the manager but also helps her/him in decision making. For middle/supervisory level managers the service helps them in problem solving and increasing production, while for workers/operator level people it assists them in solving day-to-day technical problems.

iii) Other Value-added Information Services

The services which libraries and information centres provide can be broadly grouped into two functional levels of services. At the basic level, libraries and information centres disseminate information and material acquired by them, answer reference queries and provide CAS from latest journals to keep users informed of the current development in a particular discipline. At the next level, special libraries and information centres offer complex literature searches in specific subject field, carry out retrospective searches and provide bibliographies, CAS and SDI services to individuals or group of users based on user's profile, index, and abstract or extract information to disseminate it to users in response to request or in anticipation. Some information centres, particularly in science and technology, provide highly specialised services or so called value-added services which involve analysis, synthesis and evaluation of information for the users. This evaluated information is condensed and repackaged in appropriate form for a well defined user group. Such information centres came to be known as information analysis centres and data centres.

Let us examine what is the value addition in information services. Based on the views expressed in library and information science literature, value addition aspect of information services can be organised into the following groups:

- Selection and organisation of information

- Subject and contents analysis

- Links to e-resources including full-text e-journals

- Information analysis, evaluation, synthesis and repackaging

Selection and organisation of information

In indexing and abstracting services some form of **value addition** is carried out by selecting and bringing together in convenient form items of information scattered over wide range of primary sources (such as primary research periodicals,

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research reports, conference proceedings, theses and dissertation, etc.). In addition, these services monitor the literature of a subject published in diverse languages. For example, Chemical Abstracts Service monitors the literature of chemical sciences and technology published in 50 languages. Without these services it would have been practically impossible to access the information from a single source at one place.

Subject and contents analysis

The basic process involved in indexing and abstracting of information is 'analysis' of information. In indexing activity it is 'subject analysis' and in abstracting activity it is 'contents analysis'. Both subject analysis and contents analysis are intellectual processes which add value to these services. The subject analysis provides appropriate keywords for searching and accessing the documents and contents analysis provide precise summary for identifying the relevance of the document.

Links to e-resources including full-text e-journals

Now most of the libraries have moved to web environment for information retrieval as well as for providing services to their clients. Keeping in view users' requirements, libraries are providing access to wide range of e-resources like databases which include bibliographic, numeric as well as textual databases. For example, Information Environment Service Registry (IESR) is a free catalogue of electronic resources of United Kingdom. Resources types include databases, e-learning material, e-books, e-journals, repositories, research publications and image collections. IESR contents are multi-disciplinary with particular strengths in health and social sciences. It is a machine-readable registry, which provides quality and constantly updated description of e-resources and methods of accessing them. Table-of-Contents service of many libraries provides links to full-text electronic journals and articles within journals for browsing as well as for printing by their clients. Providing full-text links to e-resources is most important value addition service provided by the present day libraries and information centres.

Information analysis, evaluation, synthesis and repackaging

In indexing and abstracting services, though subjects and contents of each document are analysed, no critical evaluation is carried out of the basic contents of the documents. Resultant product or service is factual, non-critical and non-evaluative. Now the emphasis is on providing users timely, authoritative, evaluated and consolidated information in convenient form, which users can understand, assimilate and use immediately for problem solving and decision making. This is another type of value-added service which is provided by many specialised information centres and data centres.

The following activities are carried out to provide this type of service:

• Study the target users' needs;

• Selection of relevant information sources;

• Evaluation of information contained in these sources;

• Analysis and extraction of most relevant information contained in these sources;

- Synthesis of extracted information, which involves arranging and merging of extracted information from many sources and compression of information into structure and in the form which is most suited for target user;

- Restructure and package the information, if necessary. Restructuring process deals with the contents or substance of information, while packaging deals with the form of its presentation; and

- Dissemination of the product/service and getting feedback from the users for improvement.

These value-added services cover a wide range of products. Some of them are state-of-the-art reports, market reports, assessment reports, briefing paper, data compilation and tables, executive summary, brochures, posters, etc. Some of these value-added products/services are directed towards specialists (e.g. S&T reviews, state-of-the-art reports), some towards people in business and industry (e.g. business, commerce and market summaries), some are for farmers and general public (e.g. extension services, health services in the form of films, manuals, posters, brochures, etc.).

Self Check Exercise

Note: i)   Write your answer in the space given below.

ii)   Check your answer with the answers given at the end of this Unit.

5)   What do you understand by value-added information services? Enumerate the type of value addition carried out in these services.

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9.6   ORGANISATION AND MANAGEMENT OF REFERENCE AND INFORMATION SERVICE

American Management Association defines management as "The guiding of human physical resources into dynamic organization units that attain their objectives to the satisfaction of those served, and with high degree of morale and sense of attainment on the part of those rendering service". This definition explicitly focuses on target audience. Similarly, in reference and information services division of any library and information centre that serves the users, no effort should be spared to meet the information needs of these users to their utmost satisfaction. This requires organisation and management of these services with efficiency and speed. Almost all large and middle size libraries entrust these services to a separate division. However, in small libraries there is no separate division. The librarian herself/himself provides reference service.

Management of a reference division can be achieved effectively by following the different elements of management viz., planning, organising, staffing, directing, coordinating, reporting and budgeting.
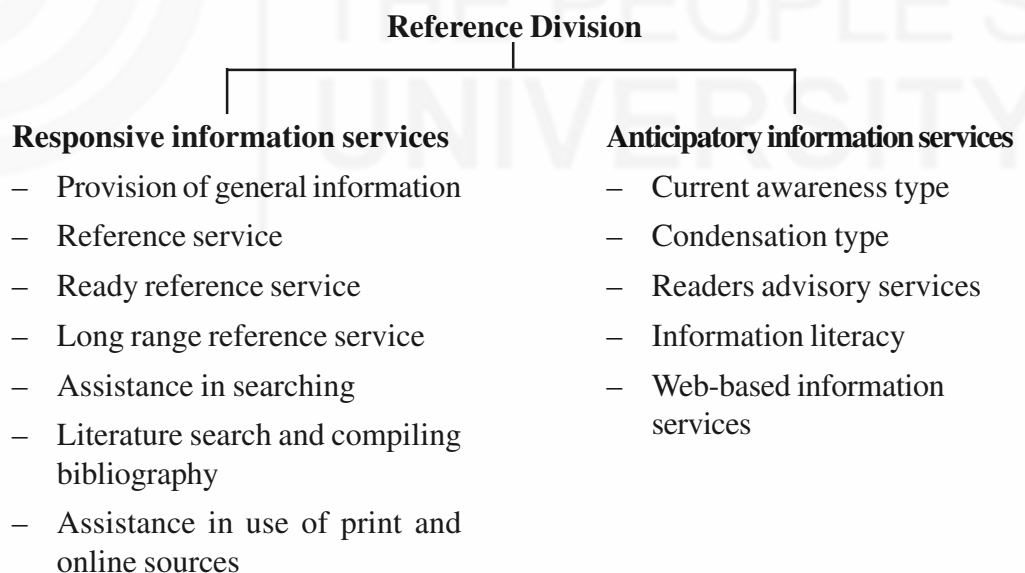
Planning

Planning is a process that deals with drawing up of a detailed working programme for an organisation or a division for meeting short term as well as long term goals. Basic resources of a reference division must be carefully planned and developed during planning process. As most of the reference and information services are of a continuing nature, there must be ample provision in the plan document for uninterrupted flow of resources that include updated reference materials both in print and electronic form, personnel to provide the service, physical facilities including technical and technological resources like computers, and telecommunication equipment. The planning of a reference division would cover the following details:

• Assessments of users' information needs;

• Types of services to be offered, both responsive and anticipatory;

• Reference collection in print as well in electronic form, their organisation and maintenance;

• Personnel for managing and providing the services;

• Physical facilities including computers and telecommunication networks;

• Getting feedback and evaluation of services; and

• Providing details of financial liabilities.

Organising

This refers to the creation of an operational structure for the reference division. The structure is determined on the basis of analysis of work and all the different activities of the division. An illustrative organsational structure is as follows:

Reference Division

Responsive information services	**Anticipatory information services**
– Provision of general information	– Current awareness type
– Reference service	– Condensation type
– Ready reference service	– Readers advisory services
– Long range reference service	– Information literacy
– Assistance in searching	– Web-based information services
– Literature search and compiling bibliography	
– Assistance in use of print and online sources	

Staffing

Staffing refers to the type, quality and the number of persons required to perform various functions of the division. The head of the division with good academic background and professional experience must have the competence and ability to lead the division. Other staff members must necessarily be more multidisciplinary to cater to different varieties of services ranging from traditional in-person desk reference to 24×7 remote access services. Reference mangers, faced with rapid

changes, must be motivated to take on new and unexpected roles that could involve partnership with libraries and negotiations with web developers, electronic database vendors, and e-journal publishers.

Directing

Traditionally, head of the division should give direction to the staff in every aspect of work of the division and get the best out of them. But, due to rapid technological changes, the hierarchy is flattening out to accommodate new vibrant roles and services necessitated by the new learning style. These new roles cover electronic resource management, web management, reference marketing, virtual reference service, etc. Now, self-directed or team-based management is being practiced in the reference division, where all members of the team are given an opportunity to learn each other's job with the idea of making reference services more integrated. The trend now is towards "self-regulating management team" that adopts a system of rotating coordinators rather than head of reference division to manage the team.

Co-ordinating

Reference division is connected to many other divisions of the library, such as technical services division, circulation, reading room, stacks and maintenance, and serials division. Co-ordination with all these divisions is absolutely necessary for effective functioning of the reference division and to face the users with confidence and alertness.

Reporting

Reports on the performance of the division, its achievements and shortfalls during a year or at shorter intervals, are essential to build the image or reputation of the division. These reports carry vital details on the various activities of the division in an analysed form.

Finance and Budget

As most of the services offered by the reference division are of a continuing nature, there should not be any paucity of finance in operating any of the services, particularly those which need financial support. Budgetary allocation should be made for each of the activities, on the bases of production and distribution for a given period, usually annually.

9.7 SUMMARY

This Unit deals with responsive and anticipatory information services.

In responsive services, the origin, growth and development of reference service has been discussed in detail. A definition of reference service encompassing its scope and nature is provided.

The Internet and the World Wide Web has introduced a powerful way of providing and accessing these services. Libraries and information centres are moving from providing traditional in-house reference service to virtual reference service to reach remote users beyond the four walls of the library. Details of virtual reference service, how it is provided, its advantages and limitations are discussed. The Internet is increasingly being used as a reference tool. The advantages and limitations of using the Internet as reference tool are highlighted.

Origin, growth and development of information service have been traced along with the basic differences between reference service and information service.

Various types of anticipatory information services such as current awareness services, indexing and abstracting services and digest services, including value-added services have been dealt with. Impact of technology on the provision of these services is highlighted.

Organisation and management of reference and information services in terms of seven elements of scientific management, with necessary changes in these elements due to technological innovations are dealt with.

9.8 ANSWERS TO SELF CHECK EXERCISES

1) Reference service in the library is any assistance provided by library staff to users seeking information. It covers direct services such as searching for information, providing directional guidance, helping in research, compiling bibliography on request, etc. and indirect services like selection and maintenance of reference material, preparation of guides and aids to the use of library and library material. Reference service is concerned with direct personal assistance to the library users seeking information whereas information service is provided in anticipation of various needs of users of library and information centres.

The differences between reference service and information service can be enumerated as follows:

Sr. No.	Reference Service	Information Service
1	Traditional service	Non-traditional service
2	Emphasis to provide documents	Emphasis to provide information
3	User is given the material or directed to locate the material	Attempt is made to provide exact information
4	Aim is to instruct the user	Less concerned towards instructing the user
5	Service provided on demand	Service provided in anticipation
6	Passive service: library staff waits for the user to approach and make demand	Active service: library staff does not wait for the user to come but provide service to keep user well informed

2) The Internet has emerged as an omnipresent reference tool in the 21st century. Most of the print reference sources are available online on the Internet. Online sources provide updated contents, more advanced search options, download and print option. Despite all its advantages, the Internet is not considered to be as a full-fledged reference tool because of its inherent limitations which are as follows:

Lack of quality control: Anyone can write anything, from anywhere in the world and leave it for any amount of time for any one to read on the Internet. On the other hand, in print publications, there is a built in mechanism for quality control. For example in scholarly journals each article is reviewed by peer group and edited thoroughly before it is published.

Burden of evaluation: Because of lack of quality control, the onus of evaluating websites falls on the user herself/himself. Since user is accustomed to accept all printed material as valid information, using information available on the Internet without evaluation may lead to pitfalls.

Full-text information is not free: Full-text journals are not always free to the Internet users. Quality research articles are mostly found in expensive subscription databases.

Volatility: With contents being added, modified, deleted constantly on the websites, which make the websites volatile. It becomes an imperative to constantly check the quality of website and its contents before using it for research purposes. At times, some websites disappear suddenly or change there domain name making it difficult to trace them. This does not happen with print publications, their contents remain static and publication can be safely cited.

3) The virtual reference service can be defined as delivery of reference service via the Internet to library users who are outside the physical confines of the library. Mode of delivery for virtual reference services are e-mail, electronic forms, real-time chat communication, videoconferencing, voice over IP, co-browsing or instant messaging. E-mail and chat communication are the most heavily used type of virtual reference service.

4) To keep users abreast of current developments in their respective fields of interest current awareness types of services are provided. This involves scanning newly available documents in print as well in non-print form, selecting items relevant to the needs of individual or group of users, recording them and disseminating to the users on a regular basis. Current awareness type of service is an ongoing service that enables one to monitor new information on a regular basis. Current awareness types of services meet the current information needs of the users.

Characteristics of Current Awareness Service

- The purpose of the service is to alert the user about recent developments in her/his field of interest as early as possible.

- Since time is the major factor in the preparation of this type of publication, it generally contains list of journal articles, book titles, etc. with no annotations or abstracts.

- The presentation of the items of information is such that it facilitates ease of scanning.

- It has newspaper type approach, hence, the entire list is meant for scanning.

- The service is usually not confined to a very specific narrow subject area but to a broad area in a particular subject discipline.

- Since the list is not meant for permanent use like newspapers, no attempt is made to do extensive indexing etc.

Types of Services

Types of services offered under this category are:

- Accession List / Current Awareness List/Documentation Bulletin
- Title Announcement Service/Contents-by-Journal Service
- Selective Dissemination of Information
- Research-in-Progress Bulletin
- Newspaper Clipping Service.

5) Value-added is a term which is widely and increasingly used in the context of information systems and services. If information services are related to use and users, then overall timely, current, ease of use and accuracy of information are considered most important. These factors are certainly considered valuable for judging the relevance of the services for the users. To make the services highly useful to the users, certain additional features are offered over and above the normal ones, this can be called as value addition. Some information centres, particularly in science and technology, provide highly specialised services or so called value-added services which involve analysis, synthesis and evaluation of information for the users. This evaluated information is condensed and repackaged in appropriate form, which users can understand, assimilate and immediately use for problem solving and decision making. These services and products are prepared for well defined target users. For example, some of these products/services are meant for specialists (e.g. S&T reviews, state-of-the-art reports), some for people in business and industry (e.g. business, commerce and market summaries), some for farmers and general public (.e.g. extension services, health services in the form of films, manuals, posters, brochures, etc.).

Based on the views expressed in library and information science literature, value addition aspect of information services can be organised into the following groups:

- Selection and organisation of information
- Subject and contents analysis
- Links to e-resources including full-text e-journals
- Information analysis, evaluation, synthesis and repackaging

9.9 KEYWORDS

Blog	:	Short for web log, a frequently updated website about a particular topic that contains dated entries in reverse chronological order i.e. with newest entries at the top.
Citation Alerts	:	A current awareness service which alerts the user by e-mail whenever an article selected by the subscriber is cited by new article that enters the database. 'ScienceDirect' of Elsevier Science and ISI Web of Knowledge offer this service.

Conference Alerts	:	A conference alerting service that sends e-mailed updates of conferences matching user's interests, with available dates and preferred destinations. For example, Conference Alerts and Conference Atlas offer this service.
E-Resource Registry	:	An online catalogue of e-resources that provides description of e-resources and method of accessing them.
Portal	:	A network service that brings together contents from diverse distributed resources using technologies such as cross searching, harvesting and alerting and collates them into an amalgamated form for presentation to the user.
RSS Feed	:	Really Simple Syndication feed is a format for publishing web contents. It is used to "push" timely information and updates to people who subscribe to it. For example, RSS feeds of Times of India newspaper.
Web Page Alerts	:	It is a tracking service that tracks online new contents by monitoring web pages and e-mails to users when it locates new items. For example 'GigaAlert' (formerly known as 'Google Alerts') offers this service.

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UNIT 10   LITERATURE SEARCH AND DATABASE SERVICES

Structure

10.0   OBJECTIVES

You have studied in Unit 9 of this course that indexing and abstracting services are essential tools to access published literature. In this Unit, we shall discuss methods and techniques of using these tools for searching the literature. We will cover both manual as well as computer-based searching. In addition, different types of databases and their services will be covered.

After reading this Unit, you will be able to:

- differentiate between 'reference search' and 'literature search';

- discuss the steps involved in conducting manual as well as computer-based search;

- describe the types of databases available for online searching; and

- explain the range of database search service providers and the database services offered by them.

10.1 INTRODUCTION

In Unit 8 of this course you have been provided an account of information needs of library users and types of services library and information centres are offering to meet these needs. Unit 9 elaborated on reference service, current awareness services, indexing/abstracting and value-added services.

This Unit will cover two areas viz. literature search and database services. In literature search, the methods and techniques of literature search in response to varying information needs of the users and different steps in compilation of subject bibliography using manual as well as online resources will be described. In second area the different database services, offered by primary and secondary journal publishers, online database vendors and others like subscription-cum-aggregation agencies, portal-cum-aggregation agencies, will be dealt with.

10.2 USERS THEIR INFORMATION NEEDS AND LITERATURE SEARCH

The prime objective of any library and information centre is to meet the information needs of its clients as early as possible and in most economic and efficient manner. The user may be a layperson who needs information for self educational purposes or for problem solving, a student who needs information to supplement her/his textbook studies or for project work, a teacher who needs information for teaching and research work, a professional who needs information to pursue her/his career efficiently, a manager who needs information for a new product line or for improving existing product, a researcher who needs information for finding out new area for research or for problem solving. The nature and extent of information required by each of them is different.

To meet these information needs of the users, the information institutions provide wide range of services. Literature search is one of such services. Literature search is a systematic search for published material on a specific topic. This service is concerned with searching and locating the documents in response to a specific request from the user. The queries such as I have to write a paper on different breeds of dogs, where can I find information? I have to make a comparative study of communism and capitalism, where can I find the information? Such queries, depending upon user's needs, lead to carrying out *specific searches,* finding the required document(s) and giving it to the user. While in ready reference service the answer is in the form of data i.e. short answer from the reference books, in '*specific search*' type of service, answer is in the form of one or more documents containing the information. Such query is also called 'bibliographic inquiry' or 'bibliographic search'. A bibliographic search is a search to find bibliographic citations to documents that contain the information. This type of service is also known as long range reference service. Queries leading to '*specific search*' constitute the greatest proportion of reference questions in school and academic libraries as well as in many special libraries. The time taken to answer such questions may take 10 minutes to an hour or more. The time factor also depends on what is available in the library, librarian's knowledge of the sources in the library and if the document is to be procured through inter-library loan it may take longer. In ready reference service data or facts are provided, in long range reference service documents, periodicals, or reports containing information are provided.

10.3 LITERATURE SEARCH – DEFINITION

Online Dictionary of Library and Information Science defines literature search as follows:

'Literature search is an exhaustive search for published information on a subject conducted systematically using all bibliographic finding tools, aimed at locating as much existing material on a topic as possible, an important initial step in any serious research project'.(http://www.lu.com/odlis/)

Literature search plays an important role in research activities. Any researcher, while starting any new research project needs to know in detail what has already been published on her/his area of research. Similarly, at the time of reporting the research results, a researcher needs to review the literature to compare the research results with other scholars working in the similar field. This requires an exhaustive search of previously published literature on that subject and compilation of a bibliography. Literature search is also carried out to solve any research problem and to find out how other scholars have handled the same problem. Literature search thus:

- Helps in study and research;

- Avoids duplication of research efforts;

- Helps in solving research problem(s);

- Assists in learning methods and approaches that are appropriate for a particular field of study;

- Helps to demonstrate that the researcher's contribution is new and different from others; and

- Assists in finding out new areas for research.

To satisfy information needs of researchers (scientists, technologists, social scientists, etc.), at times extensive literature searches are to be carried out in several sources like books, periodicals, non-book material, etc. Sometimes to provide this service informal sources are also consulted. Thus, the literature search in these cases has to be more exhaustive, both in depth and range. Besides bibliographies, other secondary sources like abstracting and indexing periodicals, reviewing periodicals are consulted to find information.

10.4 LITERATURE SEARCH AND COMPILATION OF SUBJECT BIBLIOGRAPHY

Subject bibliographies are compiled by libraries on requests from the users. Sometimes such bibliographies are compiled on regular basis in anticipation of the users' needs. At times bibliographies are compiled on special occasions, such as during the seminars and workshops, to provide the participants with the latest literature on the subject. University and special libraries offer this service more frequently than the public library.

For literature search, compiling a subject bibliography is very important. A researcher must know the basic steps involved in its preparation. In manual search printed sources are consulted, while in computer-based search computerised

databases are used. Computer database searches are most efficient in identifying published literature on that subject. Computer searches may be supplemented with manual searches of printed sources. To search efficiently for any particular topic, it is important to understand the literature search process.

Self Check Exercise

Note: i)   Write your answer in the space given below.

ii)   Check your answer with the answers given at the end of this Unit.

1)   Define literature search and state what purpose it serves.

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10.4.1   Search Process: Manual

In manual searches printed sources are consulted to find out requisite information. The basic steps in a manual search and compilation of a subject bibliography are as follows:

1)   Understanding the subject

2)   Decision on the scope, coverage and period

3)   Formulation of search strategy

4)   Scanning (Searching of tertiary, secondary and primary sources)

5)   Entry making

6)   Arrangement

7)   Indexing

Step 1: Understanding the Subject

In this step you should gather information on the specific subject and on related areas under study. For this, subject dictionaries and subject encyclopaedias should be consulted when in doubt. Here personal interaction with the user is also very important, since this will help you to know the scope of the subject and the purpose for which information is required.

Step 2: Decision on the Scope, Coverage and Period

In this step decision is taken on the scope, coverage and period of subject bibliography. In scope, you decide whether bibliography should be comprehensive or selective. Coverage helps you to decide on the types of documents to be covered e.g. periodical articles, conference papers, thesis, research reports, monographs, patents, standards, etc. Period specifies whether bibliography is going to be current or retrospective. For making above decisions, personal interaction with the user

is very important. The personal interaction with the user is known as **'Reference Interview'**. The reference interview is more an art than a science, since each reference interview is different as each user and each question is different. One should know the basic elements of a good reference interview and adapt them to match each situation. The overall structure of the reference interview has three phases: i) establishing contact with the user, ii) finding out user's needs, and iii) confirming that the answer provided is actually what was needed. Doing a good reference interview is a skill that comes with practice. You should be approachable so that user does not hesitate to ask a question, have active listening skills to show interest while interacting with the user to make her/him feel relaxed, develop knowledge of reference sources and continue to build it as it is essential in assisting the users, practice posing questions and ask clarifying questions to elicit more information from the user to help you to better understand the question, and ensure that the question is fully answered. For this, check with the users to see whether they have had their questions answered. This will make users comfortable and encourage them to come again.

For compiling a subject bibliography, the reference interview will help you to know:

- The query thoroughly,

- The purpose for which information is required,

- The background of the user,

- Subject scope, types, and period of the documents to be covered,

- What sources user has already consulted, and

- The time frame within which, information is required.

Step 3: Formulation of Search Strategy

In this step you formulate a systematic plan for conducting a search. First you write a clear and concise topic statement. Next you identify main concepts in the topic. Then select terminology or keywords to represent the main concepts. Here list of subject headings and thesaurus in that discipline can be consulted to find preferred terms to represent the main concepts. Next step is to check whether any bibliography already exists on this topic. If there is one already compiled or published, it will save searching the previous years' literature. There are many tertiary sources for locating already compiled subject bibliographies. Some examples of tertiary sources are: i) *Besterman's Bibliography of Bibliographies; ii) Bibliographic Index: A Cumulative Bibliography of Bibliographies from H.W. Wilson Company; iii) Walford's Guide to Reference Material,* and *iv) Sheehy's Guide to Reference Books.* Besterman's Bibliography of Bibliographies is helpful for searching retrospective bibliographies while other sources help to find more current bibliographies. In the next step you should look for a review article on the topic. A good review prepared by an expert contains comprehensive list of important references. This list can serve as a starting point for the bibliography. The next step is to select appropriate indexing and abstracting periodicals to carry out actual searching. *Ulrich's Periodical Directory* and *Abstracting and Indexing Directory from Gale Research Corp* are helpful in identifying abstracting and indexing periodicals on the subject. Thus, in literature search, one has to start from tertiary sources to identify secondary and primary sources for searching.

Step 4: Scanning

In this step abstracting and indexing periodicals are searched to identify and retrieve relevant items for bibliography and finally primary sources are consulted to find more recent information.

Step 5: Entry Making

In this step entry is prepared for each item that is identified as relevant. Each entry should be noted down on a card, so that later these entries can be arranged in a systematic order. Each entry should contain sufficient information to identify the document for purpose of bibliography and needs of the intended user. To write the bibliographical details of the document in a standard format, national or international standards may be followed. These standards are as follows:

IS: 2381: 1978: Bibliographical References- Essential and Supplementary Items.

ISO: 690: 1975: Documentation- Bibliographical References- Essential and supplementary elements.

Step 6: Arrangement

The entries thus prepared are arranged in some convenient order to facilitate browsing. The main arrangement should make it possible to use the bibliography without consulting the index. If number of entries in the bibliography is small, the entries may be arranged alphabetically author wise or chronologically by year of publication. But if number of entries is large, it is better to arrange them in classified order or under broad subject headings. The arrangement of material should be suitable for the subject and the targeted users.

Step 7: Indexing

In this step various indexes (title index, author index, subject index, etc.) are prepared to provide multiple means of access to the user. For a small bibliography, there is no need to provide an index. But for a large bibliography author, subject and title indexes may be prepared as appropriate.

Self Check Exercise

Note: i) Write your answer in the space given below.

ii) Check your answer with the answers given at the end of this Unit.

2) Enumerate the basic steps involved in manual literature search.

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10.4.2   Search Process: Computer-based

Application of computers and information communication technologies (ICTs) in bibliographical organisation of published literature and its dissemination have

opened up new vistas in searching and retrieving information from the vast store of knowledge quickly and with much more efficiency.

Computer-based search can be traced back to mid 1960s when indexing and abstracting periodicals started using computers to print their paper products. With the requisite software, the magnetic tapes on which the information was stored could be searched to retrieve information from the tapes. However, because of the slow speed, the computers required much time in processing and producing the results. During late 1960s and early 1970s, computer power, speed and memory increased and so did the ability to communicate with remote computers over the existing telephone lines. These developments paved way for online searching. The first major online dial-up service was MEDLINE, the online version of MEDLARS (Medical Literature Analysis and Retrieval System). This was followed by other commercial online services from DIALOG (Lockheed) and ORBIT (SDC) (Walker & James) by early 1970s. At that time, online searches were very expensive and one had to take the help of intermediary to conduct an effective and efficient search. By 1990s, further developments in ICT and coming up of the World Wide Web providing graphic user interface on the Internet with tutorial facilities, online searching became easy even for the novice users.

At present all major primary, secondary and tertiary publications are available in machine-readable form. Most of the national and international abstracting and indexing periodicals are available in four different formats as follows:

1) On CD-ROM Disc

2) On the Web through the Publisher

3) On the Internet via Online Host/Vendor

4) In Print

The print version of these periodicals can be searched manually using various indexes provided by the publication. The other three versions are available in electronic database form and can be searched using computers. The electronic databases in all the three formats offer more search options, can be searched speedily, and are updated more frequently than their print counterpart. The difference between Online, Web and CD-ROM versions is their update frequency. Online and Web versions are updated more frequently than their CD-ROM version. In addition, the Web version links the users to related journals, provides URLs and e-mail addresses for link journals and publishers, provides access to journal's information such as tables-of-contents, abstracts of articles, full-text journals and document delivery. It also provides usage statistics.

Basic Steps for Computer-based Searching

Steps involved in searching electronic databases vary from database to database. As each database system has its own custom-built interface that allows specific type of search with specific search operators and specific search commands. With the introduction of web-based graphical user interface online search has become quite easy. Most of the online search service providers and CD-ROM producers offer free training modules, where a novice user can search the database step-by-step and retrieve the required information. To conduct effective and efficient searches one has to familiarise oneself with various search and retrieval options available with specific electronic database before searching. In addition,

there are some basic steps (you must know) for conducting computer-based search for general searching as well as for compiling a bibliography on a specific topic. These steps are as follows:

1) Understanding the subject;

2) Decision on scope, coverage and period;

3) Internet access to online search service arranged;

4) Log on to search service provider;

5) Select the appropriate database;

6) Formulate the search expression;

7) Select the appropriate format to display the retrieved records;

8) Reformulate the query, if desired; and

9) Select the mode of delivery.

First two steps (Step 1 and Step 2) are same as in manual search. Step 3 and 4 are not required while searching CD-ROM databases. You do not need Internet connection to search CD-ROM products. Like print product, the CD-ROM product remains in the library for unlimited use, once it is purchased.

Step 3: Internet Access to Online Search Service Arranged

To search electronic databases online you require Internet connection. To get Internet connection you have to register with Internet Service Providers (ISPs). There are over 183 Internet service providers in India, of them around 40 ISPs have all India status and the remaining are particularly state specific. Some examples of ISPs with all India status are BSNL, Tata Communications (formerly VSNL), ERNET India, Airtel Broadband, Reliance Broadband, etc. These ISPs offer Internet related services from Dial-up Internet access to Broad-band access services. The charges for Internet connection varies based on the type of connection required. In addition to Internet connection, you need to register with online search service provider, which provides access to the databases for searching. Online search service provider may be a vendor like EBSCO, ProQuest or others, which provides access to a number of databases from different publishers, or a publisher providing Web access to its own databases like H.W.Wilson, CAS, etc. This can be done through subscription or licensing agreement. On registration with online search service provider, you get user ID and password. These days online registration is also possible.

Step 4: Log on to the Search Service Provider

This is usually done through the web interface of the online search service provider. At this stage one should know the web address of the search service provider (e.g. for Emareld it is http://www.emeraldinsight.com/). To access and search the database one has to enter user's ID and password. Most of the database producers offer online registration as well.

Step 5: Select the Appropriate Database

Next step is to select the appropriate database to search. Most search service providers allow users to browse through their database categories to select the appropriate database(s). The vendor like EBSCO makes available full-text and A/I databases according to user category and institutions like sources for colleges

and university level, hospitals and medical institutions, corporate, Government institutions, K-12 schools and public libraries. This information helps the user to select appropriate database(s) to conduct actual search.

Step 6: Formulate the Search Expression

This requires selection of appropriate terms or phrases for searching the database. This is normally done before the search begins. In computer-based search user is asked to fill a form in which search question is stated. User is asked to write a paragraph on the search topic, give purpose of search, list one or two references, and give names of important people and institutions in the field. All this information helps to know the exact requirement of the user and selection of the suitable keyword(s) for searching the database. Then make a list of keywords and synonyms for searching the database. Many bibliographic databases have their own specialised thesaurus for searching the database. Their thesaurus is available online and one can select appropriate terms and phrases from this for searching the database. At the same time one should have the knowledge of nature, content and structure of database, fields that are searchable, what search facilities are available such as word search or phrase search, and what appropriate operators are there. The search operators and syntax for formulating the search expression vary from one database to other database. Once search expression is formulated then actual online search is conducted.

Step 7: Select the Appropriate Format for Display of Records

When search terms are entered into the system the database starts displaying the records that match the search expression. Here you can specify whether you want to browse full record or brief record for selection. Most of the databases offer this option.

Step 8: Reformulate Search Expression, if required

If you find search results are not satisfactory, you can reformulate your search statement.

Online search is usually a repetitive process, where user conducts several searches, compares the results, and modifies the search statement or conducts a new search in order to get best results. You can combine keywords using Boolean Search operators viz. *And, Or, Not*. 'And' operator narrows the results to records that contain both the search terms e.g. Calcium and Obesity. 'Or' operator retrieves the records that contain either search term e. g. Calcium, or Obesity or both Calcium and Obesity. Use of 'Or' operator retrieve more records. 'Not' operator eliminates unwanted terms.

Step 9: Select the Mode of Delivery

You can download all the selected records online on your local computer or select an offline print out by e-mail.

10.4.3 Advantages of Computer – based Searching over Manual Searching

Speed

Searching electronic databases is much faster than their print counterparts. These databases offer current as well as retrospective searching. Sitting at the computer

terminal one can retrieve current as well as retrospective records speedily at the same time whereas in printed A/I periodicals, cumulated indexes as well as current indexes of the publication are manually searched and entry number of each item is noted down. Then volumes as well as issues of the publication carrying those entry numbers are manually located on the shelves, each entry number is searched and bibliographical details of items found relevant are noted down. Entire search process with printed sources is much more laborious and time consuming.

More Search Options

Search options provided by electronic databases are also far more than their print counterparts. In printed sources the searching is limited to the indexes (such as author, subject, keyword indexes, etc.) provided by the print publication. In electronic databases there are more search options such as search by field, year of publication, or journal title apart from author, keywords and subject terms. Moreover electronic databases offer Keyword or Phrase search (one can search by single search term or by phrase comprising more than one term), Boolean search (using Boolean operators like And, Or, Not), and Truncation search (One can search for all different form of word having same root).

Present day electronic databases offer many more services which will be discussed in subsequent sections of this Unit.

In 2001 the Reference and User Services Association (RUSA) of the American Library Association has issued revised guidelines for the preparation of a bibliography. Original guidelines had been prepared in 1971 and updated in 1992. The revised guidelines reflect the technological developments due to wide dissemination of bibliographies on the World Wide Web. The guidelines highlight the principles involved in preparation of a bibliography irrespective of its format. According to the guidelines, every bibliography should have a statement of scope and purpose, annotations/notes. The annotation notes can be of three types viz, i) when title of an item included in the bibliography is not clear, ii) for descriptive bibliography, the annotation should give enough information to enable users to decide whether or not they want to view the original, and iii) for critical evaluation annotation should be written by someone knowledgeable in the field, and links to full-text should be provided by electronic bibliographies, if available and if there is copyright clearance.

Self Check Exercise

Note: i)   Write your answer in the space given below.

ii)   Check your answer with the answers given at the end of this Unit.

3)   State the advantages of computer-based searching over manual searching.

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10.5 ELECTRONIC DATABASES

Electronic databases are organised collection of data or information that are stored in computer readable form and can be easily accessed, modified and updated. The database can either be publicly available or be private. Private databases can be accessed only by employees of the organisations that maintain the databases. Public databases are designed for access by the public. Database contains data in structured form. For example, in a bibliographic database the data pertaining to the name of author, title of the book, its edition, publishers' name and address, date of publication, price, etc. are recorded in storage medium in structured form for accessing these individual data elements. The range of public databases has grown to the extent that it is now possible to find data almost on any subject. Databases have been created for nearly every major field and many subfields in science and technology, medicine, business, law, social sciences, politics, arts and humanities as well as for news (world wide, national, or regional), mission (such as defence, transportation, shipping, etc.), and consumer interests (such as shopping).

Let us examine the development of database industry and types of databases that are available at present for public use. As discussed in section 10.4.2 of this Unit, the indexing and abstracting services started using computers in 1960s to bring out their print products and MEDLINE was the first computer-based database to offer online search service for remote users. This was soon followed by commercial online search service providers like DIALOG and SDC. By 1975 there were 300 public access databases from range of different vendors. Database industry has been growing since then. From 1975 to 2009, the databases grew from 301 to over 20,000. Gale Directory of Databases (34th edition, 2011) covers more than 20,000 databases in all subject areas worldwide. Directory provides detailed, up-to-date information on publicly available electronic databases accessible through online vendors or batch processor, or available for direct lease, license or purchase. Online edition of this directory is available providing access to most up-to-date information as well as historical data on these databases. The directory listings include content and subject coverage, type, language, time-span, update frequency, geographic coverage, producer' contact information, and vendor availability for the databases covered. (http://www.gale.cengage.com/pdf/)

10.6 TYPES OF DATABASES

Databases are organised and maintained in different ways for different types of data or information. Data in a database may be predominantly:

- Word oriented (e.g. bibliographic, full-text, factual);

- Numeric (e.g. statistics, experimental values);

- Image both fixed images (e.g. photographs, drawings and graphics) and moving images (e.g. film of a lion catching pray, a flower opening); and

- Sound (e.g. recording of a sound of a tornado, or an explosion).

Word oriented databases contain words, phrases, paragraphs or text as their principal data. *Bibliographic databases, full-text databases* and *factual databases* come under this category. Most of the earlier developed databases were

bibliographic databases. The principal data in *numeric databases,* often called *"databanks",* consists of numbers and symbols that represent statistical data, demographical data, time series data, etc. *Pictorial databases,* many of which are for scientific and engineering purposes, may contain representations of virtually any multidimensional structures, nuclear particles, graphs, architectural maps, etc. *Moving picture databases* can represent virtually anything in motion. *Audio databases* contain sounds and can represent music, voice, and sounds of nature or anything that can be heard.

Self Check Exercise

Note: i) Write your answer in the space given below.

ii) Check your answer with the answers given at the end of this Unit.

4) What do you understand by electronic databases? State briefly the development of online databases.

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10.7 DATABASE SERVICES

Most databases used in the libraries are bibliographic databases (such as catalogues, periodical indexes, abstracting services) and full-text databases (such as e-journals, reference sources). These databases are leased annually to the libraries under license agreement by the database producers. Database content is created by database producer, who usually publishes a print version and converts the content in machine-readable form to provide access to data on CD-ROM or online via Internet using propriety search software. The database producer provides online access to its databases through its own website or leases the content to one or more database vendors (such as EBSCO, ProQuest), who in turn provide access to these databases to registered library staff and users. Variety of database services is currently offered by primary and secondary journal publishers, online database vendors, aggregators, digital libraries, institutional repositories, search engines, etc. on the Internet. In subsequent sections you will study about these services.

10.7.1 Publishers of Secondary Periodicals

Publishers of secondary periodicals bring together recently published literature in specific discipline scattered over wide range of primary sources like journal articles, research reports, conference proceedings, dissertations, patents, monographs, etc. for public use. These publishers systematically scan the primary sources, index and arrange each item in helpful sequence with full bibliographical details and bring out a publication at regular intervals. These publications, known as secondary periodicals, contain bibliographical references of each item with or without abstracts. A secondary periodical with abstracts is an abstracting periodical and without abstract an indexing periodical. These indexing and abstracting

periodicals are now available in print as well as in computer readable form. Indexing and abstracting periodicals in computer readable form come under bibliographic databases. Most of these bibliographic databases are proprietary in nature and are available for online searching under license agreement from vendors or directly from publishers of indexing and abstracting services. Here are some examples of database services from publishers of indexing and abstracting periodicals:

a) **CAS (Chemical Abstracts Service) Databases:** CAS a Division of American Chemical Society, indexes and abstracts world's chemistry related literature published in over 10,000 major scientific journals world over in 50 languages. It also covers patents and patents family references from 61 patents authorities around the world. CAS database contents can be accessed via *SciFinder* and *STN* on the Web. CAS offers range of products and services. The information products of CAS are:

CA*plus* Database: Contains bibliographic information and abstracts for over 34 million records from 1800AD to present. Database is updated daily adding 3000 records per day. The web version allows searching the database by research topic, author name, company name, document identifier, journal, and patent.

CAS*Registry* Database: This is a *Factual database* of chemical substances covering over 52 million chemical substances. Information covers structure of the chemical substance, molecular formula, predicted and experimental properties, and unique Registry number. Substance page allows searching substances by structure, molecular formula, and substance identifier.

CAS*Reactions* Database: This is *Factual database* covering one step to multistep reactions of chemical substances.

Services offered by CAS:

- Links from references to electronic journals and patent documents. Provides links to cited references dating back to the late 19th century. Links are provided to over 280 STM (Science, Technology and Medicine) publishers for full-text journals. Links to full-text of patents from 2 major patent offices are offered.

- Common Chemistry: A free web resource that contains CAS Registry number for approximately 7,900 chemicals of wide spread public interest. CAS had collaborated with Wikipedia to develop this resource.

- Other fee-based services are CAS Client Services like confirmation, identification or assignment of CAS Registry number and document delivery service.

- CAS Media Library: Covers current interest topics and new discoveries and shows how *SciFinder and STN* can play a significant role in providing solution for the advancement of science. Provides step-by-step instructions online using multimedia presentation.

SciFinder is a software tool that helps to search CAS databases containing many scientific disciplines including biomedical sciences, chemistry,

engineering, material sciences, agricultural sciences, etc. SciFinder finds references to biomedical research using CAplus and MEDLINE databases and allows searching protein and nucleic acid sequences from biomedical patents and journals. (http://www.cas.org/)

STN is an online database service that provides global access to published research, journal articles, patents, structures, sequence properties, and other data. As a neutral platform STN provides access to wide range of databases in Science and Technology from different database producers worldwide. STN is operated jointly by CAS and Fiz Karlsruhe world wide and is represented in Japan by JAICI. STN integrates the world first level patents databases on one platform and provides tools for analysis, visualisation and evaluations of patents. STN offers 3 types of search interfaces:

STN Express: Desktop access for experienced users;

STN on the Web: Web access for experienced online searchers; and

STN Easy: Web access for occasional and novice users.

STN Full-Text Document Solution-Linkages are provided from retrieved references to full-text documents through this service.(http://www.stn-international.de/stn_glance.html)

b) **MEDLINE/PubMed Database:** MEDLINE (Medical Literature Analysis and Retrieval System Online) is a premier bibliographic database of the U.S. National Library of Medicine (NLM). MEDLINE contains over 21 million references to journal articles in life sciences with concentration on biomedicine. The database covers approximately 5200 journals world wide in 37 languages. The database is updated daily adding 2000 to 4000 records everyday. The records are indexed using controlled vocabulary from NLM's Medical Subject Headings (MESH). MEDLINE is the primary component of PubMed database (http://www.nlm.nih.gov/) searchable via **Entrez.** MEDLINE/PubMed may also be searched using NLM Gateway (http://gateway.nml.gov/), a service from the National Institute of Health.

PubMed Central (PMC): This is full-text database from U.S. National Institute of Health (NIH).The database consists of full-text articles (over 1,500,000) from 450 journals, that are linked to PubMed and are fully searchable free of charge.

National Library of Medicine has over 100 databases created by NLM international partners and collaborating agencies. All these databases are searchable online. Some of them are as follows:

MedlinePlus: Health information for patients, families and health care providers.

AIDSInfo: Database of AIDS Clinical trials.

BookShelf: Collection of online biomedical books whose full-text can be searched through Entrez system.

ChemIDPlus: Online dictionary of chemicals including names, synonyms, and chemical structures.

3D Domain: Macromolecular structural database.

GenBank: Genetic sequences databases.

Protein: Protein sequences databases.

Nucleotide: Nucleotide sequence databases.

MESH Database: Online database of Medical Subject Headings.

MESH Browser: Medical Subject Headings look up tool.

NLM Catalog: Online public access catalogue of NLM.

OLDMEDLINE Data: References to biomedical journals articles through 1948 to 1965.

TOXLINE: Database of 4 million references to toxicological literature.

TOXNET: Toxicological data networks. Database on toxicology, hazardous chemicals, and environmental health.

PubMed services cover the following:

Journal databases: search by topic, journal title, or abbreviation, ISSN, or browse by subject terms.

Limit searches to PubMed journal or currently indexed MEDLINE journals.

Clinical queries: A search interface for finding citations to specific clinical study category; systematic reviews or medical genetics.

MEDLINE/PubMed databases are searchable via **Entrez.** Entrez is a search engine run by National Center for Biotechnology Information (NCBI), which is a part of NLM, under the guidance of the National Institute of Health (NIH). MEDLINE/PubMed may also be searched using NLM Gateway (http://gateway.nml.gov/), a service of the National Institute of Health. PubMed database can be searched free of charge. Citation may include links to full-text articles from PubMed Central or from publishers' website.

10.7.2 Publishers of Primary Periodicals

Primary research periodicals are published by learned societies, R&D institutions, Government organisations, R&D units of industrial organisations, academic institutions and commercial publishers. Ulrich's Periodical Directory lists over 270,000 active serial titles of which 70,000 titles represent academic and scholarly journals. First scholarly electronic journal was 'Online Journal of Current Clinical Trials' published by American Association of Advancement of Science (AAAS) in 1992. At present most of the scholarly peer reviewed journals are available in print as well in electronic form. E-journals have additional features that are not available in print form. Let us examine the services provided by some of the major e-journal publishers and aggregators:

ScienceDirect (http://www.sciencedirect.com): Elsevier, world's leading publisher of science and health information (http://www.elseveir.com/), publishes over 2380 primary scholarly journals in print as well in electronic form. The publisher offers online searching of over 2500 e-journals, 26 bibliographical databases, and 20,379 books in science and technology. Elsevier provides access to full-text e-journals and book chapters via *ScienceDirect.*

ScienceDirect is full-text database offering online access to articles from more than 2500 peer-reviewed e-journals and chapters from more than 11,000 books

in science and technology. At present there are more than 9.5 million articles/ chapters in the database. The database is growing at a rate of 0.5 million items per year. The e-journals are searchable from year 1995 onwards. Journal's contents are available for search even at an early publication stage. Search options allow downloading, saving and printing of multiple documents. Search results can be forwarded to other researchers when desired. Elsevier publisher offers a variety of subscription and access options to the subscribers such as **ScienceDirect Complete, ScienceDirect Standard, and ScienceDirect e-Select.** Depending upon the type of library or information centre, different editions of ScienceDirect are available such as **ScienceDirect Government Edition; Corporate Edition; College Edition; and Business School Edition.**

Variety of database services are offered to the subscribers such as:

Science Alert: Runs a saved search automatically and delivers an e-mail notification with link to the new search results.

Journal Issue Alert: Send an e-mail notification when a new issue of a specific journal is made available on ScienceDirect.

Citation Alert: Send an e-mail notification when a document which cites a specific article of interest is added to ScienceDirect.

Topic Alerts: Notifies the subscribers by e-mail when a predefined topic related search retrieves new results.

ScienceDirect Top 25 Hottest Articles : An e-mail sent every 3 months to subscribers, listing 25 most frequently downloaded journal articles from any selected journal among more than 2,000 titles.

Specific Journal Alerts: Some groups of journals have specific alerting services.

Apart from above listed services Elsevier offers online training, customised settings, and usage reports for subscribing libraries.

SCOPUS: (http://www.scopus.com): The largest abstract and citation database of peer-reviewed journals and web resources. Updated daily, Scopus offers nearly 18.000 titles from over 5,000 international publishers, including peer-reviewed journals (16,000), open access journals (1200), trade publications (600) and book-series (350). The database offers full integration of the Scientific Web in its search results with 435 million web pages. It also provides access to 23 million patents from 5 patent offices, articles-in-press from over 3000 journals, and sources from institutional repositories, digital archives, etc.

10.7.3 Aggregators

E-journal publishers, in addition to providing full-text access to their publications from their own websites, are also making their e-resources available through vendors and other third party mediators for exploitation under license agreement. Third party mediators, known as aggregators provide online access to a large number of journals from different publishers on a single platform and customise information for individual libraries based on the needs of each library. This type of arrangement is beneficial for both the libraries and the publisher. Libraries can enter into agreement with single service provider instead of dealing large number of publishers. Publishers gain increased exposure for their services by

making their contents available through more than one source. There are large numbers of aggregators providing e-journal services on the Internet. Some of them are EBSCO, ProQuest, J-Gate, etc.

a)   **EBSCO:** EBSCO Industries Inc. is a global corporation with divisions in 23 countries around the world. EBSCO Industries have diversified into 40 businesses, including, electronic and print periodical subscription services, research databases and related information management services. EBSCO provides integrated services, that combines reference databases, subscription management, online journals, books linking services, and A to Z solutions. (http://www.ebsco.com/)

EBSCO*host*: More than 300 full-text databases are available through Ebscohost. It is designed to cater to the users needs at every level of research i.e. at colleges and university level, hospitals and medical institutes, corporations, Govt. institutions, K-12 schools, and public libraries. (http://www.ebscohost.com/)

EBSCO A-to-Z service provides library users with a single comprehensive list of titles which they can access through subscription. Master A to Z titles provides links and coverage information to more than 600,000 unique titles from more than 4200 databases and e-journal packages. All major database vendors and publishers are represented.

EBSCO search software offers wide range of services as follows:

Search Alerts: Current session searches can be set up as search alerts to automatically update users with new articles published on a specific subject.

Journal Alerts: Sends Journal Alert notifications to users via e-mail when new title is made available in a specific database.

Links to Full-text Databases: Users can link from EBSCOhost citations to its full-text in another subscribed database.

Links to e-journals in library's collection: Links from EBSCOhost citations to full-text e-journals are provided either on publishers' site; or EBSCOhost E-journal Service or via CrossRef to participating publishers.

Links to OPACS and A-Z list of e-resources: Provides links to over 30 integrated library systems OPACs and Union Catalogues and from libraries catalogue to EBSCO's full-text.

Links to Document Delivery Systems: Linking is available to major document delivery services such as Inforetrieve, CISTI and British Library.

Result List

The search software allows results to be sorted by Date, Source, Author, and Relevance.

The search screen has instant citation preview icon, source type for narrowing results, popular limiters to refine results, and related image screen, and date slide bar for result refinement.

Visual Search User Interface:

- EBSCOhost offers graphical displays of search results. The service allows user to choose between block or column style results display, or results to be grouped by subject or publication date;

- Brings images to result list items for instant viewing; and

- Charts, maps, photos, illustrations from over 3,300 journals are displayed for selection.

Branding: This facility allows customisation of subscribing library by putting library's name or logo as well as library's special messages on the EBSCOhost screens. (http://www.ebscohost.com/)

b) **J-Gate** (http://j-gate.informindia.co.in/): J-gate is an electronic gateway to global e-journal literature. Launched in 2001 by Informatics India Ltd., J-gate provides access to over 5 million articles of e-journals online. It has database indexed from 25940 plus e-journals with links to full-text articles at publishers' site. It indexes articles from 9400 open access journals and maintains links to them.

J-Gate offers two types of services **J-Gate Portal** and **J-Gate Customized Services.**

J-Gate Portal: This service provides table-of-contents of latest issues of journals and comprehensive online searchable database of over 5 million articles with daily addition of over 4000 plus articles. Table-of-contents provides links to full-text articles on publishers' website.

J-Gate Customized Services: This service offers **J-Gate Custom Content (JCC)** and **J-Gate Custom Content for Consortia (JCCC).** JCC is a local Intranet/Internet solution to libraries providing e-access to subscribed journals. This service provides TOC and database service to all journals subscribed by the library. JCCC service is for homogeneous group of libraries that wish to share resources. JCC software is installed at participating libraries. Common TOC and database service is provided to all the participating libraries and links to union catalogue are provided for resource sharing.

10.7.4 Digital Libraries

A digital library is a library in which collections are stored in digital formats (as opposed to print, microform or other media) and accessible through computers. The digital contents may be shared locally or accessed remotely via computer networks (http://www.en.wikipedia.org/). An important advantage of digital library is its increased accessibility to users. Users of digital library can access the contents of the library round the clock from any location. It offers multiple search options, user is able to use any search term such as word, phrase, title, name, subject to search entire collection. The same sources can be used simultaneously by number of institutions and patrons. Digital libraries can provide user friendly interface giving clickable access to its resources. Digital libraries conserve the fragile material which may otherwise deteriorate with repeated use. While traditional libraries are limited by storage space, digital libraries have the

potential to store much more information, because digital information requires very little physical space to contain them. Some of the examples of digital library are:

The World Digital Library (WDL): The library makes available on the Internet, free of charge, significant primary materials from countries and cultures in multilingual format covering seven languages. The World Digital Library is a collaborative project of U.S. Library of Congress, UNESCO and partners throughout the world. Libraries and other cultural institutions in Africa, Asia, Europe and North and South America, are contributing the contents as well as curatorial, cataloguing, linguistics, and technical expertise. WDL site is hosted by Library of Congress. A team based at The Library of Congress maintains the site. The digital library was launched in April, 2009 and principal objectives of the WDL are: i) to promote international and intercultural understanding; ii) expand the volume and variety of cultural contents on the Internet; iii) provide resources for educators, scholars, and general audiences; and iv) build capacity in particular institutions to narrow the digital divide within and between countries. (http://www.wdl.com)

Digital Library of India: Hosted by Regional Mega Scanning Centre, International Institute of Information Technology, Hyderabad in co-operation with IISc, CMU, ERNET and MCIT for the Govt. of India and 21 participating institutions, the Digital Library of India envisages developing a collection of one million digital books. Books denoting ancient historical events of India, cultural and social books in different languages have been digitalised. The materials are obtained from authorised university and public libraries of India. Palm leaves journals and manuscripts are also digitised. Preliminary discussions are being held with OCLC as a host, for registry of scanned items. With a view to select best books, the project will seek publishers' permission to scan the books for college libraries. The principal benefit of universal library of this type will be to supplement formal education system by making knowledge available to anyone who can read and has access. (http://www.dli.iiit.ac.in/)

10.7.5 Open Access E-Journals

Open access journals are scholarly journals that are available online to readers without financial, legal or technical barriers. Open access literature is digital, free of charge and free of most copyright and licensing restrictions. Open access scholarly journals permit users to read, download, copy, distribute, search or link to the full-text articles. Open access literature is available in open access journals, subject repositories and digital archives.

Directory of Open Access Journals: The Directory covers free, full-text quality controlled scientific and scholarly journals. There are 6960 journals in the directory. Currently 3174 journals are searchable at article level. The database of directory has over 623995 articles. The aim of the directory of open access journals is to increase the visibility and ease of use of open access scientific and scholarly journals there by promoting their usage and impact. (http://www.doaj.org/)

10.7.6 Institutional Repositories

Institutional repositories are digital archives of research output of a particular R&D institution, or a central repository of a group of institutions or a subject

specific repository. These repositories archive the scholarly material and offer free access to this material for scholarly and educational purposes.

Some institutions in India such as Indian Institute of Science, Bangalore, Indian Statistical Institute (IISc), Bangalore, Indian Institute of Technology, Delhi and others have established open access institutional repositories (IRs) to disseminate the research output of their respective institution. Some institutional repositories are self archived like Indian Institute of Science, Bangalore. IISc (eprints@IISc) repository collects, preserves and disseminates in digital formats the pre-prints, post-prints and other scholarly material created by IISc research community. In some repositories, the administrators of the repository collect the research material from different sources and disseminate for public use on behalf of the person concerned. Subject specific repositories are repositories providing access to subject specific scholarly material. These repositories accept scholarly publications from different sources on a specific subject and provide free access to this collection. For example, National Informatics Centre stores, maintains, and provides free access to biomedical literature through OpenMed@NIC. (http://www.indmed.nic.in/)

Apart from the above listed database service providers, there are many others which offer database services on the Internet such as 'Find article' from Look Smart, 'Google Scholar' from Google Inc., and subject specific portals and many more.

10.7.7   Database Services - Emerging Trends

Impact of ICT has brought a spectacular change in information storage, retrieval, and dissemination related activities. Producers of indexing and abstracting periodicals and publishers of primary periodicals, which were two separate industries earlier, are now merging or entering into partnership. Publishers of primary journals are offering online access to full-text e-journals to the subscribers of their print publications under license agreement. Producers of bibliographic databases are diversifying by bringing out factual statistical and multimedia databases. They are offering linkages from citations to full-text journal articles on publisher's site. As demands for multimedia databases is growing, database producers are increasingly adding graphics, images, audio and video to the technical contents of the databases. Apart from providing linkage services, the publishers are offering additional services to the end-users like journal issue alert, citation alert, topic alert service and many more. Database producers are offering customised services by bringing out different products according to requirements of different clients. New generation of e-journal service providers are emerging like aggregators. Aggregators like EBSCO and ProQuest, with license rights from primary publishers are providing online access to full-text online aggregated databases. They are also providing links from secondary services to the full-text articles online. Many database search service providers allow search results to be sorted out by various parameters like date, author, source or relevance and save it to user's personal account. Some allow graphical display of search results. Many more players have joined database service market like digital libraries, institutional repositories, open access e-journal initiators, search engines and others.

Self Check Exercise

Note: i) Write your answers in the space given below.

ii) Check your answers with the answers given at the end of this Unit.

5) Enumerate the types of databases available for online searching.

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6) List the online database search service providers.

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10.8 SUMMARY

The Unit deals with literature search and database services. In the first part of the Unit we have discussed the need and importance of literature search in R&D related activities. We have also described basic steps for conducting manual as well as computer-based search for general purpose searches and for compilation of subject bibliographies. The advantages of computer-based search over manual search have been pointed out. The second part of the Unit deals with electronic database services. In this part we have described briefly the growth of electronic databases, types of databases and their services. The database services from producers of indexing and abstracting periodicals, e-journal publishers, aggregators, digital libraries, open-access e-journals, and institutional repositories have been dealt in detail with examples. A brief account of emerging trends in database service industry is provided.

10.9 ANSWERS TO SELF CHECK EXERCISES

1) Literature search is an exhaustive search for published information on a subject conducted systematically using all bibliographic finding tools, aimed at locating as much existing material on a topic as possible, an important initial step in any serious research project. Literature search thus:

- Helps the researcher in study and research;

- Avoids duplication of research efforts;

- Helps in solving research problem;

- Assists in learning methods and techniques that are appropriate for particular field of study;

• Helps the researcher to demonstrate that the researcher's contribution is new and different from others; and

• Assists in finding out new areas for research.

2) Different steps in a manual search and compilation of a subject bibliography are:

• To understand the exact subject to be searched;

• To decide whether bibliography should be comprehensive or selective, current or retrospective and the types of documents to be included;

• Formulate the search strategy based on the user requirements;

• Select appropriate sources for search;

• Carry out search beginning with a review publication followed by search in secondary and primary sources;

• Record the references in a standard format;

• Arrange the references in order suitable for subject and the targeted user; and

• Prepare various indexes to provide multiple means of access to the user.

3) Advantages of computer-based searching over manual searching are as follows:

a) Searching electronic databases is much faster than their print counter-parts.

b) Search options provided by electronic databases are also far more than their print counterparts.

c) Electronic databases offer linkages from citation to full-text journal article.

d) Provide alerting services like journal issue alert, citation alert, topic alert, etc.

e) Search results are displayed in computer-based search during search process and search strategy can be altered or revised based on the results.

f) Some databases offer graphical display of search results whereas, options c, d, e and f are not available in print publications.

4) Electronic databases are organised collection of data or information that are stored in computer readable form and can be easily accessed, modified and updated. Database contains data in structured form. For example, in a bibliographic database the data pertaining to the name of author, title of the book, its edition, publishers' name and address, date of publication, price, etc. are recorded in storage medium in structured form for accessing these individual data elements. The range of public databases has grown to the extent that it is now possible to find data almost on any subject. The indexing and abstracting services started using computers in 1960s to bring out their print products and MEDLINE was the first computer-based database to offer online search service for remote users. This was soon followed by commercial online search service providers like DIALOG and SDC. By 1975 there were 300 public access databases from range of different vendors. Database industry has been growing since then. From 1975 to 2009, the

databases grew from 301 to over 20,000. Gale Directory of Databases (34th edition, 2011) covers more than 20,000 databases in all subject areas world wide.

5) Databases are categorised according to the type of data they contain. Data in a database may be word oriented, numeric, images-both fixed images and moving images or sound.

Word oriented databases contain words, phrases, paragraphs or text as their principal data. *Bibliographic databases, full-text databases* and *factual databases* come under this category. Most of the earlier developed databases were bibliographic databases. The principal data in *numeric databases,* often called *"databanks",* consists of numbers and symbols that represent statistical data, demographical data, time series data, etc. *Pictorial databases,* many of which are for scientific and engineering purposes, may contain representations of virtually any multidimensional structures, nuclear particles, graphs, architectural maps, etc. *Moving picture databases* can represent virtually anything in motion. *Audio databases* contain sounds and can represent music, voice, and sounds of nature or anything that can be heard.

6) Online database search service providers are:

- Producers of Secondary Periodicals;
- Publishers of Primary e-Journals;
- Aggregators;
- Digital Libraries;
- Open Access e-Journals;
- Institutional Repositories;
- Search Engines; and
- Publishers of e-books and e-reference books.

10.10 KEYWORDS

Aggregator	:	A bibliographic service that provide online access to digital full-text of periodicals published by different publishers. For example, aggregators like EBSCO, ProQuest provide online access to large number of journals from different publishers on a single platform.
Boolean Search Operators	:	A system of logic developed by English mathematician George Boole that allows the user to combine words or phrases representing significant concepts when searching an online catalogue or bibliographic database by keywords. Three logical commands (also called operators) viz. AND, OR, and NOT are available in most search software. The **OR** command is used to

expand retrieval by including synonyms and related terms in the query. The **AND** command is used to narrow search results. Each time another concept is added using "and" the search becomes specific. The **NOT** command is used to exclude unwanted records from search results.

Broad Band Access : High speed data transmission, commonly used in reference to Internet access via cable, modem, DSL or wireless network, which provide higher bandwidth than a dial-up connection.

Dial-up Internet Connection : Connection from a computer terminal to the Internet service provider via telephone lines is known as dial-up Internet connection.

Digital Library : A library in which significant proportion of the resources are available in machine-readable format, accessible by means of computers. The digital content may be locally held or accessed remotely via computer networks.

Graphical User Interface (GUI): A computer interface that allows the user to provide input and receive output interactively by manipulating menu bars, icons and moveable, sizable windows by means of keyboard or pointing device such as a mouse.

Institutional Repository : A set of services offered by an institution or a group of institutions to members of its community for the management and dissemination of scholarly material in digital format created by the institution and its members, such as e-prints, technical reports, theses and dissertations, data sets and teaching materials.

Internet Service Provider (ISP): A company in the business of providing Internet access to computer users who do not have direct connection, usually via a telecommunication channel in exchange for payment of a fee.

Online Service Provider : A company or a library concerned with selecting and providing access to electronic resources such as online catalogues, bibliographic databases, full-text databases, etc.

Open Access : Information content made freely and universally available via the Internet in easy

to read format. Open access is new model of scholarly publishing to free researchers and libraries from limitations imposed by excessive subscription price increase for peer-reviewed journals, particularly in science, technology, and medicine.

Reference Interview : Interpersonal communication that occurs between a reference librarian and a library user to determine the person's specific information need(s).

10.11 LIST OF ABBREVIATIONS

CMU   Carnegie Mellon University, Pittsburgh, PA15213.

ERNET   Education and Research Network, New Delhi.

IISc   Indian Institute of Science, Bangalore.

MCIT   Ministry of Communication and Information Technology, under Department of Information Technology, Govt. of India.

NSF   National Science Foundation, USA.

STN   Science and Technology Network.

TOC   Table of Contents.

10.12 REFERENCES AND FURTHER READING

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