Notes

17

LIBRARY USERS

17.1 INTRODUCTION

The primary objective of any library, irrespective of its type or size, is to meet the information requirements of its users. All the activities of a library, from selection of resources to their organization, storage and dissemination are carried out keeping in view the users' requirements. User satisfaction becomes the ultimate goal of any library. Libraries, therefore, need to assess their services to ensure that the best use is being made of the available resources. They need to find out, if the services provided are appropriate to the needs of the users, reaching the target group and user's opinion about the services. For this, libraries regularly carry out user studies.

In this lesson, you will study the methods and techniques of library user studies. You will also be exposed to types of user orientation and user education programmes. Such training programmes not only create awareness but also make users independent in finding and using information.

17.2 OBJECTIVES

After studying this lesson, you will be able to:

- list different types of users and their information needs;
- state the methods and techniques of assessing users' information requirements;
- illustrate methods of information gathering habits of users;
- design questionnaires for gathering information requirements of the users;
- describe the purpose and methods of user education; and
- learn about user orientation and user education programmes offered by the libraries.

17.3 USER GROUPS AND INFORMATION NEEDS

As you are aware, an academic library serves the students and teachers of a specific school, college or university. Special library, attached to an R&D organization, serves personnel engaged in research and development activities and a public library serves the local residents of a region. Thus, each library serves a specific user group. Each user group need information for some purpose or other. Information needs vary from person to person. Table 17.1 shows Information needs of user groups and purpose for which they need information.

USER GROUP	INFORMATION NEEDS AND PURPOSE
Students	Study, project work, general interest
Teachers	Teaching and research
Researchers	R&D information in specific disciplines
Professionals	Technical information to pursue careers
Planners, Policy Makers	Information to frame policies and take decisions
Managers, business people	Product information, market trends and regulatory information
Communicators, intermediaries	Information to create awareness in masses about new processes, products, etc.
Technicians, supervisors, and para professionals in industry, business	Technical and problem solving information
General public	Vocation related information, general interest information

Table 17. 1: User Groups and Their Information Needs

Of all the user groups, researchers are the most extensive users of library resources and services. They need information to keep up to date, to find new areas of research, to avoid duplication of research and to solve problem. A large number of user surveys have been conducted to ascertain information needs of all categories of library users including common man. On basis of these surveys, we can identify four types of information user needs, namely, i) Current Information Need, ii) Exhaustive Information Need, iii) Everyday Information Need, and iv) Catching up Information Need. Information needs usually vary from person to person. Besides this, a user may have varied needs at different point of time.

When users need latest developments in their areas of interest on regular basis, the need is known as **current information need.**

When user wants to have complete and detailed information on a particular topic, the need is known as **exhaustive information need.** This type of information need is usually required by researchers.

Everyday information need is for a specific information required by users in their day-to-day activities. The need is generally for factual information normally available in standard reference books.

Catching-up information need arises when a user, not conversant with a particular subject field, requires an account of overall development of that subject in short and compact form.

To meet information needs of their users, libraries provide a wide range of services, which you have studied in Lessons 12, 13 and 14.

INTEXT QUESTION 17.1

1. List the different types of information needs of library users.

17.4 USER STUDIES

Libraries periodically conduct user studies to ascertain the needs and opinion of the users. The user studies also help the libraries to:

- assess the information needs of the users,
- know unfulfilled information needs,
- find out the use of library resources and services,
- know users' opinion about the library collection, staff, and services, and
- ascertain need for a new services.

17.5 USER STUDIES - METHODS

Libraries use various methods to carry out user studies. These methods are direct and indirect methods. Direct methods are based on establishing contact with the users and active involvement of the users under study. While, indirect methods are based on library's own analysis of its records and other sources, without the involvement of the users under study.

17.6 INDIRECT METHODS

Many libraries depend on analysis of their records and statistics, like, circulation records, reservation records, reference query files, etc. to assess the information requirements of their users. These methods are known as **indirect methods.** Library records provide useful information. For example, records of reference questions and literature search can give an insight into the type of queries received, type of documents used and time taken to answer a question, etc. Similarly, circulation record can be analyzed to determine the activity of the library as well as to determine the reading habits of library users. Indirect methods provide useful information. However, for finding views of the user, indirect methods are not appropriate. For example, indirect methods cannot provide information related to user's views about library services and his/her attitude, opinion, or preferences or behavior as an individual. It thus, becomes necessary to observe or question them directly.

INTEXT QUESTIONS 17.2

1. Why do libraries conduct user studies?
2. What do you understand by direct and indirect methods of library user studies?

17.7 DIRECT METHODS

Direct methods of user studies involve participation of the users under study. Most of the general methods and techniques of social surveys, such as questionnaire, interview, diaries, observations, etc. are direct methods. You will learn these methods in the following sections.

17.7.1 Questionnaire

A questionnaire is a structured schedule of questions, intended to be answered in writing. Questionnaires are a useful way to seek the opinion of users over widely scattered area. The most common form of questionnaire is the postal questionnaire, although questionnaire may also be given by hand, or may be sent via e-mail or online.

17.7.1.1 Types of Questions

Questions may be for seeking **facts** or **opinion**, and can be **closed** or **open-ended.**

a) Questions on Facts or Opinion

Questions on facts are those which are intended to obtain facts and are concerned with characteristics of respondent, description of a behaviour or events. For example, questions about respondents' age, sex, qualifications, occupation, use of a particular service, etc. are fact finding questions.

Questions on opinion seek to find out, not what a person knows, or what he has done, but what he thinks about certain service, event, or situation. For example, one might ask questions like - Are you satisfied with the library services? Or what, if anything, do you think can be done to improve library services?

b) Closed Questions

Questions can be constructed in such a way that the response categories are determined in advance. Such questions are called closed questions.

Type of Closed Questions

The simplest form of closed question is one for which only two possible responses are provided from which the respondent must choose one, often 'Yes' or 'No'. There may also be questions to which several alternative responses are provided, but again the respondent must choose only one. For example:

Q. Which of the following age groups you belong to?

Under 21	
21-45	
46-65	
Over 65	

In some questions, respondent may be instructed to select all the responses which may be applicable.

Q. For which of the following reasons you use this service? (You may tick more than one)

Current Teaching Programme	
Current Research Programme	
Keeping Up-to-Date	
To Write a Paper	
General Interest	

Another form of closed question consists of responses in the form of a scale on which the respondent marks the strength of his opinion.

Simplest and most commonly used form of a scale is following:-

Strongly Agree	
Agree	
Neither Agree Nor Disagree	
Disagree	
Strongly Disagree	

Such scales are **verbal scale** and have middle option. It is important that odd category is provided so that there is always a middle point. An alternate to verbal scale is **numerical scale** in which lowest and highest number represent the extreme views. In order to make scale more familiar to respondents, an image such as ladder or smiley chart showing faces may be provided which is a simple way of representing the level of satisfaction. Such scales are known as **image scale**.

Ranking Questions

In some questions, you may wish to know the relative importance which the respondent attaches to a list of categories. The respondent may be asked to rank a whole list of categories or choose the most and least desirable items from a list or select the most desirable item from a pair of comparisons.

Q. Below are listed attributes of librarians. Please rank them in the order of importance (from 1 to 5), as you see it, putting the most important one first

- Sound knowledge of subject
- Skill in on-line searching
- Good manners with public
- Pleasant appearance
- Good general knowledge

Advantages of Closed Questions

- They are simple to administer.
- It is easy to pre-code responses to facilitates analysis.

Disadvantages of Closed Questions

- A respondent may be forced to state an opinion on an issue about which he has no opinion.
- They do not allow respondent to qualify his/her response.
- Omission of possible alternatives may lead to bias.

c) **Open-Ended Questions**

Open ended questions are those in which the question itself is standardized but the response is left blank. It allows the respondent to answer in his own words.

Advantages of Open-Ended Questions

- Respondents can express themselves in their own language.
- Allows and encourages respondents to give their opinion fully.
- Allows respondents to make distinctions, which are not possible with closed format.
- Generate quotations which can be used in survey findings to make them interesting.

Disadvantages

- When used on mailed questionnaire, the answer may be short and superficial.
- The amount of space allotted for the entry of a response is likely to affect the wording of the response.
- Open-ended questions demand more thought from the respondents, and thoughts may emerge in a haphazard way.
- Analysis of open-ended questions is more difficult than analysis of closed questions.

17.7.1.2 Designing the Questionnaire

Designing a questionnaire involves skillful translation of objectives of the study into a set of questions. Questionnaire should be designed carefully. If the questionnaire is poor, the results of the study could be useless. A good questionnaire is brief, attractive, asks unambiguous questions, interesting and easy to complete. The following should be kept in mind, while designing a questionnaire.

i) Questions Wording

Questions should be clearly phrased. Avoid ambiguous terms. Ambiguity can arise in two ways, firstly in the use of individual words, and secondly in the sentence construction. Avoid loose terms like usually, sometimes, rarely, frequently, etc.

ii) Leading and Loaded Questions

Avoid leading and loaded questions. For instance, if you prepare a question with the phrase such as 'many people do such and such', you may encourage the respondent to give an answer that shows he conforms and it may not be his true opinion.

For example, the following question is a leading question and should be avoided:-

Q. Most people find reference staff in the library helpful. Do you? Yes/No

The above question may be reframed as follows:-

Q. Do you find the reference staff in the library helpful? Yes/No

Here, the pressure to conform towards a favourable view is removed.

iii) Length of the Questionnaire

In general, questionnaire should be as short as possible, without compromising the aim of the study.

iv) Order of Questions

Start the questionnaire with a question that will put the respondent at ease, and make him willing to complete the rest of the questionnaire. First question should be easy to complete. If possible, try to begin with closed questions rather than open-ended ones, as closed questions require less effort by the respondent and also help to clarify what the study is about.

Try to ask questions in logical order. Questions on the same topic should be grouped together and when the topic is to be changed, the respondent should be alerted with the introductory phrase.

v) Questionnaire's Format

- Be consistent,
- Make clear where and how response is to be given,
- Leave adequate space for responses,

- Number all the questions in continuous sequence and use letters to identify sub-parts, and
- Do not split question and its response category between pages.

vi) Accompanying Letter

All questionnaires should be sent out with an accompanying letter. Identify the organization conducting the study, purpose of the study and its social usefulness in the letter. Explain why the respondent is important, by simply describing, the way he was chosen. Respondent should be told whom to contact, if he has some queries. A phone number should be included. Indicate how the results of the survey would be communicated and thank respondents for their cooperation.

17.7.1.3 Advantages of Questionnaire

A questionnaire can be used to advantage when:

- Population to be reached is large and widely scattered geographically;
- It is possible to determine in advance what questions need to be asked in the study;
- Resources for data collection are limited.

17.7.1.4 Disadvantages

- Return is never complete, as normally only 50% of the mailed questionnaires are returned.
- At times questions are misinterpreted. To guard against misinterpretation, it is advisable to pretest and check the questionnaire on limited subjects. Another way to guard against misinterpretation is to supply a filled-in model questionnaire along with the questionnaire.
- As the interviewer is not present during the study, the tendency is to give the ideal or best answer, which may affect the findings.
- Some respondents may be unable to complete the questionnaire due to reading and writing illiteracy, language problem or any other reason.

INTEXT QUESTIONS 17.3

1. Enumerate direct methods of library user studies.
2. When should questionnaire method be used in library user studies?
3. Differentiate between closed and open-ended questions.

17.7.2 Interview

An interview involves verbal interaction between the interviewer and one or more respondents. It is either conducted face-to-face or by telephone. It is usually conducted with one individual at a time, but it may also be done with a group of individuals.

17.7.2.1 Type of Interviews

Interviews can be of different types, i.e., structured, semi-structured and unstructured interviews.

i) Structured Interview

Here the questions, their order, and response categories are decided in advance. Structured interview is based on an interview schedule, which is in the form of a questionnaire.

Advantages of Structured Interview

As there is consistency in the topics covered, responses to the questions can be compared and aggregated. Data analysis is also simple.

Disadvantages

- Questions and answers cannot be adopted if they seem inappropriate.
- Information which does not fit into predetermined categories is lost.
- Respondents may have to distort their views in order to choose a response.

ii) Semi-Structured Interview

Here some questions are structured and some are open-ended. Often, structured questions are used to obtain 'factual' information, such as age, number of books borrowed, employment status, etc. and open-ended questions are used when opinion, explanation or description of behaviour or events are sought. Here, the design of an interview schedule involves the use of principles similar to those used in the questionnaires.

iii) Unstructured Interview

It closely resembles natural conversation. Neither the questions, nor the response categories are determined in advance. Questions emerge from the interview as it develops. This method has great degree of flexibility. Respondents are free to express themselves in a language that suits them; they are not obliged to fit their ideas into someone else's categories. However, analysis of responses is difficult, as there is no consistency in the coverage of the topics, and the amount of data generated.

17.7.2.2 Advantages of Interview

- Misinterpretation of the questions can be avoided, as the interviewer is present to provide the correct interpretation.
- The response is hundred percent, and not like the questionnaire method, where response is invariably poor.

17.7.2.3 Disadvantages

- To reach a sizable sample, interview method is time consuming and costly.
- This method is costlier than questionnaire method, because the interviewers need to be trained.
- Interviewers need to establish rapport with the interviewees, especially the reluctant ones to get the answers skillfully.

INTEXT QUESTIONS 17.4

1. What do you understand by interview? Describe its types.
2. Which type of interview is more useful for carrying out library user studies?

17.7.3 Diary Method

In this method, individuals under study are asked to maintain a detailed record of particular information activity. Activities, like searching for information, actual reading, discussion with the colleagues, library use, etc. can be recorded for a given period of time. To facilitate the work of recording and the final analysis of data, 'data diary forms' are supplied to the individuals.

17.7.3.1 Advantages of Diary Method

This method provides a useful starting point for a semi-structured interview, as diary provides a check-list of topics to be covered in the 'interview'.

Diaries can be used to record information related activities of the individuals, which are otherwise difficult to observe, such as reading habits at home.

17.7.3.2 Disadvantages

As this method involves maximum effort on the part of the individuals, they may not record their activities completely. This tendency will be greater, if the period of record keeping is longer.

17.7.4 Observation

Observation by others is a way of collecting data in a purposeful and systematic manner about the behaviour of an individual or groups at a specific time and place. The technique of observation involves watching and recording actions as they occur. Distinguishing feature of observation is that information required by the investigator is obtained directly.

Observation method is useful for studying

- the use of library catalogue;
- use of reading room facilities;
- use of books and periodicals in the display area;
- activities in the reference and enquiry desk; and
- the number of users approaching the library staff.

17.7.4.1 Advantages of Observation

- You can discover what actually happens rather than individual's version of what happens.
- Observation is independent of individual's willingness to report.
- Some things are taken for granted by the individuals and may not be reported, but are noticed by a trained observer.
- It is rather inexpensive compared to other methods of data gathering

17.7.4.2 Disadvantages

- The method is not suitable for collecting data on people's attitudes and opinions.
- There is a possibility of influencing the individual's behavior if they know they are being observed.
- Method is not suitable for recording past events.

INTEXT QUESTIONS 17.5

1. What is Diary Method of library user studies? List its limitations.
2. Describe Observation method and state how it is useful.

17.8 USER TRAINING

User studies conducted during 1950s provided an insight into the users' information requirements and also revealed that existing library resources and services are not fully utilized by the users. Library professionals stressed the need for training the users, so that they may use the library resources to their benefit. This was emphasized more, because it was observed, that users were not fully aware of the library resources and services. In the years which followed, the need for library instructions in academic libraries was widely accepted, and means for implementation were being followed. Presently, it would be difficult to find any library that is not engaged in some activity or programme concerned with user training.

A wide range of training programmes are provided by the libraries. These training programmes aim to help the user to find and search information independently. Depending upon the type of instructions, the programme may be user orientation, bibliographic instruction, or user education programme. Let us study what each training programme offers.

17.8.1 User Orientation

Libraries, particularly academic libraries, organize 'user orientation' or 'user initiation' programmes for the new students at beginning of the academic session. Basic aim of the user orientation programmes is to introduce the library and its services to the new user. Such programmes acquaint the user to the library and its facilities such as general rules and regulations of the library, collection of the library and its location, catalogue of the library and how to use it, lending and borrowing facilities, and about reference and information services of the library. These programmes are in the form of a lecture by the librarian followed by a tour of the library; or a brochure containing all the information, or an audio/visual kit that introduces the library to the new comer.

17.8.2 Bibliographic Instructions

Training programmes on bibliographic instructions concentrate on teaching the participants with basic literature search techniques to find required information. The training course normally covers structure of the literature of a subject. It can be different types of documents that are available and their information characteristics. The training includes how to plan a search that will give best results in shortest possible time; availability of computerized databases and search techniques through them; and practical exercises on literature search on specific topic. Such training programmes are normally offered in universities and research organisations.

17.8.3 User Education

User education is a broader concept. It is an educational activity which is concerned with creating awareness among the students about the value of information, motivating them to use library resources to supplement class room teaching. Here the user training programmes are designed based on the course curriculum of the target users. At times class teachers are also involved in preparing practical exercises. Such activities develop skills in the users to find and search information independently for study, research and recreational purposes.

17.8.4 Information Literacy (IL)

Information literacy is a recent concept. *US Forum on Information Literacy* defines information literacy as "The ability to know when there is need for information, to be able to identify, locate, evaluate and effectively use that information for the issue or problem in hand".

Information Literacy empowers people in all walks of life to :

- identify which information is needed;
- understand how information is organized;
- identify the best sources of information for a given need;
- locate these sources;
- evaluate the sources critically; and
- use and create information effectively, to achieve their personal, social, occupational and educational goals.

Information literacy is important, because we are surrounded by information in all formats, particularly digital information on the Web. Not all created information is equal. Some is authoritative, current and reliable, while some is biased, outdated, misleading and false. Information literacy competency enables people to judge that the information they are using is accurate and is from a reliable source.

Libraries and library professionals can play an active role in information literacy programmes of parent institutions, by:

- Creating information access tools (OPAC, databases, etc.),
- Selecting, organizing and preserving information in all formats (print as well as non-print),
- Introducing information technologies, and
- Acting as consultant and facilitators in the use of information technologies.

INTEXT QUESTIONS 17.6

1. What is User Orientation?
2. Define information literacy.

WHAT YOU HAVE LEARNT

- User studies are conducted by the libraries to know the information requirements of the users and to find out the use of library resources and services. There are two methods of user studies, the direct and indirect method.
- User studies have helped to identify four types of information needs of the users, viz., current information need, exhaustive information need, everyday information need and catching-up information need.
- Indirect user studies methods are based on the analysis of library's own records, such as circulation, reference service records, etc.,without the involvements of the users under study.
- Direct methods involve active participation of the users under study. Direct methods use Questionnaire, Interview, Diary or Observation as an instrument for conducting the user studies. Each of the direct methods has its advantages and limitations.
- Questionnaire method should be used when population to be covered is large, distantly located and resources are limited.
- Designing a questionnaire is an art. Questionnaire should be brief, attractive, ask unambiguous questions, interesting and easy to complete.
- User studies revealed that existing library resources and services are not fully utilized by the users and stressed the need for training the users.
- User training programmes provided by the libraries aim to help the users to use existing resources and services fully and make them independent in searching and using information.

TERMINAL QUESTIONS

1. Describe in detail the various aspects to be included while designing a questionnaire.
2. List various types of interview schedules, explaing their advantages and disadvantages.
3. Discuss in detail, the types of information needs of the library users.
4. What is information literacy? What is the role of a library in information literacy programmes of its parent institution?

ANSWERS TO INTEXT QUESTIONS

17.1

1. There are four types of information needs of the users, namely, i) Current Information Need, ii) Exhaustive Information Need, iii) Everyday Information Need, and iv) Catching up Information Need.

17.2

1. Library user studies are conducted to find out information requirements of the users, use of library collection and services, know users' opinion about existing services, their unmet information needs and to find out if there is any need for a new service.
2. Direct methods of user studies involve participation of the users under study and are based on establishing contact with the users. Whereas indirect methods are based on library' own analysis of library records and other sources, without the involvement of the users under study.

17.3

1. Direct methods of library user studies are questionnaire, Interview, diaries and observation.
2. A questionnaire is a structured schedule of questions, intended to be answered in writing. Questionnaires method is used when population to be covered is large, widely scattered and resources for data collection are limited.
3. In closed questions, the questions and response categories are determined in advance and both are standardized. In open-ended questions, the

question itself is standardized, but the response category is left blank, which allows respondent to answer in his own words.

17.4

1. An interview involves verbal interaction between the interviewer and one or more respondents. It is either conducted face-to-face or by telephone. It is usually conducted with one individual at a time, but it may also be done with a group of individuals. Interviews can be structured, semi-structured and unstructured interviews.

2. Semi-Structured Interview is more useful for conducting library user studies. Here some questions are structured and some are open-ended. Often, structured questions are used to obtain 'factual' information, such as age, number of books borrowed, employment status, etc. and open-ended questions are used when opinion, explanation or description of behaviour or events are sought. Here, the design of an interview schedule involves the use of principles similar to those used in the questionnaires.

17.5

1. In Diary Method, the individuals to be studied are asked to keep a detailed record of their information related activities. Activities, like searching for information, actual reading, discussion with the colleagues, library use, etc. are recorded for a given period of time. To facilitate the work of recording and the final analysis of data, 'data diary forms' are supplied to the subjects. As, this method involves maximum effort on the part of the subjects, they may not record their activities completely. This tendency will be greater, if the period of record keeping is longer.

2. Observation method involves watching and recording in a purposeful and systematic manner the behaviour of an individual or group at a specific time and place. Distinguishing feature of observation is that information required by the investigator is obtained directly. Observation method is useful for studying the use of library catalogue, use of reading room facilities, use of books and periodicals in the display area, or for finding out what happens to users in the reference and enquiry desk, and what proportion of users approach library staff, etc.

17.6

1. User orientation is acquainting the new user to the library and its facilities. These programmes are in the form of a lecture by the librarian followed by a tour of the library or distribution of library brochure or an audio/visual kit is prepared to introduce the library.

2. Information Literacy can be defined as "The ability to know when there is need for information, to be able to identify, locate, evaluate and effectively use that information for the issue or problem in hand".

GLOSSARY

Circulation record: Records related to circulation of library material.

Image scale: It is used in closed questions. Here responses are in the form of scale using image such as faces or ladder to represent different views.

Numerical scale: Used in closed questions. Here responses are in the form of scale using numbers ranging from 1 to 5 or 7 to represent different views.

Reference query file: File containing questions received by the reference staff from the users and their answers.

Respondent: Someone who answers or replies.

Verbal scale: Used in closed questions. Here responses are in the form of scale using words to represent different views.

WEBSITES

http://www.en.wikipedia/wiki/Information_literacy

http://www.infolit.org

http://www.unesco.org/webworld/ramp/html/r8722e/r8722e0l.htm

http://www.slideshare.net/BLAlib/user-education-what-is-it-and-why-is-it-important-1725827

http://www.slideshare.net/Janecatalla/library-orientation-14381347

17

SEARCH TECHNIQUES: BASIC AND ADVANCED

17.1 INTRODUCTION

Searching is the activity of looking thoroughly in order to find something. In library and information science, searching refers to looking through records thoroughly in order to find desired information. You have already studied retrieval tools like catalogues, indexes, etc., for retrieving information. In this lesson, you will learn need and ways of searching organized information for retrieval purposes. You will also be exposed to fundamental aspects of search techniques for information retrieval from electronic sources.

17.2 OBJECTIVES

After studying this lesson, you will be able to:

- define search techniques;
- explain organization of words in a dictionary;
- use dictionary, numeric and numeric/classified techniques for arranging and retrieving library material;
- define search engines;
- identify search process and design a search query;
- know the role of search operators;
- define Boolean logic;
- understand types of search;

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- define, explain and differentiate the field based and full text search with examples.

17.3 SEARCH TECHNIQUES

The search technique is a mechanism through which one can find relevant information from information systems. The information system may be in-house or online. In-house information system is one where information is stored within the scope of an organization for retrieval purposes. The online information system is a system where electronic information sources are stored remotely and are accessible through a communication mechanism. Most of the online information systems are compatible with World Wide Web (WWW) and are accessible through internet. The in-house information system may have information sources in both printed and electronic form. Thus, storing mechanism and search techniques are two different aspects. We will discuss these two aspects of storage and retrieval of information.

INTEXT QUESTIONS 17.1

1. Define search technique.
2. What is online information system?

17.4 STORAGE MECHANISM

In-house information systems and online information systems are designed to store specialised information or information on a particular theme or subject. Such systems provide their own search mechanisms and a set of guidelines to find specific information. In library and information centers, information is available in both print and electronic form. Given below are some of the storage mechanisms and their role in information retrieval:

(i) Dictionary Arrangement

(ii) Numeric Arrangement

(iii) Classified Arrangement

17.4.1 Dictionary Arrangement

Dictionary arrangement means an arrangement where words are organized in alphabetical order of the language. The alphabetical order is the sequence based on the position of a particular alphabet in the script of the language. For

example, the English language uses roman alphabets and the order is A, B, C, D,.....Z. Here, the alphabet "A" is at first position, "B" at second and likewise "Z" at twenty sixth position in the sequence. Therefore, the words in dictionary arrangement are organized as per the sequential position of alphabets. For example,

Action
Ante
Apple
Art
Catalogue
Classification
Search
.....

Here, the first four words start with "A" but their positions are fixed as per the position of second, third or fourth letter. This is followed by another set of two words starting with "C". Hence, the words starting with "C" have been given position after the words starting with "A". Following this process, the words are organized in this arrangement. This mechanism of arrangement is followed for arranging entries in catalogues, which have words as access point. For example, author, title, subject, etc.

17.4.2 Numeric Arrangement

The numeric arrangement is the arrangement where numbers are organized in ascending or descending order. For example,

123.45
234.15
234.51
435.21
541.23
.....

Here, you find that all the numbers have same set of five digits, i.e., 1 to 5, but as per their numeric value, these are organized in ascending order and sequence has been made. In libraries, that follow Dewey Decimal Classification system, you will find that the books are arranged in numeric order on the shelves.

17.4.3 Classified Arrangement

Most of the libraries organize their books on the shelves as per the call number

of books. The call numbers are the combination of class number, book number and collection number. These three numbers may be numeric or alphanumeric as per the scheme, followed by the library. Hence, retrieving books from the shelves becomes easy when we understand the numeric, alphanumeric or classified arrangement. For example, a few call numbers based on DDC scheme have been arranged below as they are arranged on shelves.

321.4 RAM
370.1150954 DEM
370.1523 DES
371 ILL
371.3075 KEM
371.32 NIS
371.397 GRE
371.926 BRA

Another example of information retrieval following these arrangements is taken from a book index. You might have noticed that almost all books have an index at the end. The book index is a list of words/terms alongwith page numbers on which those appear in the text. Depending upon the size and nature of the book, the terms in the book index are organized either in dictionary or classified order. After understanding these arrangements, you can find information on a topic from the book easily.

INTEXT QUESTION 17.2

1. Define dictionary, numeric and classified arrangement.

17.5 SEARCH ENGINE

Searching information from the electronic or digital media is different from the print media. When information is stored in electronic or digital form, user interface is provided to find relevant information from the system. This user interface is a software, which has provisions to accept keywords or terms, representing required information to conduct the search. It brings the result of the search in the format defined in the software. The software meant for searching information from the information system is known as search engine. Hence, we can define a search engine as 'a software, meant for searching information from electronic or digital information domain, on the basis of input given by a searcher that displays the result in user friendly format'.

The input to the search engine is known as search string or query. The query may be a single term or a set of terms representing the information one is looking for. The search engine searches information based on the query and provides a list of sources which match the query. The list is displayed in a format, designed by the search engines. Depending upon the nature of the search engine, the list may contain brief description of information sources, on the basis of which, the searcher may decide to acquire or refer to full record or not.

You might have searched Online Public Access Catalogue (OPAC) of your library or *Library of Congress Online Catalog (LCOC)* or *PubMed* as well as *Google* or *Yahoo* on internet. All are the search engines.

INTEXT QUESTION 17.3

1. Explain a search engine.

17.6 SEARCH PROCESS

The search process is a set of functions which are performed for searching the relevant information effectively. The process follows some basic steps to conduct search and get desired results. These steps are as follows:

(i) Recognise and State the Need

(ii) Development of Search Strategy

(iii) Execution of the Search Strategy

(iv) Review Search Results

(v) Edit Search Results

(vi) Evaluation and Feedback

17.6.1 Recognise and State the Need

It is important for an information professional or searcher to understand the need and the purpose of a search. Information on a topic may be needed for general knowledge, research and development, or for any other purpose. After understanding the need and purpose of the search, a query statement should be developed.

There should be an agreement between the information seeker and the searcher on the search requirements. This agreement leads to formulation of effective search strategy for relevant and effective result.

17.6.2 Development of Search Strategy

The development of the search strategy includes conceptual formulation of query, translation of conceptual formulation into the language of keywords, descriptors or facets, identification of synonym and associated terms, etc. The concept of facet analysis(PMEST), given by Ranganathan as well as the concept of specific subject can be used as an effective tool for designing a query. After this, it is important to select the information domain to be searched like, the OPAC of a library, database or likewise, depending upon requirements.

The search string or query, is the combination of terms, keywords or descriptors, which represent the information. As search strings contain vocabulary, the linguistic features and their implications on the search and retrieval of information have to be analyzed. Here, three aspects, namely, Syntactic Value, Semantic Value and Boolean Operators are to be understood.

a) Syntactic Value

The syntactic value of a search string deals with the kind of formula or connecting symbols through which keywords or terms are connected to represent the concept to be searched by the search engines. We will try to understand the syntactic value of a query by this example. There are two terms, say "poetry" and "Indians" connected by two different connectors, "among" and "by". Each gives a different meaning, as follows:

(a) 'poetry among Indians' means 'What is the status of poetry among Indians?" Or 'What is the approch of Indians towards poetry?"

(b) 'Poetry by Indians' means, poetry composed by Indians.

b) Semantic Value

The semantic value of a search string deals with the meaning of the string in the context of the required information and the interpretation by the search engine. For establishing the meaning of the concept to be searched and understood by the search engines, we use operators as connectors of keywords as permitted by the search engines.We can understand the semantic value of a query through two examples given below:

(i) The query 'contribution of Indian society in mathematics' means the contribution of Indian society in the field of Mathematics.

(ii) The query 'contribution of mathematics in indian society' means contribution of Mathematics in shaping Indian society.

These two examples give us clear perception of the semantic value of a query. The same set of keywords and connectors give different meaning when written in different order.

c) Boolean Operators

Boolean Operators are simple words (AND, OR and NOT) used as conjunctions to combine or exclude keywords in a search. These are used to connect and define the relationship between the search terms. Thus, resulting in more focused and productive results.These three terms are widely accepted by the designers of the search engines. They have well defined meaning while used as operators in information search. The three operators of Boolean logic are the logical sum (+) OR, logical product (x) AND, and logical difference (-) NOT. All the information retrieval systems allow the users to express their queries by using these operators. Let us now understand the implications of these three operators.

OR Operator: The OR operator allows the searcher to specify alternatives among the search terms. When a string is created using OR operator, the search engines retrieve all those resources where any of the terms or keywords connected with 'OR' exist. For example, if we create a search string like, 'student OR education' and search it, then the output of the search will be a list of references of all those resources, available in the system, where either student or education exists.

AND Operator: The AND operator is used to combine two or more terms. When a string is created using AND operator, the search engine retrieves all those resources where all the terms or keyword connected with 'AND'exist. For example, if we design a search string like, 'student AND education and search, then the output of the search will be a list of references of all those resources, where student and education, both the terms exist.

NOT Operator: The NOT operator is used to exclude the term from a set of resources. For example, if we create a search string like 'student NOT education' and search, then the result of the search will be a list of references of all those resources, available in the system, where term student exists but not education.

You can understand the implications of boolean operators with the graphic representations. Here 'A' represents a set of students and 'B' represents a set of education in Fig. 17.1

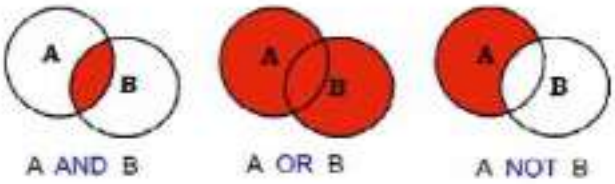

Fig. 17.1: Graphical presentation of the implications of Boolean Operators

INTEXT QUESTION 17.4

1. Define search strategy.

17.6.3 Execution of the Search Strategy

The searcher should have knowledge of data structure adopted by the information system that stores data before executing a search. The system based search engines are designed to search information in a database according to its architecture. Like in OPAC, if we put a query as 'Tagore, Rabindra Nath' and search in author field, then only those records will be retrieved and displayed from the database which have been authored by him. But, if we direct the same query into the title field, then those records will be displayed, in which 'Tagore, Rabindra Nath'appears in the title or a part of the title. This means that the references of materials, written on 'Tagore, Rabindra Nath'will be listed in result.

Depending upon the need and purpose of the search and expertise of the searcher, the search may be conducted using the features of the search engines. Hence a searcher should know the types of search and implications to get effective output. The types of searches are:

a) Field Based Search
b) Full Text Search
c) Truncation Search
d) Proximity Search
e) Limiting Search
f) Range Search

g) Simple Search

h) Advanced Search

(a) Field Based Search

The search conducted on a particular field of the database to get required information is termed as field based search. As you are aware, the complete information of catalogue is stored in different fields in a bibliographic database. If you wish to search an author, direct the search engine to author field or if you wish to search through title or subject, direct the search engine to title or subject field.

If 'Sen, Amartya' is searched in Author field, then the result will show the works authored by him. While, the same search when executed on Title field, the result will show the works on him. For example, a search was conducted on Library of Congress Online Catalogue (LCOC) putting 'Sen, Amartya' as a search string and selected 'author creator' field to be searched. The result given by the search engine was a list of 7 documents when author/creator was searched, while it gave a list of 137 documents when title field was searched. The images of the search and the results are given below in Figs. 17.2 to 17.5.

Fig. 17.2: Search on LCOC

Fig. 17.3: Search on LCOC where Sen, Amartya was searched in author/creator field

Fig. 17.4: Search on LCOC

Notes

Fig. 17.5: Search on LCOC where Sen, Amartya was searched in title field

(b) Full Text Search

Full text search is a searching mechanism, which conducts the search on each and every field of the database and extracts all those records which match the query. For example, the same search (Amartya Sen) when conducted on LCOC with keyword option, which works as full text search, gave a list of 193 records. This shows that, in full text search the number of hits increased as it extracted all those records which had 'Sen, Amartya' in any fields. The search result is given in Figure-17.6.

Fig. 17.6: Search on LCOC

Notes

Fig. 17.7: Search on LCOC where Sen, Amartya was searched in keyword search.

(c) Truncation Search

Truncation search, is a search technique, in which, the search is conducted for different forms of a word having the same common root. It is one of the most widely adopted methods in information retrieval system. In this technique, root word is taken with truncation mark and search is conducted. For example, if we search 'India*' then all the records will be retrieved where term 'India' appears full or part of any word. The output will list all the records of the domain having, India, Indian, Indiana, Indianization or likewise.

(d) Proximity Search

The proximity search, is a search technique, which allows the searcher to define the distance of two terms from each other. Whether, the two search terms, should occur adjacent to each other, or, one or more words occur in between the search terms, or the search terms should occur in the same paragraph, irrespective of the intervening words, etc. Different search engines use different set of operators for this purpose.

(e) Limiting Search

In limiting search technique, a searcher limits the string as per the architecture of database and searches different terms of the same string in different fields. For example, if a searcher is searching 'Development as freedom by Amartya Sen' then the string will be broken into two sub-strings, viz 'Development as

freedom'and 'Amartya Sen'. The sub-string 'Development as freedom' will be put in title field and sub string 'Amartya Sen' will be put in author filed and then search will be conducted.

(f) Range Search

Range search technique is a technique,which allows searchers to select records within certain data ranges. This technique is more suitable for numeric data search. The operators and their meaning differ from search engine to search engine. A few commonly used operators are:

- Greater than (>)
- Less than (<)
- Equal to (=)
- Not equal to (!= or <>)
- Greater than or equal to (>=)
- Less than or equal to (<=)

For example, if we put publication year 2000 >=, then the result will list all those resources which have been published 2000 AD onwards.

(g) Simple Search

Simple search is such a technique where a searcher puts keywords in a simple format without understanding the behavior of the search engine or the architecture of the database or the impact of the operators and connectors. Almost all the search engines provide the facility of using simple search technique. The simple search works on the model of Full text search discussed above.

(h) Advanced Search

Advanced search technique is a technique through which a searcher searches the information using different tools and mechanisms to get precise and relevant results. In this technique, a searcher creates the search string using operators and parameters provided by the search engine. Searching information, combining different methods discussed above, also falls in this category. Here, the scope of each and every term of the string may be defined as per facility available in the search engine. We will discuss different aspects of advance search in Lesson 18.

INTEXT QUESTIONS 17.5

1. What is field based search?
2. Explain full text search.
3. Define truncation search.
4. Discuss limiting search.

17.6.4 Review Search Results

The best reviewer of the search results is the user. But the information professionals should also review the search results on the basis of criteria given for evaluating information retrieval systems.

17.6.5 Edit Search Results

The editing of search results involves transformation of the search results into a user friendly format. This may involve arranging the results into a well-organised package, highlighting the important entities, adding more information to the entities and reformating of information to suit the user's requirements.

17.6.6 Evaluation and Feedback

The evalution of search results involves participation of both, the users and the searchers. The quality and quantity of the results are assessed and if needed, the process may be redefined and restarted if the final result does not satisfy the users' needs.

On the basis of the search process discussed above, a simple model can be given as in Fig. 17.8.

Fig. 17.8 : Search Process Model

INTEXT QUESTIONS 17.6

1. How a search result is reviewed?
2. What is the need of editing search result?

WHAT YOU HAVE LEARNT

- The standard mechanism, called information search techniques is used for retrieving information from any information system.
- The search technique is a mechanism through which, one can find relevant information from information systems. The information system may be in-house or online.
- Storage mechanism can be dictionary, numeric and classified arrangement of information.
- Search process follows a set of functions as:
  - determination of user's need of information search;
  - designing search strategy;

- selecting the information system to be searched and accordingly the search engine;
- creating search query or string using keywords and operators which, represents the semantic value of the user's requirements and the syntactic format which the engine interprets;
- conducting the search;
- evaluation of the result. If needed, again filter or redefine or restart the search process; and
- presentation of the search results in a user friendly format.

- For getting relevant and effective search results, a searcher should have knowledge of the types of searches and skills of conducting them.

TERMINAL QUESTIONS

1. Explain search techniques and their need for information retrieval.
2. List the search process and give a brief note on each of the steps.
3. Explain semantic value of a search string.
4. Explain the Boolean operators and their impact while connecting two keywords 'A' and 'B'.
5. How does an advance search differ from a simple search?

ANSWERS TO INTEXT QUESTIONS

17.1

1. The mechanism by which we find relevant information from any information system is known as search technique.
2. The online information system is a system where electronic information sources are stored remotely and are accessible through a communication mechanism.

17.2

1. Dictionary arrangement is an arrangement in which words are organized in alphabetical order of the language. In numeric arrangement, numbers are organized in ascending or descending order. Classified arrangement is an arrangement in which the words or numbers or a mix of both (alphanumeric) are firstly grouped on the basis of some characteristics. Then these are organized in dictionary or numeric or a combination of both orders.

17.3

1. The search engine is a software, meant for searching information from electronic or digital information domain. On the basis of query given by a searcher, the search engine displays the results in user friendly format.

17.4

1. The search strategy is a process of developing conceptual formulation of query, translation of conceptual formulation into the language of keywords, descriptors or facets, identification of synonymous and associated terms, etc.

17.5

1. The field based search is one where search is conducted on a particular filed of the database to get required information.
2. The full text search is a searching mechanism, which conducts the search on each and every field of the database and extracts all those records which match the query.
3. The truncation search is a technique, in which the search is conducted for different forms of a word having the same common root.
4. In the limiting search technique a searcher breaks the string as per the architecture of a database and searches different terms of same string in different fields.

17.6

1. The best way of reviewing the search result is to get feedback of the user. If the user is satisfied with the result then the search may be considered successful.
2. The result displayed by the search engines are not always in the user friendly format. Thus, editing the result in the format which user can understand becomes is necessary.

GLOSSARY

Alphabetical arrangement: Arrangement based on the sequence of the alphabet of a particular language in which terms are written.

Ascending: Increasing order

Descending order: Decreasing order

Information domain: An information system where information or its sources are stored logically for retrieval purpose.

LCOC: Library of Congress(USA) online catalogue

Numeric arrangement: Arrangement of numbers in ascending or descending order

OPAC: Open Public Access Catalogue

PMEST: Personality, Matter, Energy, Space and Time (of Colon Classification)

PubMed: Online database of US National Library of medicine covers citations for biomedical literature from MEDLINE, life science journals and online books. The citation may include links to full-text content from PubMed Central and publishers web sites.

Software: Any computer executable programme like Libsys WINISIS etc.

User interface: A tool which works between user and the system.

WWW: World Wide Web is system of interlinked hypertext documents accessed via the Internet. With a Web browser, one can view web pages that may contain text, images videos and other multimedia and navigate between them via hyperlinks.

WEBSITES

http://catalog.loc.gov/help/titles.htm

http://www.ncbi.nlm.nih.gov

http://www.internettutorials.net/basic-search-techniques.asp

http://www.dlib.org/dlib/january97/retrieval/01shneiderman.html