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.

....

....

....

....

....

....

....

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.

....

....

....

....

....

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.

....

....

....

....

....

....

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.

....

....

....

....

....

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.

....

....

....

....

....

6)   List the online database search service providers.

....

....

....

....

....

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

Chowdhury, G. G. and Sudatta Chowdhury. *Searching CD-ROM and Online Information Sources*. London: Library Association Publishing,2001.Print.

Eaton, Alfred D. "Hubmed: A Web Based Biomedical Literature Interface". *Nucleic Acid Research* Web server issue 34, (2006): W745-W747.

Ghosh, S.B. and Anup Kumar Das. "Open Access and Institutional Repositories-A Developing Country Perspective: A Case Study of India". *IFLA   Journal* 33.4(2007): 229-250.Print.

Hutua, S.R. and Geetha ."Aggregator- A Rich Economic Source of E-Journals". *IASLIC Bulletin* 49.2 (2004):111-119.Print.

Jeevan, V.K. "Technology Enhanced Library Services and the Librarian's Identity Crisis in Academic and Research Libraries of India". *Libri* 57 (2007): 100-109.Print.

Lancaster, F.W., and Julie M. Neway. "The Future of Indexing and Abstracting Services". *Journal of American Society for Information Science* 33.3(2007): 183-189. Print.

Yanazaki, Hisamichi. (2007). "Changing Society, Role of Information Professionals and Strategy for Libraries". *IFLA Journal* 33.1(2007): 50-58.Print.