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Bachelor of Library & Information Science

I - Semester

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INFORMATION SOURCES, SYSTEMS AND SERVICE

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SYLLABI-BOOK MAPPING TABLE

Information Sources, Systems and Service

Syllabi	Mapping in Book
BLOCK I: Sources of Information & Communication **Unit-I:** Information, Information Explosion & Information Environment–Nature and Characteristics of Information. **Unit-II:** Information Transfer–Means & Methods–Formal & Informal-Barriers to Communication. **Unit-III:** Sources of Information–Documentary–Non-Documentary–Published and Unpublished-Types of Information Sources–Primary, Secondary, Tertiary Sources.	**Unit-1:** Information and Information Environment **(Pages 1-17)** **Unit-2:** Information Transfer **(Pages 18-30)** **Unit-3:** Sources of Information **(Pages 31-50)**
BLOCK II: Reference Sources and Evaluation **Unit-IV:** Categories of Information Sources–Encyclopedias–Dictionaries, Directories, Handbooks& Manuals–Biographical Sources–Geographical Sources-Bibliographies, Almanacs, Year Books. **Unit-V:** General Evaluation of Information Sources–Authority Scope, Arrangement, Treatment, etc–Abstracting and Indexing Periodicals.	**Unit-4:** Categories of Information Sources **(Pages 51-68)** **Unit-5:** General Evolution of Information Sources **(Pages 69-81)**
BLOCK III: National & International Centres **Unit-VI:** Information Systems–National Level-Need Purpose and Functions–NISCAIR, DESIDOC. **Unit-VII:** Information Systems–International National Level-NASSDOC, AGRIS, MEDLARS, INIS.	**Unit-6:** Information Systems Existing at the National Level **(Pages 82-99)** **Unit-7:** Information Systems Existing at the National and International Level **(Pages 100-126)**
BLOCK IV: Information Services **Unit-VIII:** Information Services–Reference Service–Definition, Need and Types–Ready Reference Service–Long Range Reference Service. **Unit-IX:** User Needs–User Education. Documentation Services–Current Awareness Service, SDI. **Unit-X:** Bibliographical Services–Types of Bibliographies–INB and BNB–Planning, Compilation of Bibliography.	**Unit-8:** Introduction to Information Services **(Pages 127-140)** **Unit-9:** User Needs and User Education **(Pages 141-174)** **Unit-10:** Bibliographic Services **(Pages 175-185)**
BLOCK V: Electronic Resources & Search Techniques **Unit-XI:** Electronic Resources–Types of Electronic Resources–Advantages and Disadvantages. **Unit-XII:** Web Based Resources and Services–Evaluation Criteria. **Unit-XIII:** Reference Librarian: Role, Skills, & Competencies. **Unit-XIV:** Reference Interview & Search Techniques-Literature Search.	**Unit-11:** Electronic Resources **(Pages 186-213)** **Unit-12:** Web Based Resources and Services **(Pages 214-235)** **Unit-13:** Reference Librarian: An Overview **(Pages 236-243)** **Unit-14:** Reference Interview and Search Techniques **(Pages 244-250)**

CONTENTS

INTRODUCTION

NOTES

A communication system is made up of devices that employ one of two communication methods (wireless or wired), different types of equipment (portable radios, mobile radios, base/fixed station radios, and repeaters), and various accessories (examples include speaker microphones, battery eliminators, and carrying cases) and/or enhancements (encryption, digital communications, security measures, and interoperability/networking) to meet the user needs.

Information system is any combination of information technology and people's activities using that technology to support operations, management and decision-making. The IS provides relevant Information which is meaningful and useful for any organization. Timely, reliable and correct information leads to better management decisions, more efficient business processes and higher profitability. Different organizations may have different needs and hence information systems are uniquely developed to serve the needs of a particular organization. The role and usage of information system is influenced by the needs of organizations and surrounding environment.

Today, as an organized system, the library is becoming an intermediary, rather than a storehouse, of information. Libraries are extensively using communication and information systems. The evolving nature of the library is characterized by a gradual change of its organization. In this information age, information is not only recorded items of knowledge, it is also the digitized bits of information that could be moved through computers and telephone lines to wherever it is needed. The management of new age libraries poses numerous challenges to the librarians and information scientists. It is essential that they should have an integrated approach to concentrate on the client expectations, electronic and print information, new skill development and standard hardware.

This book, *Information Sources, Systems and Service* has been divided into fourteen units. The book has been written in keeping with the self-instructional mode or the SIM format wherein each Unit begins with an Introduction to the topic, followed by an outline of the Objectives. The detailed content is then presented in a simple and organized manner, interspersed with Check Your Progress questions to test the student's understanding of the topics covered. A Summary along with a list of Key Words, set of Self-Assessment Questions and Exercises and Further Readings is provided at the end of each Unit for effective recapitulation.

BLOCK - I

SOURCES OF INFORMATION & COMMUNICATION

NOTES

UNIT 1 INFORMATION AND INFORMATION ENVIRONMENT

Structure

1.0 INTRODUCTION

With the introduction of mechanical technology for steam-driven railways and ships and the telegraph, the nineteenth century society felt cut off from the medieval society, whose stability was based on religious faith. Similarly, the next generation living in the early twentieth century felt cut off from the technology based society, with the arrival of cars running on internal combustion engines, the nuclear fission, and psychological insights of Dr. Sigmund Freud. The society gradually headed towards the information age and graduated into digital age from the middle of twentieth century. In the late twentieth century, the society entered the phase of a digital revolution, which is still running at a rapid pace.

Information is the key for increasing a person's knowledge and after the world's digital revolution, it has brought the information explosion at an unmatched scale, which has made data available for everyone. Any individual, if capable of operating the computer based equipment or software, become a useful commodity in modern times. On the other hand, those who are not able to cope up with

NOTES

working with the digital tools, often lag behind in this digital era and are thereby pushed down the success ladder. According to the American Educational Association, it took until 1750, since the beginning of the Christian era, for human knowledge to double. The second explosion took place in 1900 after 150 years and the third one took place in 1950s. However, in the modern times, the information explosion has reached new heights.

1.1 OBJECTIVES

After going through this unit, you will be able to:

- Describe the meaning and concept of information
- List the attributes of information
- Explain information explosion
- Identify the cause and effect of information overload

1.2 CONCEPT OF INFORMATION

Data is a set of values of qualitative or quantitative variables; restated, pieces of data are individual pieces of information. Data as a general concept refers to the fact that some existing information or knowledge is represented or coded in some form suitable for better usage or processing.

Data must be collected, managed, organized, stored and analysed to give the required information. Information is said to be useful and has meaning only when it is disseminated. In other words, if information is not distributed among the information users, it is deemed as useless. Information dissemination can take place in various ways. Information transfer happens between the sender and the receiver. For information to reach the receiver, the sender needs to initiate the process and use some media via which the information will travel and reach the receiver. Information is said to be successfully transferred only when the receiver acts upon or responds to the information in a manner that was intended by the sender.

Information will have direct impact on the user, if it is clear, relevant, unambiguous, accurate, concise, precise and concrete. In addition, information needs to be truthful; wrong facts and figures are a case of misinformation. Wrong information is of no use and does not solve any purpose. Wrong information does not help in any manner and is usually discarded.

1.2.1 Definition of Information

We live in what is called the information age. Information is the essence of everything we need and is central to all life forms. Information is derived from data. Data is

NOTES

nothing but a random and unorganized collection of indications or measurements of certain qualities or attributes of an entity or an object. This data is collected and recorded in alphabetical, numerical, alphanumerical, voice, image, text or any other form.

Data is basically unstructured raw facts, observations or unevaluated messages in isolation. On its own, data does not convey much and is of not much use. It is like a material which is available in unfinished form. Data consists of facts and figures which are not currently being used for anything and do not contribute to decision-making process in any manner. This data, however, when converted to information helps in decision-making process.

Information can be defined as the data that is collected, processed, logically organized and analysed so that it can be used. Information can be called the finished product. Information brings clarity and creates an intelligent human response in the human mind.

It is essential to present information in the right manner because if it is not rightly presented, it may fail to communicate anything of value to the receiver. Since information is the basis of communication, it is essential to ensure that information is transmitted correctly. The degree of communication is greatly affected in the manner the information is handled and processed.

Information has the following characteristics as opposed to data which is merely raw facts and figures.

- Information improves the representation of an entity.
- Information updates the level of knowledge.
- Information has a surprise level.
- Information reduced uncertainty.
- Information aids the decision making process.

The above characteristics are central to the quality of information. Depending on the mix of the above stated characteristics information can be good or bad and useful or useless.

1.2.2 Information Process

Data are raw facts and figures that must be processed to get the information which is useful. To convert data to information, various operations need to be performed. Meaningful information can be obtained from data by processing it through the information process. The process of information consists of following stages:

- **Capturing:** Data capturing is the first step in information processing. The data from an event or a transaction is recorded for processing later on.
- **Verification:** The data captured needs to be verified, checked and validated for correctness. This is essential because only correct data can give the correct information. Information obtained on the basis of incorrect data is neither useful nor required.

NOTES

- **Classification:** Once the data is verified, it needs to be categorized according to its characteristic attributes. In this stage, the data of the same type or for the same object is stored in one category.
- **Arranging:** The classified data is then placed in a sorted manner. The data is placed in a sequence so that it can be easily retrieved when required.
- **Summarizing:** Data of the same type or the data collected for the same object needs to be combined or aggregated so that it can be processed in the required manner.
- **Calculation:** Once data related to the same entity has been obtained, various arithmetic and logical operations or calculations are carried on the data so that it can be converted to something meaningful which is information.
- **Storing:** Once data has been operated upon, it needs to be stored in some storage media so that it can be retrieved at a later date. The storing of data requires the storage of all elements and attributes associated with it.
- **Retrieving:** Information needs to be retrieved from time to time so that it can be used.
- **Dissemination:** Data and information need to be transmitted from one place to another so that they can be used. Dissemination is of importance when it comes to information processing. If information is not disseminated or communicated, it is of no use. Dissemination of information is essential for the receiver to receive it.

Figure 1.1 illustrates the flow chart for information processing.

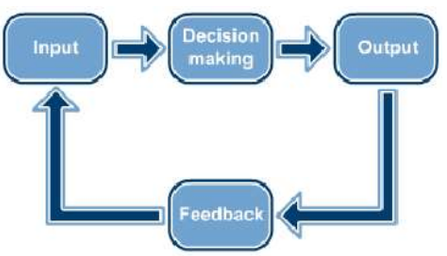

Fig. 1.1 *Information Processing*

Humans as Information Processors

A human being can hear, see, touch, feel and smell. These senses are then transmitted to the brain which analyses them and act with an appropriate response. This human behaviour can be seen or explained in terms of information processing.

The sensory receptors, i.e., eyes, ears, nose, and so on, receive signals which are then transmitted to the brain. The signals are then processed by the brain and appropriate responses are communicated. Thus, signals from sensory receptors become inputs. These signals are then transmitted through the nervous system which acts as the channel or medium. These signals are communicated to

NOTES

the brain where the processing of signals is done. Processing leads to response which can be viewed as outputs.

However, human beings cannot go on accepting unlimited inputs and keep coming up with unlimited outputs as the human capacity to accept inputs and offer outputs is rather limited. If there is too much of input, the human capacity will simply be unable to accept the input and correspondingly the output will also be reduced or restricted. This too much of input affecting the output is called overloading.

To avoid overloading, humans restrict input to a manageable quantity by being selective in accepting some inputs and blocking other inputs. This process leads to creation of filters resulting from:

- Frame of reference of the person concerned based on prior knowledge and experience
- Normal decision procedure
- Decision-making under stress

Filtering apart from blocking unwanted data may also block data which is not considered consistent with the established frame of reference. This may further result in errors of perception like omission, distortion, inferences, and so on. The errors of perception may reduce the information content that humans accept and understand. Humans make use of the perceived and comprehended information to solve problems and for other purposes.

1.2.3 Different Approaches to Information

Information is something, which informs. Information is conveyed either as content in a message or through direct or indirect observation of something. The basic purpose of information is to convey a message or communication. However, a message can have different meanings in different contexts. In other words, it is not essential that the same message be interpreted by different receivers in the same manner or in the same context. This is because information and its perception are dependent and affected by many factors namely constraint, communication, form, education, knowledge, meaning, understanding, mental stimuli, perception, pattern, entropy, and representation. The different approaches to information are:

- **Information Theory Approach:** According to the information theory approach, information is an ordered sequence of symbols from an alphabet and consists of an input and an output. According to this theory, information processing consists of an input/output function that maps the input sequence into an output sequence. This mapping or conversion of input to output can be deterministic or probabilistic.
- **Representation and Complexity Approach:** According to this approach, information is a concept that involves at least two related entities in order to make quantitative sense. In other words, if there is an object A with a subset

NOTES

B, then B is the representation of A. Also the amount of information conveyed about A by B depends upon pattern, invariance, complexity, representation and information available about B. According to this approach, the five constructs of pattern, invariance, information, representation and complexity are used to characterize and measure subjective information.

- **Sensory Input Approach:** According to this approach, information is viewed as a type of input to an organism or a system. Based on this approach, inputs can be classified as casual inputs which are important for the functioning of an organism or the system by themselves. The other inputs called information are associated with casual inputs and are used to predict some occurrences of casual inputs. According to this approach, information is vital to the functioning of the organism or the system.
- **Influence Transformation Approach:** This approach defines that information is any pattern that influences the formation or transformation of other patterns. The approach also implies the fact that the information is perceived and interpreted by a conscious mind so that the information can be transformed into knowledge. This also means that information can be used for decision-making purposes once it is established in the relevant context.
- **Physics Approach:** Information in physics has a well-defined meaning. The physical world is made up of information and so information is central to all concepts of physics. This essentially applies to digital physics wherein it is believed that universe is described by information and is so computable. The mathematical universe hypothesis suggests that virtually everything in the physical world could be defined by mathematical patterns of information. This approach also suggests the fact that material information itself cannot travel faster than light even if this information is disseminated indirectly. The physics approach also suggests that information and various physical properties are directly related and linked and so it is impossible to destroy information. Information can also be thought of as interchangeable with energy and information can be converted to work as well. The approach also suggests that information is any kind of event that affects the state of dynamics of any system that is capable of interpreting information.
- **Records Approach:** Records are specialized forms of information according to this approach. The approach suggests that records are information produced consciously or as a by-product of transactions and events. This information is retained because of its value and can be used later for decision-making.

Information can, thus, be broadly defined as an answer to a question and from which data and knowledge can be derived. At the most fundamental level, information is any propagation of cause and effect within a system. Information can be encoded in various forms for transmission and interpretation. It can also be encrypted for storage and communication.

NOTES

1.2.4 Information as a Quality Product

Information is a product of data processing. It is, therefore, essential to carry out the data processing in such a manner that the information obtained is of high quality. The quality of information can be measured on four dimensions- utility, satisfaction, error and bias.

Utility simply means putting the information to use. The utility of information has four facets- form, time, access and possession. The utility of information is directly proportional to all these facets. The utility of information increases if it is available or presented in the required form. The utility increases if the information is made available in time or at the time when it is required. Receiving or using information long after when it was required does not give any meaningful results and thus information is rendered useless. Accessing information quickly and easily further adds to the utility of information. The possession of information by the right person and at the right time also increases the utility of information.

Satisfaction of information simply implies the fact that the user of information puts the information to use and is satisfied with the results. Information is said to be of good quality is the user is satisfied with the end results after putting the information to use. If the user is not satisfied with the end results, the information is said to be useless.

Error in information leads to the deterioration of the quality of information. Errors may creep into information because of the following reasons:

- Incorrect data measurement
- Incorrect collection method
- Failure to follow the prescribed data processing method
- Incomplete data
- Loss of data
- Poor application of data validation systems
- Deliberate falsification of data

Data that is erroneous leads to erroneous information. Erroneous information can be a problem because it cannot be used for getting the desired results. Therefore, it is essential that errors be avoided by following proper analysis and control functions. If the error in data cannot be avoided, it must be detected and controlled.

For the quality of the information, it is essential to ensure that it is not biased. Bias enters information mainly because people try to block sensitive and other information which affects them. To maintain the good quality information, deliberate bias in covering certain information should be avoided. Sometimes, the information may be presented correctly but bias may enter the processes of collection, processing and presentation of information. For example, if information is presented in a graphical form, the choice of graphics, size of images and attributes of images may be biased and the information so perceived by the user is of no use.

NOTES

The presence of bias in information usually influences the user in his decision. Usually, bias in information can take any of the following forms:

- Delayed delivery of information
- Change in format and content of report that contains information
- Suppressing and filtering information of confidential and sensitive nature
- Suppressing details and references of data and information
- Truncated or lopsided information

Information bias in any form results in wrong, incorrect and poor quality information. This information cannot be used in the required manner at the required time for getting satisfactory results. Bias in information must be avoided so that the information can be used in the right manner to get satisfactory results.

Thus, good quality information helps in reducing and sometimes even eliminating elements of risk that are associated with the decision-making process. Good quality information also helps to achieve the desired and optimum results within the given constraints. The purpose of good quality information is to affect the behaviour of the user and make the difference in the sense that the user is able to use the relevant information to make a quality decision. One of the main characteristics of good quality information is that it can be distributed in an effective manner to all those who use the information for various purposes. Good quality information can be summarized in the right manner to avoid confusion and misunderstanding.

1.2.5 Attributes of Information

Information as we know is a collection of organized facts and figures that can be used to reach the desired results. Good quality information is useful information that helps in decision-making process. Information to be of use must possess certain attributes. These include:

- **Timely availability:** Information to be useful must be available at the required time. If the information is not available at the time when it is required, it is deemed useless.
- **Accuracy:** Accurate and correct information can be used for the purpose of decision- making. Inaccurate information is of no use because it cannot help in reaching a decision.
- **Reliability:** Information must be reliable so that it can be put to use. The sources from which information is collected must be reliable and provide accurate information.
- **Periodicity:** Information should be available for use frequently. When information is made available to use, it must be ensured that the information is available if required again for the same process.
- **Verifiability:** Any information that is put to use must be verifiable for accuracy and correctness. If information cannot be verified it implies the fact that information is false and so cannot be used.

- **Relevant:** Information used must be relevant to the application or the process or the user who is using it. If irrelevant information is available to a user, it cannot be used and applied in the required manner making it useless.
- **Completeness:** When information is used, it must be complete. Incomplete information is of no use and does not help in any manner. When complete information is used, it ensures that the right results are obtained.
- **Comprehensibility:** Only the information which can be understood or comprehended by the user can be put to use. If the user does not understand what the information conveys, he cannot use it. Thus information that cannot be correctly comprehended cannot be used in any manner.
- **Clarity:** Useful information possesses the attribute of clarity. Only information that is clear and unbiased can be put to use effectively.
- **Consistency:** To be useful, information must be consistent. In other words, when a user applies information for the same purpose, the results must always be same. Inconsistency in information leads to inaccurate and different results.
- **Brevity**: Information that is usable is concise. This means that the information conveys exactly what it is meant to convey. Brevity of information is an important attribute mainly because of the fact that only concise information is what is used and any extra information is neglected and is of no use.
- **Cost effectiveness:** Information which is usable should be cost effective. This means that the sources of information as well as the outcome should be cost effective. The data processing method which results in meaningful information should be applicable in a cost effective manner.

It is usually believed that the more attributes information has, the better it is. In other words, the quality of information and the usefulness of information depend upon the number of its attributes. This good quality information can be put to several uses and can produce the desired results. This means that any information with the above attributes or features is result-oriented.

The fact that information to be of good quality must have the above listed attributes also implies the fact that if information does not have any of these attributes, then it is of poor quality and cannot be put to use. The lack of the attributes of information also suggests the fact that information that is of poor quality cannot give any results or cannot be used for decision-making.

1.3 INFORMATION EXPLOSION

The word "information explosion" explains the exponential enhancement and diversification of published data and information, as the word "information" has been used in electronic media synonymously with "data". The term "information explosion" has been used synonymously for "data flood" (also called as *data*

NOTES

deluge) and for the term "information flood" as well. All this denotes the ever-increasing amount of electronic data exchanged per time unit. The awareness about non-manageable amount of data grew along with the advent of ever more powerful data processing since the mid-1960s.

Information explosion could simply be defined as the rapid increase in the amount of published information. It is a situation in which information is abundantly available or overabundance of data. Information explosion has been further explained as a situation in which users and managers of information are overwhelmed with available information. Wilson (2001) calls this information overload and went on to identify two types of overload namely, Personal Overload and Organizational Overload.

Personal Overload which appears cognitive is defined as "A perception by a person (observer) the information associated with tasks is greater than can be managed effectively" and that such overload can create a degree of stress for which effective coping strategies are necessary.

Organizational Overload on the other hand is "A situation in which the extent perceived individual information overload is sufficiently widespread within an organization as to reduce the overall effectiveness of management operations" (Wilson 2002).

According to Wilson, the scenario of abundant or overabundance of information could be traced to the 17th and 19th century when information became an important input to any human activity. In view of the need to send information compactly, the American Military during the Second World War resorted to the use of pictures through which a lot of information could be sent at a time with short notes than long prose. It was this approach that introduced visuals into the information packaging system and when audio was also introduced the information system professionals were referred to as audio-visual librarian, media librarian and other terms. Exponential availability of information in the form of books, journal papers, patent books and grey literature gained prominence in view of improved publishing facilities.

There is a fact that information explosion preceded Information and Communication Technology (ICT); however, Information and Communication Technology complicated the situation as it exponentially increased the information available especially through the Internet and the World Wide Web. Despite this, it is the emergence of Information and Communication Technology that came to the rescue of information and knowledge managers in confronting the menace of information explosion. It enabled them to manage mirage of available information-either in the selection, ordering, process, preservation or packaging for delivery. Information and Communication Technology further played down the place of physical structure as epitomized by the traditional library as specialised information centres can take care of specific groups without gigantic structures.

NOTES

1.3.1 Cause and Effect of Information Overload

In addition to the benefits from the sudden increase of new information created by the information explosion a problem has surfaced to the attention of those that study the information sciences; information overload. Information overload is not a new concept.

In the 15th century, Gutenburg's press was credited with propagating the Renaissance culture. The Renaissance was all about the discovery of new ideas and information. The printing press allowed explorers, inventors, social commentators, and other idea holders the ability to share the information about discoveries with a wider audience. Many religious leaders of the time believed that this 15th century explosion was dangerous to moral values of the society. They held the opinion that by making information available to the masses that had not been disseminated earlier; the masses might be left in a dilemma as to what is morally right or wrong. To these leaders, the printing press created an information overload on issues of morality. Authors Rudds and Rudds go on to talk about information overload, which would be over-exceeding the maximum amount of information actually acquired by a processing system. In the above example, the processing system was the church, which was overloaded and lost much of the control it once held over the population. It could no longer contain information within the walls of the religious scholars to be distributed in an orderly and controlled manner. In today's terms, it is the information seekers who are suffering from information overload. Vast amount of information is available to the individual, too much to process and retain.

The Rudds believed that three things arise from overloading the internal processing system. First, you might experience an overload effect, becoming confused, tuning out some information, there could be a decrease in the quantity and/or quality of the information you manage to output, and in rare case you could have a system wide shutdown. Second, other information seekers might have an increase in quality and/or quantity of information output, and a slim group would have no discernible change (Rudd & Rudd, p2-3). Thirdly, these last two groups of information seekers come out of the potential overload relatively unscathed. Let us understand this with the help of an example. For instance, try and search for a keyword in a journal database. You will be bombarded with information as you will come over 800 results for the term information overload.

1.4 INFORMATION ENVIRONMENT

The digital information environment has dramatically changed the way that users access information worldwide. Libraries around the world have established a role for themselves in this "digital revolution" by negotiating for and providing networked electronic services that publishers and vendors formerly sold as print materials. These include electronic indexes and abstracts, reference materials, electronic journals, and electronic books, just to name a few.

NOTES

The information environment is a construct based upon the idea that the existence and proliferation of information and information systems creates a distinct operating dimension or environment. As a combination of tangible (physical information systems and networks) and intangible elements (information and decision-making) the information environment is both. The most intangible element of the information environment – information – is of supreme importance. This is because in spite of its lack of physical existence, the content and flow of information within a specific geographic area produces real, tangible effects in the physical world and in the operating environment. For these reasons, our understanding of the information environment must ultimately include how content and its flow affect the execution of military operations.

Information environment is viewed as the type of environment which individuals interact with either for purposes of providing or obtaining information for use in day-to-day living or to perform a task. In this context, distance learning is viewed as the task. Information environment can also refer to the context in which information is sourced, accessed, managed, utilized and generally made available for the use of distance learners in pursuit of their distance learning programmes. The sources and/or channels of information comprise colleagues or friends, mass media such as radio and television and newspapers, library and electronic mediated devices such as the Internet, among others.

Information, an intangible resource, is used by decision-makers, planners and managers as a power to manage other tangible resources i.e man, material and money. Access to relevant information has always been important to those who influence their world consistently and successfully. Today the whole world is divided into two conceptual categories—information rich and information poor nations. Only information rich are considered powerful and leaders of the society. Information is a vital resource which acts as a driving force for technological as well as societal development of any nation. A nation which is rich in information is rich in the socio-economic sphere as well. The backwardness of any country in respect of socio-economic sphere is mainly due to lack of adequate information especially in the field of science and technology. Scientific and technological information made the greatest impact in the post-industrial society and contributed a great deal in research and development. Advanced nations pay great attention to support research and development activities of their industries and institutions. They use information as a power to lead the society in all spheres of mankind. Following are some of the key features of the information environment.

- Information acts as a key resource. A typical IT industry treats information as a commodity and involves economics of information, viz., production, costing and marketing.
- In an IT environment, information plays a vital role as a fourth managerial asset after people, equipment and capital.

- Information, a conceptual resource, is used to manage other physical resources, thus, acting as power.
- Revolutionary change in the technology is the driving force of an IT environment.
- The pace of change in technology has been speeding up which shrunk the time scales from one hundred generations for the agrarian revolution, ten for the industrial revolution, to only one for the information revolution.
- Information moves very fast and brings incredible turbulence, change and progress in the lives of individuals, organizations, nations and regions.
- Information also, transforms international politics and socio-economic relations and presents the world with new market opportunities.
- Information technology converts information as the new global currency or new wealth creator.
- Scientific and technological information made the greatest impact in the post-industrial society and contributed great deal for research and development.
- Availability of information in electronic form is the prime feature of an IT environment. The value of electronic information is that it can be easily shared, distributed, updated, manipulated and rapidly searched. Also, the resources in an electronic environment are networked in such a seamless way that they can be accessed across different computing platforms.

Check Your Progress

1. Define the term data.
2. What is information?
3. Define information explosion.
4. Name the types of information overload.

1.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Data is a random and unorganized collection of indicators and measurements of certain qualities or attributes of an entity or an object.
2. Information is data that is collected, processed, logically organized and analysed so that it can be used.
3. The word "information explosion" explains the exponential enhancement and diversification of published data and information, as the word "information" has been used in electronic media synonymously with "data".
4. The two types of information overload are personal overload and organizational overload.

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1.6 SUMMARY

- Data is a set of values of qualitative or quantitative variables; restated, pieces of data are individual pieces of information.
- Data must be collected, managed, organized, stored and analysed to give the required information.
- Information will have direct impact on the user, if it is clear, relevant, unambiguous, accurate, concise, precise and concrete.
- Information can be defined as the data that is collected, processed, logically organized and analysed so that it can be used. Information can be called the finished product. Information brings clarity and creates an intelligent human response in the human mind.
- Data are raw facts and figures that must be processed to get the information which is useful. To convert data to information, various operations need to be performed.
- To avoid overloading, humans restrict input to a manageable quantity by being selective in accepting some inputs and blocking other inputs. This process leads to creation of filters resulting from:
  - o Frame of reference of the person concerned based on prior knowledge and experience
  - o Normal decision procedure
- Information is what informs. Information is conveyed either as content in a message or through direct or indirect observation of something.
- Information is a product of data processing. It is, therefore, essential to carry out the data processing in such a manner that the information obtained is of high quality.
- For the quality of the information, it is essential to ensure that it is not biased. Bias enters information mainly because people try to block sensitive and other information which affects them.
- Information as we know is a collection of organized facts and figures that can be used to reach the desired results. Good quality information is useful information that helps in decision-making process.
- The nineteenth century society felt cut off from the medieval society, whose stability was based on religious faith, with the introduction of mechanical dynamics for steam driven railways and ships and the telegraph.
- Since the late twentieth century, it entered into the phase of a digital revolution which is intensifying at a rapid pace.
- Information is the key source of increasing a person's knowledge and after the world's digital revolution, it has brought the information explosion at an

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unmatched scale which has made data available in an open source for everyone.

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- Since the late twentieth century, it entered into the phase of a digital revolution which is intensifying at a rapid pace.
- Information is the key source of increasing a person's knowledge and after the world's digital revolution, it has brought the information explosion at an unmatched scale which has made data available in an open source for everyone.
- The term "information explosion" has been used synonymously for "data flood" (also called as *data deluge*) and for the term "information flood" as well. All this denotes the ever-increasing amount of electronic data exchanged per time unit.
- Wilson (2001) went on to identify two types of overload namely, Personal Overload and Organizational Overload.
- According to Wilson, the scenario of abundant or overabundance of information could be traced to the 17th and 19th century when information became an important input to any human activity.
- Information and Communication Technology further played down the place of physical structure as epitomized by the traditional library as specialised information centres can take care of specific groups without gigantic structures.
- In addition to the benefits from the sudden increase of new information created by the information explosion a problem has surfaced to the attention of those that study the information sciences; information overload. Information overload is not a new concept.
- The printing press allowed explorers, inventors, social commentators, and other idea holders the ability to share the information about discoveries with a wider audience. Many religious leaders of the time believed that this 15th century explosion was dangerous to moral values of the society.
- The digital information environment has dramatically changed the way that users access information worldwide.
- The information environment is a construct based upon the idea that the existence and proliferation of information and information systems creates a distinct operating dimension or environment.
- Information environment is viewed as the type of environment which individuals interact with either for purposes of providing or obtaining information for use in day-to-day living or to perform a task.

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- Information, an intangible resource, is used by decision-makers, planners and managers as a power to manage other tangible resources i.e man, material and money.
- Information moves very fast and brings incredible turbulence, change and progress in the lives of individuals, organizations, nations and regions.

1.7 KEY WORDS

- **Visual:** It refers to something related to seeing and is used for effect or illustration.
- **World Wide Web:** It is a combination of all resources and users on the Internet that are using the Hypertext Transfer Protocol (HTTP).
- **Mirage:** It is naturally occurring optical phenomenon in which light rays bend to produce a displaced image of distant objects or the sky.
- **Renaissance:** It refers to the transitional movement in Europe between medieval and modern times beginning in the 14th century in Italy, lasting into the 17th century, and marked by a humanistic revival of classical influence expressed in a flowering of the arts and literature and by the beginnings of modern science.
- **Index:** It is the alphabetically arranged list of items (such as names or terms) given at the end of a printed text with page numbers on which the item can be found.
- **Mass media:** It is a diversified collection of media technologies that reach a large audience via mass communication.

1.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the characteristics of information?
2. How is information viewed by sensory input approach?
3. Define context of representation and complexity approach.
4. How is information defined in the context of physics approach?
5. What do you understand by the term 'information overload'?
6. Write a short note on the nature of information.
7. List the characteristics of information.

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Long-Answer Questions

1. Explain the steps involved in processing of information.
2. Discuss the implications of the digital information environment.
3. What is the significance of Information and Communication Technology (ICT) in the present times?
4. 'Information is a vital resource which acts as a driving force for technological as well as societal development of any nation.' Do you agree? Give reasons for your answer.

1.9 FURTHER READINGS

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UNIT 2 INFORMATION TRANSFER

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Structure

2.0 INTRODUCTION

In the previous unit, you studied about information explosion, information environment and the nature and characteristics of information. In this unit, you will go through the various stages of the information transfer cycle, means and methods of information transfer, communication of information, modes of communication, types of communication and the types of communication barriers.

2.1 OBJECTIVES

After going through this unit, you will be able to:

- Explain the various stages of the Information Transfer Cycle (ITC)
- Define communication
- Identify the modes of communication
- List the types of communication
- Discuss the barriers to communication

2.2 INFORMATION TRANSFER CYCLE

Cycle means a series of events that are regularly repeated in the same order. Transfer of information from its generation to its end user becomes possible through many processes. These processes are also regularly repeated in the same order. This processes a cycle, which is called as Information Transfer Cycle (ITC). The ITC comprises generation, collection, storage, communication and retrieval.

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Let us go through the stages of the ITC in detail.

(a) **Information Creation/Generation:** Information is created with the happening of incidents and activities of humans. If an activity or an incident does not happen, no information is created. Information is mostly created by research and development programmes, government activities, survey and census of population, business and industrial organizations etc., and presented in a format by author, scientist, researcher, editor, writer, poets, novelists, dramatists and so forth. Over the Web, information is produced by the general people irrespective of their background and is not restricted only to academics such as scholars, scientists and others.

(b) **Information Production and Dissemination:** It is the mass production of knowledge through publishing companies or others that will help the mass distribution of knowledge in some physical or electronic form. Previously the information had been disseminated in the form of books. Many conventional and non-conventional, printed and non-printed sources of information are nowadays available which are different in shape, size, and type ad format. Over the web, the production is accelerated by posting information electronically over the websites. This speeds up the transfer of information globally at a rapid rate instead, of taking months or years to get published on paper.

(c) **Information Storage, Organization, Retrieval and Communication:** The storage is the process by which the information described and presented in the documents is stored. Information is collected and stored by libraries, documentation centres, information analysis centres, data banks, data centres and so forth. Computer has been accepted as a boon for storing of information. It can store a huge amount of information in the form of database. Besides, the computer, disks and CDROMs are the newly developed and very significant tools of storing information.

   (i) Organization is how that representation of knowledge is found among others of its kind. In the library environment, the classification and catalogue, shelf list, various kinds of guides and others facilitate the retrieval function. All these tools are equipped with controlled vocabulary. In the computer environment, organization is facilitated by databases, search engines and others. Knowledge is individual and the users determine its usefulness; so keyword and natural language searching in computer environment is more attractive.

   (ii) Retrieval is a process of getting information from the collection of a library, for providing answer to the queries of the users and other aspects.

   (iii) Communication is the process of transmission of information from one place to another, from the creator of information to its users. It is necessary for the best use of the same. It is the process of social exchange. In the library environment, communication of information

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can be made through telephone, CAS services, SDI services, teleconferencing, e-mail and others. Sometimes, the publisher also brings different kinds of information sources to the notice of the user community.

(d) **Information Diffusion and Utilization:** Diffusion is viewed as a more targeted flow of information to a particular segment of society. The diffusion of information should find its way to people who actually need it instead of targeting the people who will use it for their own benefit.

(e) **Information Preservation and Destruction:** The different kinds of libraries, archives are trying to preserve information in different formats. Over web, the Internet archive and the cached page of search engines are serving some purpose in this regard.

The information that is less frequently accessed or has met its assigned retention periods may be considered for relocation to an archive. Then from the archive, it needs to be weeded at some time or other by means of appropriate procedure for the content.

The meaning of information cycle relates to the unit of knowledge from where the information is generated and then transmitted to the users with the state of various processes. The whole process of information from its creation to its use is called the information cycle.

2.3 MEANS AND METHODS OF INFORMATION TRANSFER

Let us go through the means and methods of information transfer. The spread of word or information is largely through the communication process. Hence, we will study about communication and the various modes of communication.

2.3.1 Communication of Information

The word communication is derived from the Latin word, *communis* which means common. The definition underscores the fact that unless a common understanding results from the exchange of information, there is no communication. Communication is the process of transmitting the idea generated by the human mind, following as event or fact. Communication is essential as it helps information to reach its defined destination. In earlier times, people used to transmit information via process of 'Smriti and Shruti' as printing mode was not known. As a result, the piece of information used to die away with person. Similarly, a number of facts were communicated by way of symbols and signs representing occurrences that could not be preserved. Later, with the invention of printing, the facts could be transformed into words, preserved communication in printed form. When a fact is communicated to others, then it becomes universally known i.e., which constitutes knowledge.

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Two common elements in every communication exchange are the sender and the receiver. The sender initiates the communication. In a school, the sender is a person who has a need or desire to convey an idea or concept to others. The receiver is the individual to whom the message is sent. The sender encodes the idea by selecting words, symbols, or gestures with which to compose a message. The message is the outcome of the encoding, which takes the form of verbal, non-verbal, or written language. The message is sent through a medium or channel, which is the carrier of the communication. The medium can be a face-to-face conversation, telephone call, e-mail, or written report. The receiver decodes the received message into meaningful information. Noise is anything that distorts the message. Different perceptions of the message, language barriers, interruptions, emotions, and attitudes are examples of noise. Finally, feedback occurs when the receiver responds to the sender's message and returns the message to the sender. Feedback allows the sender to determine whether the message has been received and understood.

Communication is closely related to information. In today's world, the only way to strike a balance between the information explosion and increase in research work is the expeditious communication of information by adopting new technologies. Information communicated at a particular time has its value, which if not received in time may be useless or cause some mishap. Hence, there should be free flow of information and any barriers in its free flow should be removed.

2.3.2 Mode of Communication

The two major modes or channels of communication are formal and informal.

1. The Formal Mode

This usually refers to the printed and published mode of transfer to reach out to a wide audience. The quantity of use of that information is the measure of its quality. The recorded information is in the form of periodicals, printed and other forms of reports, tapes and so forth. Indexing and abstracting services, books, encyclopaedia, summaries, bibliographic reviews, annual reviews and state-of-art reports, conference proceedings, cord catalogues, audio visual materials and others. The recorded form of information is authentic and consistent and, hence, very popular. The only drawback is the time lag in publication.

2. The Informal Mode

This mode is oral as well as written and helpful for community of scientists or research scholars working in small groups. Some of the common sources of information communications are:

- Discussions and talks via telephone, Internet telephony or conferencing or personal letters
- Distribution of manuscripts, among friends and scientists

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- Direct talks with friends, colleagues and others
- Exchange of ideas in conferences and group discussions
- Work in progress
- Unpublished thesis and dissertations
- Technological gatekeepers

2.3.3 Types of Communication

Let us briefly go through the types of communication.

- **Oral communication:** It is one of the oldest and fastest medium, but there is a major shortcoming that is, information may not be long-lived as it is not recorded. Education imparted in most of the academic institutions use this method for transmitting information.
- **Verbal communication:** It refers to the recorded information available in printed form like books, periodicals, encyclopaedias, dictionaries, and so on. These documents are able to assist the users in retrospective as well as recent information search and, hence, are also most sought after documents in libraries and academic institutions.
- **Audio-Visual communication**: This includes pictures, charts, illustrated maps, slides, film strips, video tapes, cassettes, and so on. These modes may be combined with oral and verbal medium to produce more effective communication.
- **Mass media communication**: It comprises film, radio, and television. It is the most effective medium as it is able to bring the information as soon as it occurs to the masses. In a developing society, it swiftly and timely spreads information, education, and culture. Two significant developments in this field are linking up micrographics with computer technology and video-recording with computer systems.
- **Telecommunication**: Telecommunication encompasses the electronic transmission of voice, data, and video information from one location to another. The telecommunication technology has been an essential factor in the speedy growth of computer based library systems, such as the use of centralized cataloguing and online search services. As a result, a large collection of bibliographic data on variety of computer systems throughout the world can easily be accessed from a terminal in the library or information centre. The terminals in various libraries and information centres are linked to either a local computer system or to one or more remote computer systems for data communication.
- **Satellite communication**: The advancements in space technology and communication have narrowed the gap between time and space as information is relayed from one corner of the world to another through satellites.

2.4 BARRIERS TO COMMUNICATION

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- We know that the process of communication is the one that is initiated by a sender and generates a desired response from the receiver of the message. The message to be communicated is sent over a communication channel. However, communication may not always be effective in the sense that it may not bring about the desires response at the receiver end. This is because when a sender and a receiver communicate, they tend to create barriers around them making it difficult for the communication process to effectively take place. In addition, the message may not be received or understood by the receiver in the manner desired leading to ineffective communication. There may be several barriers in the communication process that render communication ineffective.
- There are many barriers to communication. One of the most common communication barriers is the lack of communication skills. When the sender or the receiver lacks communication skills, the message may not be sent or received in the right manner. In other words, lack of communication skills leads to information gap and also confusion with regard to the message which has been sent or received. Fear to communicate honestly is another communication barrier. In other words, when there is bias in the message which is being exchanged or when a message is not honestly put across, the communication tends to be ineffective.
- For communication to be effective, it is essential to make sure that the domain of knowledge of the sender as well as the receiver is the same. If the sender and the receiver do not share the same knowledge domain, the message will not be sent or received in an effective manner. Ego is also a communication barrier that leads to ineffective communication. Ego on the part of the sender or the receiver may lead to misunderstandings and confusion between the communicators.

2.4.1 Types of Communication Barriers

There are seven types of barriers to effective communication, which are as follows:

- **Physical barriers:** Physical barriers are due to the physical distance between the sender and the receiver. Physical barriers are easy to spot. These barriers lead to ineffective communication. It is essential to remove these physical communication barriers for open communication. An example of physical communication barrier is individual cubicles in an office set-up that make it difficult for people to communicate.
- **Perceptual barriers:** Perceptual barriers are internal and not physical. These are not easy to spot. For instance, if the sender of the message thinks that the receiver is not going to respond to the message or will not be

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interested in the message, the sender purposely develops a tone that is sarcastic and obtuse, which leads to a communication gap. The sender and receiver fail to communicate anything of substance due to perceptual barriers.

- **Emotional barriers:** Emotional barriers to communication make it difficult for the sender and the receiver to communicate. When communicators involve emotions in the message, the message becomes unclear and biased. The best way to overcome emotional barriers is to be confident about what is being communicated. Fear is the worst emotional barrier that can lead to an unclear and ambiguous message.
- **Cultural barriers:** Cultural barriers in communication exist due to different cultures that the communicators belong to. Cultural clashes can hinder communication between people at workplace or even at a personal level. Societal or racial cultural differences need to be overcome to ensure that communication can take place in an effective manner. When people of different cultures communicate by keeping aside their cultural issues and thoughts, a message is communicated in an effective manner and delivered more clearly.
- **Language barriers:** Language barriers can be the hidden communication barriers. Language barriers are usually self-inherent and arise because of different languages that people use to communicate. Language barriers cause a problem especially when people from different backgrounds and knowledge domains are communicating with each other. In such a situation, the communicators use their own jargon and terms, which the other person may not understand. Language barriers, therefore, make communication impossible and render the communication process ineffective.
- **Gender barriers:** Though gender barriers have become lesser known communication barriers, these may still crop up in certain situations. Gender barriers in communication take place because of the different genders. Men and women usually have different ideas and thoughts for the same concept, which leads to an issue in communication between the two. It is generally observed that men are better at spatial and calculative skills, while women communicate more with language and emotions. A difference between thoughts and opinions leads to communication being ineffective.
- **Interpersonal barriers:** Interpersonal barriers are perhaps the ones that hinder the communication process the most. Interpersonal barriers make it difficult for people to communicate with each other. Interpersonal barriers occur because of lack of knowledge of the sender or the receiver. Sometimes, the sender and the receiver do not have enough knowledge with regards to the same domain and are unable to communicate in the right manner. Sometimes, the receiver lacks listening skills making interpersonal communication ineffective. In many instances of interpersonal communication, physical distractions make it difficult to send the right message across. The

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best way to overcome interpersonal barriers is to communicate more so that messages are communicated in a clear and straightforward manner.

Communication is a two-way process wherein the message must be confidently and clearly put across so that no communication barrier can render the communication process ineffective. Since communication is a process that involves several elements namely sender, encoding, transmission, receiver, decoding, and feedback, barriers to communication can be found associated with any of these elements.

- **Encoding barriers:** The process of encoding requires the message to be converted and organized as signals so that the transmission media can carry it. The following barriers while encoding may lead to ineffective communication:
  - **Lack of sensitivity towards receiver:** Communication is ineffective when the message gets encoded without taking into consideration the needs, knowledge, and the language of the receiver. If the message has not been encoded keeping the receiver's needs in mind, the desired response cannot be achieved from the receiver.
  - **Lack of basic communication skills:** If the sender lacks basic communication skills and is unable to use precise words and content in the message, the receiver will have trouble comprehending the message. The same holds true for receiver as well. If the receiver lacks communication skills, the message will not be understood correctly leading to communication gap.
  - **Lack of knowledge:** If the sender or the receivers do not have the necessary knowledge about a piece of information, the message will be unclear and ambiguous.
  - **Irrelevant or overloaded information:** While encoding a message, care must be taken to encode only the relevant message and any irrelevant information must be avoided. Information overload results in the receiver having difficulty understanding the message because lengthy messages create confusion making it difficult to interpret by the receiver.
  - **Emotional interferences:** Emotional people cannot communicate well. This is because when composing a message or while encoding the message, several emotional issues like anger, hostility, resentment, and fear may lead to the message being improperly encoded and composed, leading to misunderstanding and confusion.
- **Transmission barriers:** When a message is transmitted over a communication channel, there may be several barriers that may lead to ineffective communication, which are as follows:
  - **Physical distractions:** Physical distractions may lead to a problem in communication. If the message over a communication media is distorted

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or a message does not appear physically attractive, it may not be interpreted in the desired manner and may not get the desired response.

- **Conflicting messages:** Sometimes when a message is transmitted, it may lead to conflicts in the perception of the receiver and may not result in the desired response or reaction. This means that the communication process is ineffective.
- **Channel barriers:** Sometimes, the wrong transmission or communication channel is chosen by the sender, which results in the receiver not receiving the message as intended. The information over a wrong channel may get distorted or even lost, which makes the communication process unsuccessful.
- **Long communication chain:** Sometimes, the transmission chain is very long. In other words, the original message passes through several communication channels or receivers before reaching the target receiver or audience. In such cases, there are chances of the message getting distorted and the final receiver getting an unclear message, which may be difficult to interpret.
- **Noise:** Noise is perhaps the worst transmission barrier that can take place, when a message is being conveyed. Noise is any interference with the encoded message that is sent over the transmission medium. This noise may distort the message to a great extent. This means that the message received by the receiver may have errors and may not be in the actual form in which it was sent. Noise disrupts the message and thus makes the communication ineffective because the receiver does not get the correct message and is unable to understand it properly.

- **Decoding Barriers:** The process of communication can be ineffective when a message is received and decoded because of the following reasons:
  - **Lack of interest**: The communication process is ineffective, if the message is received by a receiver who is not interested in the message. In this case, the receiver may go through the message hurriedly or may ignore the message altogether.
  - **Lack of knowledge:** If the receiver does not have the required knowledge about the information being communicated, he may not understand the message and, therefore, will be unable to respond in the desired manner, making the communication process ineffective.
  - **Lack of communication skills:** People who have weak listening, reading, and receptive skills are not effective receivers. Lack of communication skills may result in the message being interpreted in a wrong manner, thus leading to misunderstanding and confusion.

- **Emotional distractions:** If the emotions of the receiver interfere with decoding and comprehending the message, it is possible that the message is not understood correctly. The message may be misinterpreted and may not be received objectively, thus, leading to failure of the communication process.
- **Physical distractions:** Physical distraction like noise, crowd and other factors may lead to a receiver decoding the message in a wrong manner. This leads to confusion and misunderstanding between the communicators.

- **Responding barriers:** The process of communication may fail when proper and adequate feedback is not provided. It may happen that there is no provision for feedback on the sent message. This means that the communication flows only in a linear manner. However, since communication is a two-way process, the sender must get feedback to make communication process a success. Inadequate feedback can also result in the failure of the communication process. Delayed and judgmental feedback on the part of the sender can be a barrier in the communication process. This is because the sender may not get the required or desired response.

Check Your Progress

1. Define communication.
2. Name the two major elements found in every communication process.

2.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Communication is the process of transmitting the idea generated by the human mind, following as event or fact. Communication is essential as it helps information to reach its defined destination.
2. The two major elements found in every communication process are the sender and the receiver.

2.6 SUMMARY

- Transfer of information from its generation to its end user becomes possible through many processes. These processes are also regularly repeated in the same order. This processes a cycle, which is called as Information Transfer Cycle (ITC).
- Retrieval is a process of getting information from the collection of a library, for providing answer to the queries of the users and other aspects.

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- The different kinds of libraries, archives are trying to preserve information in different formats. Over web, the Internet archive and the cached page of search engines are serving some purpose in this regard.
- The word communication is derived from the Latin word, *communis* which means common. The definition underscores the fact that unless a common understanding results from the exchange of information, there is no communication.
- Communication is closely related to information. In today's world, the only way to strike a balance between the information explosion and increase in research work is the expeditious communication of information by adopting new technologies.
- Some of the common sources of information communications are:
  - Discussions and talks via telephone, Internet telephony or conferencing or personal letters
  - Distribution of manuscripts, among friends and scientists
  - Direct talks with friends, colleagues and others
  - Exchange of ideas in conferences and group discussions
  - Work in progress
  - Unpublished thesis and dissertations
  - Technological gatekeepers
- Telecommunication encompasses the electronic transmission of voice, data and video information from one location to another. The telecommunication technology has been an essential factor in the speedy growth of computer based library systems, such as the use of centralized cataloguing and online search services.
- There may be several barriers in the communication process that render communication ineffective. There are many barriers to communication. One of the most common communication barriers is the lack of communication skills.
- For communication to be effective, it is essential to make sure that the domain of knowledge of the sender as well as the receiver is the same. If the sender and the receiver do not share the same knowledge domain, the message will not be sent or received in an effective manner.
- Perceptual barriers are internal and not physical. These are not easy to spot. For instance, if the sender of the message thinks that the receiver is not going to respond to the message or will not be interested in the message, the sender purposely develops a tone that is sarcastic and obtuse, and leads to a communication gap.

- Interpersonal barriers are perhaps the ones that hinder the communication process the most. Interpersonal barriers make it difficult for people to communicate with each other. Interpersonal barriers occur because of lack of knowledge of the sender or the receiver.
- Communication is a two-way process that wherein the message must be confidently and clearly put across so that no communication barrier can render the communication process ineffective.
- The process of communication may fail when proper and adequate feedback is not provided. It may happen that there is no provision for feedback on the message sent.

2.7 KEY WORDS

- **Teleconference:** It is a meeting involving people who are located in far-off places, but who are connected by video and computers.
- **The Central Authentication Service** (CAS): It is a single sign-on protocol for the web. Its main objective is to authorize a user to access multiple applications while providing their credentials (such as user id and password) only once.
- **Selective Dissemination of Information (SDI):** It is defined as the system in which automatically generated matching information is disseminated to researchers, scholars and users.
- **Satellite communication:** It is the use of satellite technology in the field of communications. The services provided by satellite communications include voice and video calling, Internet, fax, television and radio channels.

2.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. Name the two modes of communication.
2. Mention the types of communication.
3. What is an information cycle?
4. How can the process of communication be made effective?

Long-Answer Questions

1. Discuss the stages of the Information Transfer Cycle (ITC).
2. Explain the barriers to communication.
3. What is the significance of feedback in the communication process?

2.9 FURTHER READINGS

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UNIT 3 SOURCES OF INFORMATION

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Structure

3.0 INTRODUCTION

In the previous unit, you studied about the means and transfer of information and the barriers to communication. This unit will provide description of the sources of information and the types of information sources.

There are various sources of information which are broadly classified into two categories, namely, Documentary sources that include primary, secondary and tertiary sources (the primary sources are the first to appear, secondary sources came out next and tertiary sources are the last to appear); and Non-documentary sources (formal and informal).

3.1 OBJECTIVES

After going through this unit, you will be able to:

- List the types of documents available in the library
- Identify the documentary and non-documentary sources of information
- State the published and unpublished sources of information
- Discuss the primary, secondary and tertiary sources of information

3.2 TYPES OF DOCUMENTS IN A LIBRARY

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There are several different types of documents in the library. Each type of document has different characteristics. Each type of document may be related to other documents in the library. The following sections explain these different types of documents.

3.2.1 Original Document

Original documents are primary sources including the scanned images of original documents. These may be provincial gazettes or other printed legal documents that have been scanned, converted into Adobe Acrobat Portable Document File (PDF) format and uploaded in the database of the library. A scanned image of an original legal document may contain one or many laws, orders, and regulations. Scanned images of original documents show laws in their original, officially published form, including any official signatures or stamps. They also include birth certificates, property deeds, trial transcripts, etc.

3.2.2 Legal Document

A legal document may refer to a single law, judicial decision, legislative record, administrative decision, financial or budgetary decision, executive order, regulation, or other document that is an official law. These legal documents normally originate from official gazettes. They can be published separately in the library and linked to the scanned original document image of the official gazette. This makes it possible to classify each law and decision separately and in a searchable form. Library users can then find these documents more quickly. When a legal document is added to the library it is classified by jurisdiction and subject. The language of the document, date the law or decision was published, the status of the law or decision, and other information about the law or decision are also entered into the library record.

3.2.3 Legal Literature

Legal literature consists of writings that cover legal topics, but do not carry the weight of a law. They include legal commentary about the law written by legal experts. These documents are normally published in the library in PDF format. A piece of legal literature may be related to one or more legal documents or scanned original documents in the library. Links to related documents in the library are shown at the bottom of each document listing. Documents are sometimes classified as secret, private or public. They may also be described as a draft or proof. When a document is copied, the source is referred to as the original.

3.2.4 Non-Documentary Sources of Information

The non-documentary sources of information are live sources which are extremely important in the process of communication. Very often, if a scientist working on an

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experiment needs some information, he would turn to his/her colleague working in the same laboratory rather than to a printed page. It is easier to have a dialogue with an expert than to use a bibliography or index or card catalogue or even a consultation with a reference librarian. Non-documentary sources of information provide information instantly and it is very easy to handle. The non-documentary sources are divided into two categories: formal and informal. The main disadvantage of non-documentary sources of information is that it involves high cost when distance between the people is huge and it also demands the use of highly sophisticated techniques i.e., computer system, videoconference, telephone and so forth. The non-documentary sources of information include government establishment, departments, universities, technological institutions, data centres, information centres, referral centres, clearing houses, consultants, technological gatekeeper and others. Non-documentary sources of information also include discussion with colleagues, visitors, participants of seminars and conferences. The library through the referral service provides access to important non-documentary sources of information which may include the following types:

(i) **Research association:** Research association may establish cooperative information centres. In such cases, there is a possibility of firm to firm discussion and exchange of information between the members of an association.

(ii) **Learned societies and professional institutions**: A member of these bodies forms the core of a discipline or profession. The headquarters' staff helps the members personally on professional matter and sometimes, they may direct the queries to the expert member of the body.

(iii) **Industrial liaison officer:** These officers particularly provide the preliminary information needed to put a firm on the right track and for information which needs to be given personally and supported by practical advice in order to be fully effective. They visit firms, explore their needs and problems and help them to find solutions, sometimes directly on the spot, more often by putting them in touch with specialized sources of information and assistance or refer to some other specialists.

(iv) **Mass media:** Mass media is a means of communication of information through broadcasting and telecasting or a combination of these two for the masses, which is more effective than the documentary sources. It is easier to have a dialogue with an expert than to use a bibliography or index or card catalogue or even a consultation with a reference librarian. Non-documentary sources of information provide information instantly and it is very easy to handle.

3.2.5 Published Sources

The published and unpublished sources plays an important role in the present era. The authentication of any information can be validated by the medium of its sources, that is whether it has been published or unpublished. Print source is a source of

NOTES

information that was originally published and made available to the public by being printed on paper. This includes books, magazines, newspapers, encyclopaedias, journals, and letters. To put it in simple words, anything that was originally made available to the public through an ink-on-paper medium is known as published source.

Printed sheets

A sheet is a piece of paper of varying sizes, on which the written or typed matter is printed. Usually the printed sheets are used for advertising, campaigning, and other purposes.

Leaflets

A leaflet is a small sheet of paper folded once and printed to make two or four pages. The pages follow the same sequence as those of a book. It is neither stitched nor stapled.

Printed cards

Note cards are printed to convey greetings, invite people to attend marriage, and other ceremonies such as Diwali, New Year, Christmas, and so on.

Books

According to UNESCO, a book is a non-periodic printed publication of at least 49 pages, exclusive of cover pages. A book is usually stapled/stitched along one edge and placed within protective covers to form a volume. In general libraries, the collection is predominated by books. The sizes of books may vary.

Periodicals

The periodical is a powerful medium for the dissemination of information. Researchers all over the world publish their papers describing their latest findings in primary periodicals. Secondary periodicals gather information from primary periodicals and present the same in the form of abstracts, popular articles, or reviews.

3.2.6 Unpublished Sources

Unpublished sources could be audio-visual items or varieties of microforms. Even maps, atlases, and globes are sometimes included under this. However, no suitable definition is available to encompass the term precisely, therefore, we would list the non-print media that normally included under the unpublished sources:

- Photographs, film slides, and transparencies
- Realia, mock-ups, models, and specimens
- Phonograph recordings, including discs
- Audio tapes, cassettes, and cartridges

- Motion pictures, Video Tapes, and Kinescopes
- Portfolio and Kits
- Maps, Atlases, and Globes
- Microforms
- Magnetic media
- Optical media

Importance of Document in Library

In Library and Information Science and in documentation science, a "document" is considered a basic theoretical construct. It is everything which may be preserved or represented in order to serve as evidence for some purpose. The classical example provided by author Suzanne Briet is an antelope: "An antelope running wild on the plains of Africa should not be considered a document, she rules. But if it was to be captured, taken to a zoo and made an object of study, it has been made into a document. It has become physical evidence being used by those who study it. Indeed, scholarly articles written about the antelope are secondary documents, since the antelope itself is the primary document." (Buckland, 1998). This view has been seen as an early expression of what now is known as actor–network theory. That documents cannot be defined by their transmission medium (such as paper) is evident because of the existence of electronic documents. The concept of document has been defined as "any concrete or symbolic indication, preserved or recorded, for reconstructing or for proving a phenomenon, whether physical or mental".

3.3 INFORMATION SOURCES AND ITS TYPES

An information source is anything that might inform a person about something or provide knowledge about something a person wants to know. Different questions, projects and reports require different types of information. The sources of information can be observations, people, speeches, statistics, documents, pictures, organizations, websites and so on.

The commonly used information sources include the following:

- Printed and online articles may provide information about something. Articles, however, provide limited information.
- Newspapers provide information via articles, editorials and reports. This information may be very limited and precise.
- Books including e-books provide in-depth information about something. The books generally have a lot of information about a particular topic.
- Dissertation or thesis is original piece of information. Sometimes, the topics for thesis are very obscure and so these are the only information sources available for a specific topic.

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- Websites provide information about various things and even government agencies and public organizations. Usually, websites have published articles, whitepapers, documents, images and videos related to a topic.
- Microforms are archives of information available in libraries.
- Images offer pictorial or graphical information about a topic.
- Videos are generally documentaries or short films that provide information about a topic in a very precise manner.
- Audio information is available in form of CDs and recordings and offer information about a topic in a concise form.

One can make use of any of these sources of information provided that the information is accurate and concrete. The information available from these sources must also be relevant to the topic and must be concise. Also, locating information in these sources must be an easy task and should not take too much time. The information available in these sources must also be properly indexed and organized for easy access. In addition, the information sources must provide clear and unambiguous information to the user of the information.

Table 3.1 shows the advantages and disadvantages of various sources of information.

Table 3.1 *Advantages and Disadvantages of Sources of Information*

Source	Advantage	Disadvantage
Books	• Easy to access • Scope for greater depth of coverage than journal • Overview • Portable • Familiar • Reduced cost if can borrow from library	• Quickly out of date • Quality of indexing varies • Time consuming to search/scan • Expensive to buy • Storage problems • Access to libraries may be limited
Primary journals	• More current • May be available free online • May be peer reviewed • Easy to access • Portable	• Not necessarily an overview • Not all titles indexed • Time consuming to search/scan • May not have access to all titles electronically • Problems with peer review
Secondary journals	• Have structured abstract • Comments from independent experts • Critically appraised evidence • Methodologically sound studies • Strict inclusion criteria • Clinically relevant studies	• Summaries only • Brief results only • May not have access to all titles electronically • Do not cover all topic areas
Abstracts and indexes	• Broad overview of literature • Generally good quality	• Limited depth • Abstracts often written by authors -biased?
Reference lists and bibliographies	• Useful pointers to related literature on topic • Pulls out good quality articles	• Subjective selection by another • Unclear criteria
Supervisors, colleagues, mentors	• Personal, specific for your needs • Easily accessible • Shared interest in quality improvement • Team goals • Encourages communication amongst teams	• Bias • Variability in willingness and motivation to help • Priorities may be different • May be large travelling distances • Time pressure
Internet	• Very up-to-date • Valuable/unique information • Professional networking information exchange	• No central directory; information and sites difficult to locate • No censorship or editing procedures

NOTES

	• Full-text • Access to world-wide information • 24-hour access	• No quality guarantee/not validated • Can be slow depending on network • Needs computer and ICT skills
E-mail	• Speed of delivery • Documents, multimedia clips can be attached to messages • Replies and forwarding of messages handled by software • Private messages can be encrypted • Active Web-page address links	• Attachments can be difficult to deal with • Electronic junk mail ('spam') can annoy • Threat of viruses within attachments
Mailing lists	• One-to-many communication • Subject specific • Free to subscribe between lists • Can be set up to receive weekly digests only • Access to wide range of opinion • Very cheap means of dissemination • Can be open or closed to public • Central archives have search/browse facility	• Most people 'lurk' during discussion • Require care with 'netiquette' (etiquette using the net) • Amount of messages vary • Mistakes sent to everybody • Difficult to sustain discussion
Bibliographic databases	• Very wide range of journals indexed • Regular updating • Time saving • Free-text searching supported • Controlled vocabularies • Fast/sophisticated search facilities	• Not fully up-to-date • Only some have access to full text • Bias • Reflects publication bias • Not always accessible • Sometimes hard to use • Difficult to acquire foreign articles

3.3.1 Primary Sources of Information

The primary sources of information are original materials or pieces of information. The primary sources of information have not been distorted in any manner. Primary sources contain all original information, which has neither been filtered nor evaluated in any manner. These sources may present original thinking, an original discovery, or share new information.

The definition of primary sources may vary depending on the context in which it is used and also the discipline for which it is used. For instance, in natural sciences, primary sources may be defined as a report that describes original findings and ideas. Using primary sources can be a bit challenging. This is because these may be ambiguous and may contain terms that are obsolete. It is difficult to interpret and analyse these sources of information. When a primary source is used, the following questions need to be asked:

- Who is the intended audience of the primary source?
- What is the purpose of the primary source of information?
- What assumptions have been made by the author of the primary source?
- What is the source of the primary information contained in the source?
- What are the bases of the conclusions that the author has made about the information?

The following are the various sources of primary information:

Government documents

The documents of a government reflect its functions, activities, and policies. Such documents are imperative for any research related to the mechanisms of the government and serve as primary documents. Some of the primary sources usually

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seen in government documents include the hearings and debates of legislative bodies; the official text of laws, regulations, and treaties; records of government expenditures and finances; statistical compilations, like census data, investigative reports, scientific data, and many more, which are concerned nearly with all the facets of society. This information can be found in a large variety of formats such as books, periodicals, maps, CD-ROMs, microfiche, and online databases.

Manuscript and archival material

These are exclusive resources that are available only in a library or particular institution. They serve as primary source material for research in subjects like history, political science, sociology, literature, journalism, cultural anthropology, health sciences, law, and education. They are different from other library resources because they are described, accessed, handled and evaluated. Manuscripts and archives are usually unpublished primary materials. The word 'archives' refers to the records generated or received and kept up to date by an institution or organization for its legal purposes or in conducting of its business. The word 'manuscripts', actually means handwritten content, as per the dictionary, is also used nowadays to mean a collection of papers belonging to an individual or a family.

Maps

Maps serve as primary sources since they represent the creator's ideas in a specific cultural context. In some cases, cartographers may even have some secret motive or may be working under the influence of unspecified political or social factors. Maps, thus, end up revealing slip-ups or intentional misrepresentations.

Artifacts or Realia

Realia and artifacts serve as sources of crucial information about the lives and histories of peoples. In library science, realia refers to the three-dimensional objects from real life that do not easily fit into the orderly categories of printed material. Realia and artifacts are three-dimensional objects, which could be man-made or naturally occurring. All collected realia and artifacts are considered to have documentary value—some have intrinsic worth, some are artistic, while others have historical or scientific significance.

Tablets

Tablets are objects that depict the culture of the time and may contain commemorative inscriptions, scholarly treatises, letters and business documents, administrative accounts, and literature in poetry and prose, epic narratives, recipes of magic spells, and other similar representations of the ancient culture and world.

Visual Materials

Visual materials are a primary source, where images are independently used to convey meaning. These images may sometimes be accompanied by words and/or

sounds. Certain commonly seen visual materials are: original art, which would include paintings, drawings, sculpture, architectural drawings and plans, and monoprints.

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Monoprints are those material, which are works produced in multiple but limited numbers such as woodcuts, engravings, etchings, lithographs, graphic arts, including materials such as posters, trade cards, and computer generated graphics, photographs, film, and video. All such materials are of immense value to a researcher. The advantages of visual materials as primary information sources include:

- These offer a visual record of a specific period.
- These convey multiple details about places, events, people and objects that mere words cannot.
- The visual materials convey information about daily life and habits, which can only be communicated visually, such as hair and clothing styles and interior design.
- These occasionally convey the photographer or painter's mind-set.
- They come in handy when there are no written records available on a certain period or culture.
- They proved to be easier to relate to for the viewer.

The disadvantages of visual materials as information sources are as follows:

- Such materials are not a complete source. They also cannot be considered as facts or objective representations of reality.
- Often, it is not clear what the relationship or vantage point of the painter or photographer is, in relation to the subject.
- The bias of the photographer or painter may take precedence over reality in the interpretation.
- The identity of the people, place, date, and photographer or painter are usually not clear.
- It is difficult to accurately interpret the emotions and thoughts of the subjects.
- Visual imagery is largely suggestive and not definitive. It requires other resources like documents, oral histories, etc., in order to make sense or to be correctly interpreted. It cannot be a standalone evidence of the history of a period.

Oral History

Oral history is an account of a person's (informant's) memories, explanations, and analyses of the past in his or her own spoken words, gotten through planned interview(s) and preserved on audio or video tape, film, or as written transcription. The advantages of oral history are as follows:

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- Personalizes history by recording an individual's remembrances (or opinions) about their life or an event in which they were involved.
- Provides information about a topic or time period that may otherwise lack documentation in written or archival records.
- Often conveys emotion clearly
- Contains spontaneity and sincerity that may not always present in a personally written account.
- May contain unusual dialect or speech patterns.
- Often informant is living and may be consulted for clarification or additional information.

The disadvantages of oral history are as follows:

- The accuracy of oral recounting is always in question.
- The informant's memory is also a factor and may change some facts.
- The informant may have hidden agendas, which influence the narration.
- The interviewees may be biased or influenced by the interviewer.
- The informant may change their version in another retelling or another interview.

Music

Music are the primary sources, which offer information regarding the production and performance of music, aural traditions, and histories of musical composition, notation, and technique, information about music theory and individuals' and cultures' technological advancement, economy, education, cognition, and more. The kinds of resources employed in research are manuscript of musical scores, musical instruments, sheet music, historical and contemporary sound recordings on LP and disc, books, periodicals, photographs, and archives related to music and musicians. A recording would include music as well as the spoken word, including poetry, plays, speeches, etc.

Documents

Documents include diaries, letters, birth/death, or marriage certificates, deeds, contracts, constitutions, laws, court records, tax records, census records, wills, inventories, treaties, report cards, medical records, passenger lists, passports, visas, naturalization papers, military enlistment or discharge papers, etc. These are the primary sources of information, which are usually used. The following are the advantages of documents:

- Offer details such as the "who, what, where, when, why, and how" of an incident.
- Give printed, written, or diagrammatic information.

- Provide clarity about the purpose of the communication or transaction.
- Indicate the socio-economic status and emotional state of the writer
- Has the power to stimulate the personal involvement of the reader.

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The following are the disadvantages of documents:

- It may not be entirely objective and may discount other more relevant perspectives on the same incident.
- It may not be clear who the author is, especially in the case of government documents.
- In most cases, the author has passed on and is therefore, not available for consultation or confirmation.
- The handwriting may be incomprehensible or the words may be unclear or undecipherable.
- Documents need to be appraised in comparison to other related documents or evidence available of the same time period, in order to check the authenticity of the information being provided.

Examples of primary sources of information include:

- Artifacts like coins, fossils, and specimens
- Diaries
- Audio recordings
- Letters
- Interviews
- Newspaper articles
- Original documents like birth certificates and marriage license
- Patents
- Photographs
- Video recordings
- Surveys like market surveys, public opinion polls
- Proceedings of meetings and conferences
- Speeches
- Records of organizations like annual reports, Treaty, Constitution
- E-mails
- Websites
- Works of art, literature and music like paintings, novels, poems

All of the above listed information sources provide only original information which has not been published and used before. Primary sources are used mainly for research purposes.

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The characteristic features of primary sources are as follows:

- Primary sources are created by witnesses or recorders who experienced the events or conditions being documented at first hand. Primary means "first", "original" or "direct".
- The primary sources give the first-hand insights to the past.
- They are actual records that have survived from the past. They are in their original form (diaries, letters, photos, etc.) usually without explanation or interpretation.
- Primary sources do not speak for themselves, they need to be interpreted.
- Primary sources document events, people, and viewpoints of the time.
- The nature and value of a source cannot be determined without reference to the topic and questions it is meant to answer.
- Provenance (chain of ownership) needs to be established for personal belongings. Date and authority of sources must be verified before using them in your assignment. In other words, consider a document's attribution (the name of the author or editor and how the document came into being) first.
- One must remember that primary source is not always an objective source.
- Primary sources are characterized by their content, regardless of whether they are available in original format, in microfilm/microfiche, in digital format, or in published format.
- They may either be published or unpublished.

As has been said, primary sources are usually used for research purposes. They prove to be beneficial to the researcher in the various ways. They help the researcher improve their critical thought process. Using primary sources requires the researcher to be critical as well as analytical since documents and objects must be examined carefully. Primary sources are only snippets of information and therefore, are mostly incomplete and lack a context. Thus, it becomes the researcher's responsibility to scrutinize the sources thoroughly and to determine the other information and sources required to confirm their findings. Factors like purpose, creator bias, and perspective, serve to challenge the assumptions of the researcher. Primary sources oblige the researcher to admit that any retelling of an incident, regardless of how objective it seems to be, is in essence, subjective.

They help the researcher to feel empathetic towards human suffering and provide a better understanding of the human psyche. Primary sources allow the researcher to come into contact with first-hand retelling of events. This kind of proximity to a primary source helps the researcher relate better to the historical event and its impact. These resources enable the researcher to take into account various points of views during analysis. It is a common tendency to perceive history as a series of facts, dates, and events which is conveniently packaged into a book.

With more thorough research involving primary sources, they start to recognize that the book may represent just one of the multiple possible interpretations. Primary sources provide the researcher with a number of perspectives on wider issues concerning humanity.

Primary sources of information help the researcher to construct knowledge. Scholarly research is ideally based on facts and observation, for which the use of primary sources is essential. Scrutinizing primary sources enables the researcher to observe contradictions and compare multiple sources that convey differing point of views, thereby recognizing the intricacy of the past events. After studying primary sources and other information, researchers come to reasoned conclusions based on evidence and context and thus, synthesize multiple perspectives to construct knowledge.

One of the main advantages of using primary sources of information is that one gets reliable and correct information. However, a major disadvantage of primary sources of information is the fact that these may not always be available. In addition, the process of collecting information from these sources may be time consuming as well as costly.

3.3.2 Secondary Sources

A secondary source of information is the one that presents or discusses information that has already originally been presented elsewhere. Information from secondary sources are obtained when the original information is generalized, analysed, synthesizes, interpreted and evaluated. Secondary sources are basically not evidence; rather these are commentary on and discussion of evidence or a primary source of information that has already been used.

The definition of secondary sources varies from one field to another and also in the context in which these are used. In general, secondary sources are self-described and are articles of review. In library and information sciences, secondary sources are the ones that add commentary or summarize the information contained in primary sources.

In humanities and history, secondary sources are usually books or scholarly journals. Examples of secondary sources of information:

- Commentaries and criticism
- Bibliographies
- Dictionaries
- Encyclopaedia
- Histories
- Journal articles
- Magazine and newspaper articles
- Monographs

- Websites
- Textbooks

All the above listed secondary sources of information offer additional information to the original information already known. These sources of information are not new and are used to describe primary information sources. Secondary sources are written after the facts have been described. These are usually written to support the fact with enough evidence to bring forth the correctness of the information.

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Secondary sources of information are interpreted and evaluated information pieces. This means that secondary sources of information are not free from bias. The interpreter or evaluator may be biased in documenting the secondary sources of information and so the information available may not always be correct and accurate.

Since secondary sources of information are based on review of primary information, these are generally more useful and may even source latest findings and information. This is especially useful in areas where a lot of information has not been reviewed and documented.

Advantages of secondary sources of information are as follows:

- The use of secondary sources of information saves time required for analysis and research.
- These sources of information are easily available.
- Use of secondary sources of information is not expensive; especially when compared with primary information sources.
- These make the process of analysis very easy since these sources are published from already existing information sources.
- Secondary sources of information are usually free from bias of all types.
- Secondary information sources ate more feasible to use in research.

The disadvantages of secondary sources of information are as follows:

- The information provided by secondary sources of information may be inappropriate. Though, these sources provide a huge amount of information but all of it may not always be appropriate and relevant.
- There is always a lack of control on the quality of information when secondary information sources are made use of.
- Secondary sources of information can also be used for research purposes. These help researchers in the following ways:
- Secondary information sources provide vital background information. Having as much knowledge as possible about the text or event about which the researchers are researching is crucial. Familiarizing with what has been written about the research topic will allow the researcher to write more knowledgeably,

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- These sources inform the researcher as to what others have said so that the researcher can avoid repeating ideas that are already out there.
- These can be used to support ideas of the researcher or to show an alternative view.

When using a secondary information source, the reliability of the information source is very important. The following questions must be asked when evaluating a secondary information source as reliable:

- Who is the author? Are they a scholar in the field?
- Was the book/journal published by a scholarly publisher?
- What is the purpose of the text or motive for writing it?
- Does the writer have an obvious bias?
- Does the book/article have an extensive bibliography?
- What are the primary sources referred to by the author?
- What secondary sources are used by the author?
- Does the text have citations enabling you to check the author's sources?

Information sources that can be used as primary as well as secondary sources of information:

- **Printed or Published Texts:** Printed or published texts may include books and pamphlets, serials (newspapers, magazines and periodicals). In the case of published memoirs, autobiographies, and published documents, books function as a primary information source. Books can also function as secondary sources of information especially from the vantage point. Scholars make use of some information to write books which then act as secondary sources of information. A serial is a publication, such as a magazine, newspaper, or scholarly journal that is published in on-going instalments. Like books, serials can function both as primary sources and secondary sources depending on how one approaches them. Age is an important factor in determining whether a serial publication is primarily a primary or a secondary source.
- **Dissertations:** Dissertations are book-length studies based on original research and written in partial fulfilment of requirements for the doctoral degree. Although usually secondary sources, dissertations can themselves be primary sources or can be extremely helpful in identifying and locating primary sources.

Dissertations that can be primary sources might be edited versions of texts or could be used to analyse the influence of a professor on a generation of graduate students and, by extension, on the teaching and writing in a discipline over a period of time. Because a dissertation is based on original research, its bibliography will contain references to primary sources used by the author and can often lead to manuscripts, diaries, newspapers and other primary material of interest.

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3.3.3 Tertiary Sources of Information

Tertiary sources of information contain information which is distillation and collection of primary and secondary sources. Tertiary sources of information are thus an index or consolidation of primary and secondary sources of information. Tertiary sources of information may even overlap with secondary information sources. In other words, some researchers may make use of a specific information source as secondary while others may use it as tertiary. For example, a scholar may make use of a bibliography as a tertiary source of information whereas bibliography is a secondary source of information.

Examples of tertiary information sources include:

- Almanacs
- Bibliographies
- Chronologies
- Dictionaries
- Encyclopedia
- Directories
- Fact books
- Textbooks
- Manual
- Guidebooks
- Indexes used to locate primary and secondary sources

As tertiary sources of information, textbooks and encyclopaedias usually summarize and consolidate the source materials into an overview. Manuals are considered tertiary sources of information when they are written by a third party. The advantage of using tertiary information sources is that they offer a quick, easy introduction to your topic. They may point to high-quality primary and secondary sources. The disadvantage of tertiary information sources is that they may oversimplify or otherwise distort a topic. By rehashing secondary sources, they may miss new insights into a topic.

3.4 INTERNET AS AN INFORMATION SOURCE

The Internet is a collection of networks and you can retrieve information according to your requirement. For some people, it is an inter-network. For some others, it is a collection of servers connected by common protocols and agreed upon standards. The Internet has emerged as an electronic medium that allows people to access information on anything.

NOTES

The Internet is a global connection between computers, between people and information from around the globe. It is a worldwide network of computers holding vast quantities of data and information that the user can access directly from a personal computer. Information has in fact emerged as the largest 'Information Superhighway' in the world.

The Internet is a public resource. It means that no one owns the Internet. It has effectively met the explosive and exponential increase in demand of information by information seekers.

The Internet offers the following capabilities to facilitate information sharing and retrieval:

- E-mail makes person to person messaging possible. It also allows document sharing.
- Usenet Networking is a discussion group on electronic bulletin boards.
- Chatting allows for interactive conversation.
- TelNet allows a user to log in from one computer and work on another system.
- Gopher allows location of textual information using a hierarchy of menus.
- Archie allows searching databases of documents, software and data files available for downloading.
- Wide Area Information Service locates files in databases using keywords.
- World Wide Web helps to retrieve, format and display information using hypertext links.

The Internet as a source of information offers the following benefits.

- It reduces communication costs.
- It enhances communication and coordination
- It accelerates the distribution of knowledge.
- It improves customer service and satisfaction.
- It facilitates sales and marketing.

However, the Internet allows access of information to almost anyone, there are several security issues that also need to be dealt with. Security of information on the Internet is a major concern for many organizations that have their information systems online.

Check Your Progress

1. What do you understand by the term 'legal literature'?
2. State one major disadvantage of using non-documentary sources of information.

3.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

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1. 'Legal literature' is writings that cover legal topics, but do not carry the weight of a law. They include legal commentary about the law written by legal experts.
2. The main disadvantage of non-documentary sources of information is that it involves high cost when distance between the people is large and that it also demands the use of highly sophisticated techniques i.e. computer system, video conference, telephone, etc.

3.6 SUMMARY

- There are several different types of documents in the library. Each type of document has different characteristics. Each type of document may be related to other documents in the library.
- A scanned image of an original legal document may contain one or many laws, orders and regulations. Scanned images of original documents show laws in their original, officially published form, including any official signatures or stamps.
- The non-documentary sources of information are live sources which are extremely important in the process of communication.
- The non-documentary sources of information include government establishment, departments, universities, technological institutions, data centres, information centres, referral centres, clearing houses, consultants, technological gatekeeper and others.
- The published and unpublished sources plays an important role in the present era, the authentication of any information can be understand by the medium of its sources whether it has been published or unpublished.
- According to UNESCO, a book is a non-periodic printed publication of at least 49 pages exclusive of cover pages.
- In Library and Information Science and in documentation science, a "document" is considered a basic theoretical construct.
- An information source is anything that might inform a person about something or provide knowledge about something a person wants to know. Different questions, projects and reports require different types of information.
- The primary sources of information are original materials or pieces of information. The primary sources of information have not been distorted in any manner.

- The word 'archives' refers to the records generated or received and kept up to date by an institution or organization for its legal purposes or in conducting of its business.
- Visual material usually refers to a primary source where images are independently used to convey meaning.
- Visual material usually refers to a primary source where images are independently used to convey meaning.
- A secondary source of information is the one that presents or discusses information that has already originally been presented elsewhere.
- Secondary sources of information are interpreted and evaluated information pieces. This means that secondary sources of information are not free from bias.
- Tertiary sources of information contain information which is distillation and collection of primary and secondary sources. Tertiary sources of information are thus an index or consolidation of primary and secondary sources of information.
- The Internet is a collection of networks and you can retrieve information according to your requirement. For some people, it is an inter-network.

3.7 KEY WORDS

- **Leaflet:** It is a small sheet of paper folded once and printed to make two or four pages.
- **Magnetic media:** It refers to the storage of data on a magnetized medium.
- **Optical media:** It refers to any data storage device or equipment that uses optical data storage and retrieval techniques to read and write data.
- **Archive:** It refers to the records generated or received and kept up to date by an institution or organization for its legal purposes or in conducting of its business.
- **Manuscript:** It actually means handwritten content, as per the dictionary, is also used nowadays to mean a collection of papers belonging to an individual or a family.
- **Monoprint:** These are works produced in multiple but limited numbers such as woodcuts, engravings, etchings, and lithographs, graphic arts, including materials, such as posters, trade cards,

3.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

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Short-Answer Questions

1. Define a 'document' in the context of Library and Information Science.
2. Write a short note on the published and unpublished sources of information.
3. What are the commonly used information sources?
4. Briefly mention the uses of the Internet as an information source.

Long-Answer Questions

1. Discuss the non-documentary sources of information.
2. What are the primary sources of information? Give examples.
3. What are secondary sources of information? Mention their advantages.
4. 'Tertiary sources of information may even overlap with secondary information sources.' Explain the statement.

3.9 FURTHER READINGS

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BLOCK - II

REFERENCE SOURCES AND EVALUATION

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UNIT 4 CATEGORIES OF INFORMATION SOURCES

Structure

4.0 INTRODUCTION

In the previous unit, you studied about the sources of information such as documentary and non-documentary, published and unpublished and the types of information sources. This unit will further elaborate on the categories of information sources namely, encyclopedia, dictionary, directory, handbook, manual, biography, bibliography, almanac and yearbook.

4.1 OBJECTIVES

After going through this unit, you will be able to:

- State the use of encyclopedia, dictionary and directory
- Mention the use of handbook and manual

- Discuss the geographical and biographical sources
- State the use of yearbook and almanac

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4.2 ENCYCLOPEDIAS

An encyclopedia is a work which represents synthesis of knowledge. It attempts to bring some order to the knowledge, reflecting state of knowledge, as it exists during the period of its compilation. Earlier encyclopedias were intended for intellectual elite but present day encyclopedias are directed mostly to general readers. Nowadays, many encyclopedias are being brought out which are directed towards a particular kind of readership.

Encyclopedia is a book or set of books that gives information on all branches of knowledge or on certain wide fields with articles arranged alphabetically. An encyclopedia contains information about people, places, events, and things. It deals with all areas of knowledge or individual subject area.

A general encyclopedia includes information on topics in every field of knowledge. Specialized encyclopedias give detailed and technical information on specific area of knowledge such as arts, science and technology or social sciences. Specialized encyclopedia is also referred as subject encyclopedia.

A well-planned general encyclopedia presents facts about humanity, human beliefs, ideas and achievements; about the world people live in; and about the universe to which they belong. An encyclopedia is concerned with who, what, where, when, how and why of things. General encyclopedia enriches general knowledge, provides information on known topics and provides bibliography at the end of articles, which helps to find more information on that topic. For example, an article on 'computer' gives information about the development and history of computer. It also describes the function and importance of computer. Different articles in an encyclopedia vary in length ranging from a paragraph to over hundred pages depending upon the topic covered; target audience and type of encyclopedia (whether single volume or multivolume encyclopedia). Articles in standard encyclopedia are written by subject specialists and then edited by the encyclopedia staff editors to conform to policies of the publishing house in terms of content, style and punctuation. Editorial staff ensures that each article in the encyclopedia has, more or less, a similar writing style, and uses headings and sub-headings in a uniform standard pattern. Diagrams and images are included for the clarification of the concepts. It also enhances learning process. Most encyclopedias are arranged alphabetically from A to Z, whereas some are topically arranged, for example one volume can be categorized to 'Animals', another to 'Plants', 'Universe', or some other subjects.

Usually, readers expect anything and everything from a general multi-volume encyclopedia, such as Encyclopedia Americana or New Encyclopedia Britannica. However, no encyclopedia can claim to be complete and inclusive.

A general encyclopedia is a systematic summary of all information, which may be considered significant to humankind. Similarly, the same can be said about a specialized encyclopedia in the concerned field of knowledge or area of interest.

Encyclopedias serve the following purposes:

- Provide facts.
- Provide illustrations (children's encyclopedias are especially useful for colored illustrations).
- Provide ideas of a particular period (earlier editions of encyclopedias can also be used for this purpose).
- Provide different point of views on a given topic (by reading the description of a topic in different encyclopedias).
- Provide valuable bibliographies, which are appended to principle articles. These assist a reader to locate additional readings on a given subject.

Some of the leading general encyclopedias are the following:

- Hindi Visva Bharati
- Hindi Visuakosa
- New Encyclopedia Britannica
- Encyclopedia Americana
- Collier's Encyclopedia

Specialized encyclopedias are the following:

- Encyclopedia India
- Encyclopedia of Library and Information Science
- Encyclopedia of Religion and Ethics
- International Encyclopedia of Social Sciences
- McGraw Hill Concise Encyclopedia of Service and Technology
- Van Nostrand's Scientific Encyclopedia.

4.3 DICTIONARIES

The word dictionary comes from *dictionarium*, the Medieval Latin word that means the collection of words or phrases. *Dictionarium* also came from the Latin term *dictio* meaning "word". Dictionaries were first produced by the ancient Greeks and Romans. Most of the Greek and Latin dictionaries listed either rare and difficult words or specialized word list. A modern dictionary is a book that contains the words of a language alphabetically arranged with their meanings. Most dictionaries also depict more than meaning of the words. Many list pronunciations, grammatical labels, synonyms, antonyms, illustrative quotations, usage notes and other information related to the word. Some dictionaries include etymology and

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history of words. The Chambers Dictionary is an example. Thesaurus is also a reference book that deals with words. In this reference book, words that have the same or similar meaning are grouped together. Contrary, a dictionary that helps in finding meaning and pronunciation of the words, a thesaurus helps to find the most appropriate word for expression of an idea.

A dictionary is the words of a language or the terms of a subject, profession or vocation that are arranged alphabetically that give their meaning, pronunciation, spelling, syllabication, and use. Whereas, an encyclopedia gives information about the subject represented by the word. The basic difference between the two is that a dictionary defines words and an encyclopedia gives general information about topics.

4.3.1 Types of Dictionaries

Dictionaries provide meanings of the words. Dictionaries include ordinary words, technical words, idioms, words and phrases from other languages, new words emerging from technical and scientific discoveries, important proper names and geographical names, and many other types of words. The quality of a dictionary depends upon the accuracy, experience, and capability of the editors that are involved in the work. Dictionaries can be categorized into the following types:

(a) General dictionaries: General language dictionaries provide meaning of all the words of a language, their definition, and explanation in the same language. The language can be English, Hindi, French, German, or Russian. For example, an English language dictionary will cover all English words and give their meanings in English language. These dictionaries are also known as monolingual dictionaries. General Language Dictionary can be divided according to its size and target user group. According to size, general language dictionaries are as follows:

(i) Comprehensive or Unabridged dictionary includes all the words of a language. For example, Merriam Webster's Third New International Dictionary of the English Language has three volumes and has approximately 4, 50, 000 entries. It also has an online version with the name, Merriam Webster Unabridged Online Dictionary.

(ii) Abridged or College or Desk dictionary contains most common and currently used words and has less number of words as compared to unabridged dictionary. For example, Merriam Webster's Collegiate Dictionary, 11th Edition, which was published in 2003, has only 165,000 entries.

(iii) A Pocket dictionary is quite small that can be carried in a pocket for quick reference. It covers 40,000 to 60,000 words that are currently in use. For example, Merriam Webster's Pocket Dictionary has 40,000 entries only.

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Some of the commonly used dictionaries are the following:

- The Oxford English Dictionary
- Webster's New Recreational Dictionary of the English Language
- Random House Dictionary of the English Language
- Funk and Wagnall's New Dictionary of the English Language
- Roget's International Thesaurus

Depending on the target user's age and language proficiency, a general language dictionary caters to the following categories of people:

- School children
- College students
- Adults

Children's dictionaries include words that are related to the course curriculum. The meanings and definitions are written in simple language which children can understand. It also includes illustrations for understanding the concept. Many reputed publishers also publish abridged, desk, college, and children edition unabridged standard general language dictionaries. These dictionaries are continuously updated. With every updation, the editors add or delete a number of words. Desk dictionaries are used by young people and thus, reflect current usage of the words.

(b) Subject dictionaries: Subject dictionaries focus on the definition of the terms on a specific subject. They are becoming increasingly common because of the increase in study and research in different subject areas such as arts, humanities, social sciences, and science and technology. For example, McGraw Hill Dictionary of Scientific and Technical Terms, 6th Edition, is an inclusive dictionary of scientific and technical terms that covers over 115,000 terms and 125,000 definitions in 104 areas of science and technology.

(c) Special dictionaries: The special dictionaries contain special types of words. Special type of words includes obsolete words, acronyms, or abbreviations. Special aspect of the word includes linguistic part of the words, such as pronunciation, synonym and antonyms or literary aspect of the words, such as quotations, idioms, or proverbs. These aspects of the words are also covered by general language dictionaries, but special dictionaries cover them in more comprehensively manner.

(d) Cambridge Idioms Dictionary: The dictionary describes the meaning and usage of over 7000 idioms in British, American, and Australian English.

(e) The Oxford Dictionary of Quotations: The dictionary contains short quotations that are frequently used in English language.

(f) Bilingual and Multilingual Dictionaries: The bilingual dictionaries give meaning of a word from one language to another language. For example,

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an English-Hindi dictionary, will have words in English and give the same words in Hindi. This type of dictionary is known as a bilingual dictionary. A multilingual dictionary provides the meaning of a word in more than two languages. These dictionaries are also called translating dictionaries. These dictionaries translate the words from one language to another language.

4.4 DIRECTORIES

A directory is a list of persons or organizations arranged systematically, usually alphabetically. They can also be arranged in classes order, addresses or affiliation for individuals and addresses.

4.4.1 Types of Directories

Let us go through the types of directories.

General Directories: A telephone directory comes under the general directories category. Every city in a country has a telephone directory that provides information about telephone numbers and addresses of the users. These directories are compiled by the post department.

Special Directories: Directories that are used in organizations are called special directories and can be grouped into following three types:

(i) Directories of academic and research institutions

(ii) Professionals Directories

(iii) Trade and business directories

Directories of academic institutions: It list out the institutions of higher education such as colleges and universities. These directories can be international or national in coverage. The directory gives information on type of courses offered, eligibility criteria, last date for admission, duration of the course, library and research facilities, scholarship and fellowships, names of professors and senior staff members. The directory is published in every two years.

Professionals directories: There are large number of societies and associations in the world, in almost every important field of knowledge. Members of these associations are scholars in their relevant expertise. These associations also compile directories that list out the details of their members.

Trade and business directories: These give information about trade, business and industries.

4.5 HANDBOOK AND MANUALS

The word handbook is derived from the German word 'Handbuch' that means a small book, which gives useful information about a topic or a subject. The literal meaning of the term 'handbook' is a book which is 'handy' to use as it contains

useful facts and is convenient to carry. It is designed to be easily consulted and gives quick answers. They are widely used by practitioners and specialists working in an industry or a laboratory. A handbook is a compilation of various information in a compact and handy form. It contains data, procedures, principles, tables, graphs, diagrams, and illustrations. Scientists and technologists frequently use handbooks in their respective fields.

The word 'manual' is derived from the Latin word 'manuals', which means a guide book. A manual provides step-by-step instructions about a particular task or a particular machine. When you buy any home appliances or a mobile phone, you are provided with a manual that gives proper instructions on how to use that appliance. In common practice, a manual is an instruction book, which provides instructions on how to perform a job or how to do something by means of specific and clear directions.

Handbooks and Manuals contain the information like:

- Who invented toothbrush?
- Who was the first man to jump off the Brooklyn Bridge?
- Who invented the can opener?
- Who was the first person to be conferred Doctor of music in United States?
- What is the melting point of copper?
- How to transplant roses?

4.6 BIOGRAPHICAL SOURCES

The biographical sources include an extensive collection of biographical sources that can be used to research the history of individuals, firms and the profession.

4.6.1 Biographical Profiles

Biographical profiles are based on any person's own experience that the individual can have the information, which can relate with experiences on a specific topic or any issue.

4.6.2 Interviews

Interviews are one of the important sources of information which come under the category of biographical sources. The interview process is basically a two-way process taking place between two or more individuals.

4.6.3 Types of Biographies

Current biographical directories (for example, Who's who) provide brief information on living people. If older editions are retained, they can be used to find information on deceased people. Locate information about individuals, for example, address, date of birth, qualifications, awards received or positions held.

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Current biographical dictionaries provide biographical essays about famous living people. They also provide more detailed information about a person's accomplishments or general lifestyle.

Retrospective biographical dictionaries are of two types:

(i) Universal

(ii) National

Universal: This dictionary covers people worldwide.

National: This dictionary caters to people from a specific country only.

Obituaries: These include articles from national or regional newspapers and magazines. News stories written by news staff. This helps to find biographical information about people who cannot be found in standard bio reference sources.

Biographical indexes tell where information about individuals can be found rather than providing information directly. For example, it helps to find extensive biographical information on a person from a variety of perspectives.

4.7 GEOGRAPHICAL SOURCES

The improvement in the means of communication has led to increase in travel all over the world. As a result, the people are becoming more interested in knowing about the places they would like to visit or have already seen. There is also an increasing emphasis on the teaching of geography.

Geographical information sources contain atlases, globes, maps, guidebooks, and gazetteers. These sources give information about the physical features of places, people, forests, lakes, mountains, and other related information. Though other reference sources like dictionaries, encyclopedias, yearbooks, and almanacs also include information about places and people, but they only cover selected and prominent places. These topics are more comprehensively described in the sources and is precisely designed to locate the required information easily.

Geographical sources primarily consist of graphic representations. Most of them are prepared through team effort. These are used to find answers to geographical questions. Geographical questions are concerned with information about places such as cities, towns, mountains, lakes, rivers, forests, and so on, with regards to their location, description, and other details. For instance, location of Varanasi, distance between Delhi and Jaipur, population of Tokyo, and other such aspects. Sources of information, which can be used for getting geographical information, are as follows:

a) **Bibliographies and indexes:** Bibliographies are useful for locating geographical sources. Indexing and abstracting periodicals are helpful for locating articles on cities, towns, places of interest, and others. These do not contain the information itself, but direct one to sources, which contain information.

b) **Encyclopedias:** These are extremely useful sources of geographical information regarding countries, states, cities, and others. These are also good sources for maps.

c) **Dictionaries:** These provide definitions of geographical terms. These also help in the identification of large cities and towns.

d) **Sources of statistics:** These provide data in tabular forms and thematic maps.

e) **Biographical sources:** These are extremely useful for biographies of geographers and cartographers.

f) **Geographical sources:** These are specific sources, which are specifically prepared to provide geographical information. For our purpose, we may recognize the following types of geographical sources:

(i) **Gazetteers**: A gazetteer is a dictionary or an index for geographical names in an alphabetical order. It lists names of places, mountains, seas, and other geographical entities of respective area, along with its history, geography, economic development, and the people. A gazetteer is a reference source, which provides historical, social, cultural, industrial, political, demographic, and administrative information of a country, state, or a district. Gazetteers are categorized based on its coverage:

- International Gazetteer
- National Gazetteer
- Local Gazetteer

(ii) **Guide Books**: Guide books are travel guides or tourist guides designed for people, who want to travel to various places in either their own country or any other part of the world. The entire objective of having a guidebook is to guide the travelers by providing the details about the countries, which they would like to visit. These details include its weather details, accommodation, shopping details, its food culture, and other information. The travel guides contain information on archaeological or historical sites, museums, parks, and other places to visit. Other information includes the routes and travel facilities, best time to visit the place, the types of hotels, restaurants, and shopping complexes, and other related details. Maps, illustrations, and distances are also provided in the guidebook. In addition, information about visa and money exchange is also included.

Generally, a guidebook covers a region, a country, or a city. Tourism departments of the governments in many countries depute tourist guides for the promotion of tourism in their respective country. In India, all the 29 states and 7 union territories have State Tourism

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Departments that provide information and have their own tourist guides as well. The Ministry of Tourism of India has also launched its websites for the assistance of the visitors and travelers. This site provides updated information to the users.

(iii) **Maps, Atlas and Globes**: Maps, atlases and globes are important sources of geographical information. Let us briefly go through the types of maps.

- **General reference maps:** General reference maps classify and locate diverse geographic features. These maps include land features, water boundaries, political boundaries, and cities and towns.
- **Political maps:** Maps that represent boundaries of continents, countries, states, and other political units are known as political maps.
- **Physical maps:** Maps that illustrate the physical features of the earth's surface such as mountains, lakes, oceans, and rivers are called physical maps or terrain maps.
- **Road maps, street maps, and charts:** To help people locate their way easily, road maps and street maps are designed. These are maps for land, water, or air travel. Maps that shows different categories of roads, such as motorways or four-lane are called road maps. They also show the cities, towns, and other places that are connected by roads. Street maps are the same as road maps, but a street map enlarges a smaller area to give specific details. A map, which is used for navigation of ship or an airplane is called a chart. People use general reference maps for the location of specific places and observation of their location in relation to other places.
- **Thematic maps:** Thematic maps demonstrates the distribution of population, rainfall, or natural resources. Many thematic maps express quantities by color or symbols.
- **Atlas**: A book that contains a collection of maps is called an atlas. An atlas encloses every county's map.
- **Globe:** The globe is a map that is pasted or printed on a hollow sphere. As the globe surface is round like the earth's surface, therefore, only a globe gives a correct picture of the earth. A globe accurately represents all parts of the earth's surface. The proportions and positions of the earth's land and ocean and their relation to each other can be seen on a globe exactly as they are on the earth.

The organizations responsible for the production and evaluation of maps are:

- **National maps and atlases:** The reliability of maps and atlases depend upon the editorial staff and the cartographer's expertise. Countries have their own cartographic survey agencies. In India, Survey of India in Dehradun has been assigned this responsibility. It is the National Principal Mapping Agency. It is responsible for mapping and production of geophysical maps and aeronautical charts.
- **National Atlas and Thematic Organization of India (NATMO):** National Atlas of India, Thematic maps, and Digital maps are prepared in Kolkata.
- **National Atlas of India:** 'Bharat: Rashtrya Atlas', was first published in 1957 by NATMO, which had 26 multi-color maps that portrays physical and socio-cultural structure of the country.
- **International maps and atlases:** In 2011, the Times Comprehensive Atlas of the World 13th edition was published, which is the most comprehensive atlas of the world with an index of over 200,000 place names. The Atlas begins with the expert's contribution in many geographical fields that provides detailed information on key issues that are faced by the world today such as climate change, biodiversity and energy resources, environmental threats, global communications with supporting maps, photographs and graphics for the illustration of the physical world today.

4.8 BIBLIOGRAPHICAL SOURCES

Bibliography is defined as the list of written, printed, or otherwise produced record of civilization, which may include books, serials, pictures, films, maps, records, manuscripts, and any other media of communications. Bibliography is a complex structure of lists, which extends from the local library to the region, nation, and world. A bibliography records not only what is available, but also what has been available in the past, and what will be available in the immediate future.

4.8.1 Types of Bibliography

Following are the types of bibliography:

(a) Incunabula or book rarities: This type of bibliography lists the early printed material up to 15th century.

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(b) Universal or general bibliography: A universal bibliography is the survey of all records of civilization in all fields of knowledge and is not restricted by time, place, language, subject, or author.

(c) Trade bibliography: Such types of bibliographies are brought out by large publishing firms engaged in a book trade.

(d) National bibliography: Ideally speaking, a national bibliography should record all documents, published or unpublished, irrespective of the agency issuing them, covering trades as well as non-trade items, irrespective of the form of material, language, subject, or time of publication. Dr. Ranganathan, mathematician and librarian, recognizes the following categories of national bibliography:

- List of all books published in a country
- List of all books on a country
- List of all the books published by the citizens of a country
- List of all the books published on all citizens of a country
- Any one combination of the above.

Indian National Bibliography and British National Bibliography are the most important examples of national bibliographies. These have been discussed in detail in Unit 10.

(e) Selected or eclectic bibliography: This type of bibliography includes the list of only selected books.

(f) Subject bibliography: It is a comprehensive list of all books, periodical articles, pamphlets, and other reading materials in a particular subject.

(g) Author bibliography or bio-bibliography: It records books, articles, and so on written by an author or attributed to him and the material written about the author by others.

(h) Bibliography of bibliographies: It is a list of bibliographies documented in a logical and systematic order. It contains all types of bibliographies in various subject fields that are separately published.

4.9 YEARBOOKS

An yearbook is an annual volume of current information in descriptive and/or statistics form, sometimes limited to a special field. It is an annual compendium of current information. It aims to cover activities, which have taken place during a period of one year. Sometimes, it may be restricted by subject, country, or region. Following are the different types of yearbooks:

I. International yearbook: It gives reliable statistical information about each country across the world. For example, The Statesman's Yearbook 2018

published by Macmillan, provides economic, political, and social account of all the 193 countries of the world together with facts and analysis. The Yearbook is in two parts. Part-I contains details of International organizations and Part-II deals with the countries of the world in an alphabetical order.

II. **National yearbook:** It provides updated economic, political, and social information of an individual country. National yearbooks are compiled by the respective government of a particular country and are considered reliable and authoritative. For example, *India 2018: A Reference Annual* is a national yearbook, which is published by the Publication Division, Ministry of Information and Broadcasting, Government of India. This yearbook provides information on various subjects related to India like economy, rural and urban development, industry and infrastructure, arts and culture, health, defense, mass communication, science and technology, and other related topics.

III. **Subject Yearbook**: Yearbook that are devoted to specific subject or group of subjects is referred to as subject yearbook. *McGraw Hill Year Book of Science & Technology 2018* is an example of subject yearbook.

4.10 ALMANAC

An almanac is a reference book that is published once a year and contains many type of information. Originally, almanacs provided a calendar of the months with information about eclipses, the movement of planets and the rising and setting of sun, moon and stars. Presently, it includes a comprehensive presentation of statistical and descriptive data covering information of the entire world. Primarily, topics about geography, economics and business, health and medicine, government, demographic data, agriculture, transport, sports, science and technology, awards and prizes are covered. It also contains the articles focusing on events of previous year as well as summary of recent events. Almanac are more like yearbooks.

An almanac is

- An annual publication that contains a calendar that is supplemented by astronomical data and other related information.
- An annual statistics yearbook and other information related to specific field.
- These are cheap enough and cover much common ground. However, each has certain special features. These mainly carry the same basic information from year to year but are updated and revised annually. Revision becomes necessary to keep the size within reasonable limit.

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Yearbooks and almanacs usually contain the following kinds of information:

- Chronological list of the important events of the year
- Summaries of the political, social and cultural events of the year
- Major developments and trends in various fields including science and technology during the year
- Short biographies of notable living persons and also obituaries of leading personalities, prizes, awards and population

In short, relatively brief current information on a subject or person or organization of event.

These sources of information may be used to find answers to the following questions:

- Who won the Noble Prize in Physics last year?
- What are the important developments in the field of chemistry that took place in the previous year?
- Which movie won the title for the most outstanding movie of the year in 2017?

Some other information a yearbook can provide is as follows:

- Important Indian events of last year and important events of the world, which happened in year 2017.
- Address of Advertising Manager, the Times of India.
- Number of cinemas in Delhi and their seating capacity.
- List of book clubs in UK.
- How many languages and dialects are spoken in India?
- The National bird of India.
- Complete list of Noble Prize winners in medicine.
- Names of currencies used in Germany, Italy and Peru.
- Names of Commonwealth countries.
- Names of national laboratories in India.
- Length of river Nile.
- Height of Mount Everest.
- Number of radio stations in India.
- Brief account about the activities of UNESCO.
- Location of major steel plants in India.
- Total number of post offices in India.
- Functions of ILO.
- The official language of Denmark.
- Recent development in physics.

Check Your Progress

1. What is an encyclopedia?
2. State the basic difference between a dictionary and an encyclopedia.
3. What is a monolingual dictionary?
4. Name the commonly used dictionaries.
5. What is a manual used for?
6. What is a guide book?

4.11 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. An encyclopedia is a book or set of books that gives information on all branches of knowledge or on certain wide fields with articles arranged alphabetically.
2. The basic difference between the two is that a dictionary defines words and an encyclopedia gives general information about topics.
3. A monolingual dictionary is one which explains the words in the language in which you are learning. For example, an English language dictionary will cover all English words and give their meanings in English language.
4. Some of the commonly used dictionaries are the following:
   - The Oxford English Dictionary
   - Webster's New Recreational Dictionary of the English Language
   - Random House Dictionary of the English Language
   - Funk and Wagnall's New Dictionary of the English Language
   - Roget's International Thesaurus
5. In common practice, a manual is an instruction book, which provides instructions as how to perform a job or how to do something by means of specific and clear directions.
6. Guide books are travel guides or tourist guides designed for people who want to travel to various places in either their own country or any other part of the world. The entire objective of having a guidebook is to guide the travellers by providing the details of countries which they would like to visit.

4.12 SUMMARY

- An encyclopedia is a work which represents synthesis of knowledge. It attempts to bring some order to the knowledge, reflecting state of knowledge, as it exists during the period of its compilation.

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- A general encyclopedia includes information on topics in every field of knowledge.
- The word dictionary comes from *dictionarium*, the Medieval Latin word that means the collection of words or phrases. *Dictionarium* also came from the Latin term *dictio* meaning "word".
- The Chambers Dictionary is an example. Thesaurus is also a reference book that deals with words. In this reference book, words that have the same or similar meaning are grouped together.
- A dictionary is the words of a language or the terms of a subject, profession or vocation that are arranged alphabetically that give their meaning, pronunciation, spelling, syllabication, and use. Whereas, an encyclopedia gives information about the subject represented by the word.
- The dictionary quality depends upon the accuracy, experience and capability of the editors that are involved in the work.
- Subject dictionaries focus on the definition of the terms on a specific subject. They are becoming increasingly common because of the increase in study and research in different subject areas such as arts, humanities, social sciences, science and technology.
- A directory is a list of persons or organizations arranged systematically, usually in alphabetically. They can also be arranged in classes order, addresses or affiliation for individuals and addresses.
- The word handbook is derived from the German word 'Handbuch' that means a small book giving useful information about a topic or a subject.
- The word 'manual' is derived from the Latin word 'manuals', which means a guide book. A manual provides step-by-step instructions about a particular job done or operate a particular machine.
- A handbook is a compilation of various information in a compact and handy form. It contains data, procedures, principles, tables, graphs, diagrams, and illustrations.
- Biographical profiles are based on any person's own experience that the individual can have the information, which can relate with experiences on a specific topic or any issue.
- Geographical information sources contain atlases, globes, maps, guidebooks and gazetteers. These sources give information about the geographies related to places, people, forests, lakes, mountains and other related information.
- Guide books are travel guides or tourist guides designed for people who want to travel to various places in either their own country or any other part of the world.

- Maps, atlases and globes are important sources of geographical information.
- Bibliography is defined as, the list of written, printed or otherwise produced record of civilization, which may include books, serials, pictures, films, maps, records, manuscripts and any other media of communications.
- Yearbook is an annual volume of current information in descriptive and/or statistics form, sometimes limited to a special field. It is annual compendium of current information.
- An almanac is a reference book that is published once a year and contains many type of information. Originally, almanacs provided a calendar of the months with information about eclipses, the movement of planets and the rising and setting of sun, moon and stars.

4.13 KEY WORDS

- **Gazetteer:** It is a geographical dictionary or a directory used in association with a map or an atlas.
- **Cartographer:** This term is used to refer to a person who draws maps.
- **Compendium:** It is a collection of concise but detailed information about a particular subject, especially in a book or other publication.
- **Thesaurus:** It helps to find the most appropriate word for expression of an idea.
- **Thematic map:** It demonstrates the distribution of population, rainfall or natural resources. Many thematic maps express quantities by colour or symbols.
- **Yearbook:** It is an annual volume of current information in descriptive and/or statistics form, sometimes limited to a special field.
- **Almanac:** It is a reference book that is published once a year and contains many type of information.

4.14 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What is an encyclopedia used for?
2. Name the leading general encyclopedias.
3. Write a short note on handbook and manuals.
4. Name the types of maps.
5. What kind of information is provided by an almanac?

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Long-Answer Questions

1. Explain the types of directories.
2. Describe the various geographical sources.
3. Explain the types of yearbooks.

4.15 FURTHER READINGS

Lea, Peter W. 1990. *Printed Reference Materials*. Third Edition. London: Library Association.

Bell, Simon. 19996. *Learning with Information Systems: Learning Cycles in Information Systems Development*. London: Routledge.

Cooper, M. D. 1996. *Design of Library Automation Systems: File Structures, Data Structures and Tools.* New York: John Wiley & Sons.

Haravu, L. J. 2004. *Library Automation: Design, Principles and Practice*. London: Allied Publications.

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UNIT 5 GENERAL EVOLUTION OF INFORMATION SOURCES

Structure

5.0 INTRODUCTION

In the previous unit, you studied about the categories of information sources namely, encyclopedia, dictionary, directory, handbook, manual, biography, bibliography, almanac and yearbook. This unit will elaborate on the evolution of information sources, the development of printed books and other sources, the emergence of the Internet and World Wide Web and the uses and functions of abstracting and indexing periodicals.

5.1 OBJECTIVES

After going through this unit, you will be able to:

- Explain the history of the evolution of information sources
- Discuss the development of printed books and other sources

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- Analyse the evolution of periodicals
- Describe the emergence of the Internet and the World Wide Web
- List the types of index
- Prepare an overview of indexing services
- Identify the types of abstracts
- Discuss the uses and functions of indexing and periodicals

5.2 HISTORY OF EVOLUTION OF INFORMATION SOURCES

Let us begin our discussion with the gradual development of information sources over a period of time. In this section, we shall provide you a bird's eye view of the history of development of these sources. We have seen that people with some knowledge of any kind make their views, ideas, observations, experimental research results and so forth, which are known to the fellow human beings by writing or by other means of communication. This practice has been followed since time immemorial. Early living individual is believed to have communicated with another by means of gestures or sounds before actual words were developed. There is no knowledge of how humans developed speech. Experts who study language and prehistoric ways of life have made numerous guesses. Many of the scholars are of the opinion that language began as an imitation of sounds in nature, such as barking of certain animals, howling of wind and sound of streams or waterfalls.

When language developed, people started exchanging news by word of mouth. The runners carried messages over long distances. Peoples also used drumbeats, fires and smoke signals to warn against forthcoming calamity or danger from wild animals. Paintings and drawings were the first steps towards a written language. People painted or carved on cave walls or stones series of pictures to tell a story of successful hunting trip or a violent storm. Gradually, people developed a system of small pictures to represent most common objects and ideas. This type of writing is known as 'pictographic writing'. Middle Eastern people called Sumerians developed the first pictographic writing in about 3500 BC (The World Book Encyclopedia). Pictographic writing worked well for familiar things, but people faced difficulty in writing new or unusual words. Gradually, they learnt to make each symbol represent a sound instead of an object or idea. Thus, they were able to write a word in the spoken language.

With the development of written language, people exchanged written messages from long distances. Messages that are in written form could also be stored for future reference. With the invention of writing, prehistoric time ended and the period of written history began. As time progressed, the medium and method of recording information changed. Recording medium changed from cave walls or stones to clay tablets, metals (lead, copper, brass and bronze), linen,

wooden boards, wax coated wooden tablets, papyrus, parchment and vellum until the invention of paper. Originally, in India, the ancient Hindu religious writings known as Vedas were written on palm leaves. Paper was discovered by the Chinese in AD 105 that led to a landmark in the history of writing media. The Chinese art of papermaking gradually spread to other parts of the world and people all over the world started using papers. In ancient times, books were written by hand by professional writers referred to as scribes. Most of books written with hand were decorated with colorful and beautiful designs and images were drawn on each paper from AD 400 till AD 1400. Painters frequently painted the design in colours, even in gold. Leather bindings decorated with gold, silver and precious stones indicated the value and importance of books. In creating these books, high cost and time were involved; therefore, these books were not accessible to the general public. Only a few privileged ones like religious leaders or rulers belonging to royal families could access these books.

5.3 DEVELOPMENT OF PRINTED BOOKS AND OTHER SOURCES

In AD 868, the first known printed book was made by the Chinese known as *Diamond Sutra*. They printed each page from a carved block of wood. Ink was spread over the raised surfaces on the block and the inked images were printed on paper. This type of printing was known as block printing. The book as we know today resulted from the invention of printing with movable types. In movable type printing, each letter of the alphabet is made from different metal piece. Printers arrange the metal types in any combination to produce the text they want. They can also reuse the type. This method allowed printers to produce several different pages in shorter time than with any previous method of printing.

The Chinese invented movable types in AD 1000 and Koreans began using it in AD 1300. In AD mid-1400, Europeans independently developed the movable type. Johannes Gutenberg and his associates worked to develop the printing process using the movable types. The first book printed in Europe using movable type appeared in Mainz, Germany between AD 1453 and AD 1456. Bible was the first book that was printed in Latin. This Bible became to be known as Gutenberg Bible. With the invention of the printing press, it became possible to print books quickly and in large numbers. General public got access to reading books. Over the period of time, printing became the essential part of mass communication. This breakthrough also paved way for education of the masses. A number of academic institutions and libraries came up in AD 1600 to support education particularly in European countries. Printed books also brought many changes in libraries. Books gradually replaced handwritten manuscripts and were kept on open shelves, not in chest, as the manuscripts in previous times. By 1600, libraries started to look like present day libraries. Shelves of books lined the walls and tables for readers stood in the middle of the room. During 1600, the art of printing was also used in business.

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Printed news-sheets appeared in Netherlands and other trading nations, which reported mostly business news like which ships had landed and what goods they carried. The news-sheets also printed advertisements. These news-sheets soon added non-business news and became the first true newspapers.

5.4 EVOLUTION OF PERIODICALS

In earlier times, the scholars and scientists who carried out research published their findings in the form of books. This medium was unable to disseminate research results quickly. Since, each scientist had to work for years to collect enough findings, so that it can be published in the form of a book. The only other way they communicated with their fellow scientists about their research was through writing letters to them or by meeting them in conferences. This was informal communication. Scientists needed a formal and faster medium to publish their research results for avoiding any duplication of research effort and creating priority for the announcement of their invention. This led to the publication of periodicals. *Le Journal des scavans*, which means Journal of Learned Men was one of the first periodicals to be published in Europe. The first weekly issue of this periodical was published in January 1665. It was in French language and contained articles, letters and notes. In the same year, the Royal Society of London published a monthly scientific periodical called Philosophical Transactions. The first issue was published in March 1665. It contained articles and listed important philosophical books. These two journals served as representations for subsequent scientific periodicals, which was founded by academic institutions and learned societies.

5.5 EMERGENCE OF ELECTRONIC SOURCES

In late 1800s, a number of inventions like typewriter, telegraph, telephone helped quicker dissemination of information. The telephones and telegraphs could send long distance messages instantaneously through electric wires. Even electric cables were laid down in the Atlantic Ocean to send telegraphic messages from United States to England and other European countries. In 1895, inventors used electronic, which is a branch of science and engineering for sending signals through space. Electromagnetic waves are used to carry signals, which travel through the space at the speed of light. Electronics made possible the invention of radio, television, computers and other wonders of modern communication.

5.6 EMERGENCE OF MASS MEDIA

Mass medium or mass media is a form of communication that spreads to a large number of people through television, radio, press and motion pictures. Appearance of news-sheets in trading nations during 1600 and their subsequent development

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to newspapers was the first step towards development of mass media. An important advancement in printing came in 1811, when German printer named Frederick Koenig used steam engine to power the printing press. This invention allowed newspapers to print large number of copies cheaply making mass circulation of newspapers possible. In 1814, Koenig's press was first used by The *Times* newspaper of London. Practical applications of electronics led to the invention of radio in 1906 and television in 1936. At present, radio, television and films are most powerful mass media in India.

5.7 EMERGENCE OF INTERNET AND WORLD WIDE WEB

Advancement in computer and telecommunication technologies in the 20th century led to the emergence of electronic sources of information, digital or electronic libraries, Internet and the World Wide Web. Internet is a global computer network that serves billions of users worldwide. The origin of Internet dates back to the late1960s, when United States Department of Defense initiated a project to build a computer network, ARPANET (Advanced Research Project Agency Network) that could maintain itself in adverse conditions. The project was started in 1968 and soon evolved into a goal of developing techniques to build a large-scale network. At first, the goal of ARPANET researchers was to develop one large network to connect computers over long distances. However, by mid 1970s, it became clear that no single network was going to be able to serve everyone's needs. The researchers saw it would be more useful to develop a technology that would connect various types of networks into a single large system. This led to the concept of an 'inter-network' or 'Internet'.

By early 1970s, power, speed and memory of computer was increased and the ability of communication with computers on the Internet. At that time, dial-up online searches on the Internet were very expensive. Internet usage was limited until the arrival of World Wide Web or Web in 1990s. The emergence of World Wide Web and coming up of a large number of Internet service providers, offering Internet services to masses resulted in phenomenal increase in Internet usage in the world. Thus, today's Internet is not really a single large computer network; it actually is a collection of tens of thousands of networks spanning the globe. Millions of people, all over the world can communicate and share information with the use of the internet. One can communicate by sending or receiving electronic mail, or by establishing connection to someone else's computer and typing messages back and forth. You share by participating in discussion groups and by using many programs and information sources that are available free on the Internet. World Wide Web is the dominant technology on the Internet. The World Wide Web began in 1989 as a project by high-energy physics researchers in Switzerland to distribute research results on the Internet to fellow physicists. Ever since, the World Wide Web has taken over the Internet technologies, one can now see

hundreds and thousands of websites on the Internet. The websites have Web pages, which have linkages as well as multimedia features.

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5.8 DIFFERENT TYPES OF INFORMATION SOURCES

Let us now go through the different types of information sources.

5.8.1 Index

'Index' is derived from the Latin word *indicare* that means 'to show' or 'point out'. Index is a type of secondary source that scan the primary sources, select the relevant items, and arrange them in helpful sequence for easy and quick retrieval. Indexes, bibliographies, indexing and abstracting periodicals are referred as secondary publications, which list and arrange the important items from the primary documents to access easily and quickly. For instance, indexing and abstracting periodicals systematically scan the current primary sources of information (like primary periodicals, research reports, conference proceedings, and so forth) on a particular subject field, select the significant items, index (or provide brief summary of) each item, and arrange sequentially so that each item can be easily traced and identified. In indexing periodicals, each item selected is arranged under broad subject headings along with full details of primary document from which it is selected. Abstracting periodicals provide summary (called abstract) of each item selected for coverage. This helps the user to decide, whether to go for original document or not. Indexing and abstracting periodicals come out at regular intervals, keep users abreast of the current literature on a subject, and serve as important guides to the primary literature. Without them, a large part of primary literature may remain unknown and unused.

5.8.2 Types of Index

The types of index are the following:

- Book Index
- Index of Collections
- Periodical Index
- Newspaper index

1. **Book index:** Book indexes are the lists that are found in written books.
2. **Index of collections:** These indexes are collections of poems, fiction, plays, songs, essays, stories, biographies and so forth.
3. **Periodical index:** Broadly speaking, these are the three types, general indexes, subject indexes and indexes to single periodicals.
   (i) **General index:** General indexes may cover periodicals in a wide field of knowledge. The Reader's Guide to Periodical Literature is an example of a general index.

(ii) **Subject index:** These are those indexes, which cover several periodicals. It also includes pamphlets, conference proceedings new books, reports, etc.

(iii) **Index to single periodicals:** Indexes to individual periodicals vary in quality and completeness. They are usually on an annual basis.

4. **Newspaper indexes:** These are generally of two types:
   (i) Indexing many newspapers
   (ii) Indexing a single newspaper

Indian news index is an example of the first Index to *The Times of India* is an example of the second. A study of indexing services show the variety of services offered in different fields.

5.9 ABSTRACTING SERVICES

As the available literature is increasing, scholars are unable to keep themselves updated with the documents or information in their field. It is in this respect that abstracting services can play a very important role in keeping him well informed. They help in bringing information to the notice of those who need it rather quickly, and are extremely useful tools.

5.9.1 Types of Abstracts

There are two major kinds of abstracts:

(i) Indicative

(ii) Informative

Indicative abstracts merely tell briefly what the document is about. It summarizes the contents in brief, indicating the scope and contents of the documents.

Informative abstracts are longer and present the essential data and conclusions so that the reader does not need to refer to the original document. An informative abstract, usually contains scope, purpose, methods used, results or findings, conclusion, or interpretation of the results obtained by the author.

Based on informative abstract, a reader can decide whether the given contribution is a basic and primary one or not.

5.9.2 Uses of Abstract

An abstract serves many useful purposes as given below:

- It helps in keeping one up-to-date with the latest knowledge.
- It indicates, whether the article is of value to the user or not. Thus, the user need not search unnecessarily and waste his time.

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- It serves as a rapid survey of retrospective literature.
- It helps in improving indexing.
- It aids in the writing of reviews.
- It enables one to make a retrospective search for literature in a field.

5.10 INDEXING AND PERIODICALS

Indexing and periodicals are categorized as secondary publications. Indexing and periodicals, though report current literature, are useful for retrospective search also and they have a permanent use. They are different from current awareness services, whose use is temporary it lays emphasis on quick reporting of current literature.

5.10.1 Definition

'Index' is derived from the Latin word *indicare* that means 'to show' or 'point out'. An indexing periodical is an access tool for systematic arrangement of periodical literature, which provides complete bibliographical references of previously published individual items of primary documents, which are republished at regular intervals. It is arranged in a convenient way for searching the location of entries. An index can be categorized in classified, alphabetical, chronological, numerical or geographical. They are access tools to identify and locate the required information, which appeared in a particular periodical. It gives the information of the primary documents in a compact form.

The main difference between indexing and abstracting services is in the content and form. Indexing periodicals provide lists of articles with bibliographical details arranged in user-friendly order to enable a user to trace the needed information easily and quickly. Periodicals list the bibliographical details as well as provide documents abstracts in a relevant field or a group of subject fields to help the reader for his choice of an article or a paper.

5.10.2 Key functions of Abstracting and Indexing Periodicals

These are useful to keep scholars and information users abreast of current literature in their field of interest. They can be benefited from scanning the issues of indexing and abstracting periodicals. This can be termed as current use function; to find information on the literature of the subject fields as and when the need arises. The abstracting and indexing are primary tools to librarians and information workers for day-to-day reference and bibliographical work, though research scholars use them extensively. This is referred to as retrospective search function. For providing bibliographical control of literature output either by country

or by subject or by kind of materials, if the aim of the indexing and abstracting services is exhaustive coverage. This can be termed as comprehensive use of function.

The secondary functions are the following:

- To help users get over language barrier, particularly in the case of abstracting periodicals;
- To obtain correct and complete bibliographical details of particular items of literature, when there is any doubt.
- To look up for information on a topic, which may not have been well covered by books, encyclopedias, and other sources to make known the work of individual scholars or scientists;
- To serve as a source for doing statistical, sociological and bibliometric studies on the growth and pattern of literature, indicative of research and development efforts taking place; and
- To help users to get information that is otherwise scattered in other sources.

5.10.3 Scope

Index and periodicals attempt to cover current literature with as little time lag as possible. It can be exhaustive or selective in literature coverage depending upon the purpose. Time and effort is involved in production, the speed of reporting literature is not a primary consideration as it is in the case of current awareness type publications.

Indexing periodicals aim for exhaustive coverage of literature as it is comparatively easy to produce. Abstracting periodicals have to be necessarily selective in coverage, as not all documents may be suitable for abstracting from the point of view of their content. Thus, periodicals in some cases, include documents with bibliographical description giving indicative abstract only.

Indexing periodicals may cover all kinds of primary documents such as books, journal articles, pamphlets and bulletins, reports, patents and standard specifications. There are also index and periodicals devoted to unpublished literature and sources such as research reports, university theses and dissertations, proceedings of conferences, seminars or meetings are covered therein.

5.10.4 Uses of Indexing and Periodicals

Library and information workers acquire skills in using the index and periodicals as a part of their professional training and later supplemented by field experience. A specific index and periodical is worthwhile to find out its extent of coverage of literature and adequacy for searching the required information. It also obtains optimum recall of sought literature with high relevance and least possible time. As

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the cost of international abstracting periodicals is exorbitant, many librarians in India depend on these periodicals available in other libraries, rich in their collection. Such resources sharing programs are encouraged due to the establishment of city library networks in India.

Check Your Progress

1. When was paper discovered?
2. Mention an important advancement made in the field of printing in 1811.
3. What is an index?
4. Give examples of secondary publications.

5.11 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. The Chinese discovered paper in AD 105.
2. An important advancement in printing came in 1811, when German printer named Frederick Koenig used steam engine to power the printing press. This invention allowed newspapers to print large number of copies cheaply making mass circulation of newspapers possible.
3. Index is a type of secondary source that scan the primary sources, select the relevant items, and arrange them in helpful sequence for easy and quick retrieval.
4. Indexes, bibliographies, indexing and abstracting periodicals are referred as secondary publications, which list and arrange the important items from the primary documents to access easily and quickly.

5.12 SUMMARY

- Gradually, people developed a system of small pictures to represent most common objects and ideas. This type of writing is known as 'pictographic writing'. Middle Eastern people called Sumerians developed the first pictographic writing in about 3500 BC (The World Book Encyclopedia).
- With the development of written language, people exchanged written messages from long distances. Messages that are in written form could also be stored for future reference.
- With the development of written language, people exchanged written messages from long distances. Messages that are in written form could also be stored for future reference.

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- The Chinese invented movable types in AD 1000 and Koreans began using it in AD 1300. In AD mid-1400, Europeans independently developed the movable type. Johannes Gutenberg and his associates worked to develop the printing process using the movable types.
- *Le Journal des scavans*, which means Journal of Learned Men was one of the first periodicals to be published in Europe. The first weekly issue of this periodical was published in January 1665.
- In late 1800s, a number of inventions like typewriter, telegraph, telephone helped quicker dissemination of information. The telephones and telegraphs could send long distance messages instantaneously through electric wires.
- Mass medium or mass media is a form of communication that spreads to a large number of people through television, radio, press and motion pictures.
- Advancement in computer and telecommunication technologies in the 20th century led to the emergence of electronic sources of information, digital or electronic libraries, Internet and the World Wide Web.
- By early 1970s, power, speed and memory of computer was increased and the ability of communication with computers on the Internet. At that time, dial-up online searches on the Internet were very expensive. Internet usage was limited until the arrival of World Wide Web or Web in 1990s.
- Index is a type of secondary source that scan the primary sources, select the relevant items, and arrange them in helpful sequence for easy and quick retrieval.
- Indexes, bibliographies, indexing and abstracting periodicals are referred as secondary publications, which list and arrange the important items from the primary documents to access easily and quickly.
- Indexing and periodicals are categorized as secondary publications. Indexing and periodicals, though report current literature, are useful for retrospective search also and they have a permanent use.
- The main difference between indexing and abstracting services is in the content and form.
- Index and periodicals attempt to cover current literature with as little time lag as possible. It can be exhaustive or selective in literature coverage depending upon the purpose.
- Library and information workers acquire skills in using the index and periodicals as a part of their professional training and later supplemented by field experience.

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5.13 KEY WORDS

- **Papyrus:** It is a material prepared in ancient Egypt from the pithy stem of a water plant, used in sheets throughout the ancient Mediterranean world for writing or painting on and also for making articles such as rope.
- **Pictorial writing:** It is the recording of events or expression of messages by pictures representing actions or facts.
- **Vellum:** It refers to fine parchment made originally from the skin of a calf.
- **Scribe:** This term refers to a person employed before printing was invented to make copies of documents.
- **Manuscript:** It refers to the original copy of a book or article before it is printed
- **News-sheet:** It is a small newspaper that is usually printed and distributed in small quantities by a local political or social organization.
- **Bibliometric:** These are a range of quantitative measures that assess the impact of research outputs.

5.14 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the different types of indexes?
2. Name the two types of abstract.
3. State the differences between indexing and abstracting services.
4. What are the uses of Abstract?
5. What are the uses of Indexing and Periodicals?

Long-Answer Questions

1. Explain the development of printed books.
2. Discuss the emergence of electronic sources and mass media.
3. Describe the emergence of the Internet and World Wide Web,
4. What are the functions of Abstracting and Indexing Periodicals?

5.15 FURTHER READINGS

Lea, Peter W. 1990. *Printed Reference Materials*. Third Edition. London: Library Association.

Bell, Simon. 19996. *Learning with Information Systems: Learning Cycles in Information Systems Development*. London: Routledge.

Cooper, M. D. 1996. *Design of Library Automation Systems: File Structures, Data Structures and Tools.* New York: John Wiley & Sons.

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BLOCK - III

NATIONAL & INTERNATIONAL CENTRES

UNIT 6 INFORMATION SYSTEMS EXISTING AT THE NATIONAL LEVEL

Structure

6.0 INTRODUCTION

In the previous unit, you studied about the general evaluation of information sources and abstracting and indexing periodicals. This unit will explain the need, purpose, functions and activities of the National Institute of Science Communication and Information Resources (NISCAIR) and Defence Scientific Information and Documentation Centre (DESIDOC).

6.1 OBJECTIVES

After going through this unit, you will be able to:

- Explain the establishment of NISCAIR
- State the functions of NISCAIR
- Identify the need and purpose of establishing NISCAIR
- Describe the formation of DESIDOC
- Mention the functions and objectives of DESIDOC
- Analyse the process of automation in editorial and printing process of DESIDOC
- Identify the future perspectives of DJLIT

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6.2 THE NATIONAL INSTITUTE OF SCIENCE COMMUNICATION AND INFORMATION RESOURCES (NISCAIR): AN OVERVIEW

The National Institute of Science Communication and Information Resources (NISCAIR) came into existence on 30 September 2002 with the merger of the National Institute of Science Communication (NISCOM) and Indian National Scientific Documentation Centre (INSDOC). Both NISCOM and INSDOC, the two premier institutes of the Council of Scientific and Industrial Research (CSIR), were devoted to dissemination and documentation of S&T information.

NISCOM had been in existence for the last six decades (first as two Publication Units of CSIR, which were merged to form the Publications Division, which was later renamed as Publications & Information Directorate and in 1996, as NISCOM). Over the years, NISCOM diversified its activities, and through a host of its information products, comprising research and popular science journals, encyclopaedic publications, monographs, books, and information services. It has been reaching out to researchers, students, entrepreneurs, industrialists, agriculturists, policy planners and also the common man.

INSDOC came into being in 1952 and engaged in providing S&T information and documentation services through myriad activities such as abstracting and indexing, design and development of databases, translation services, library automation, providing access to international information sources, human resource development, consultancy services in setting up modern library-cum-information centres. INSDOC was also host to the National Science Library and the SAARC Documentation Centre.

Now, with the formation of NISCAIR, all the above multi-faceted activities have been amalgamated, making NISCAIR, an institute capable of serving the society using modern IT infrastructure in a more effective manner and taking up new ventures in the field of science communication, dissemination and S&T information management systems and services. Broadly, the core activity of NISCAIR is to collect/store, publish and disseminate S&T information through a mix of traditional and modern means, which will benefit different segments of society.

6.2.1 Mission Statement

To become the prime custodian of all information resources on current and traditional knowledge systems in science and technology in the country, and to promote communication in science to diverse constituents at all levels, using the most appropriate technologies.

6.2.2 Functions of NISCAIR

- To provide formal linkages of communication among the scientific community in the form of research journals in different areas of S&T.
- To disseminate S&T information to general public, particularly school students, to inculcate interest in science among them.
- To collect, collate and disseminate information on plant, animal and mineral wealth of the country.
- To harness information technology applications in information management with particular reference to science communication and modernizing libraries.
- To act as a facilitator in furthering the economic, social, industrial, scientific and commercial development by providing timely access to relevant and accurate information.
- To develop human resources in science communication, library, documentation and information science and S&T information management systems and services.
- To collaborate with international institutions and organizations having objectives and goals similar to those of NISCAIR.
- Any other activity in consonance with the mission statement of NISCAIR.

6.2.3 Need and Purpose

One of the core activities of NISCAIR is to collect, organize, and disseminate S&T information generated in India as well as in the world, which has relevance to the Indian S&T community. Under this program, the institute is building comprehensive collection of S&T publications in print as well as in electronic form and disseminating that information through traditional as well as modern means, benefiting different segments of the society. Major resources under this activity

are National Science Library, Electronic Resources, Indigenous Databases, and Raw Materials Herbarium and Museum.

Electronic resources

Automated libraries are slowly shifting to electronic libraries that will eventually lead to the establishment of digital libraries. With decreasing shelf space and ever growing collections in the libraries, NISCAIR has been advocating the conversion of automated libraries into electronic libraries.

On-line databases

Some of the online databases include:

- Web of Science (WOS)
- Journal Citation Reports (JCR)
- Library and Information Science Abstracts (LISA)
- Annual Reviews
- J-Gate
- ACS Journal Archive
- Emerald Journal Archive
- Springer Journal Archive

6.2.4 Products

NISCAIR's products are following:

- Proceedings of First Indo-US Workshop on Green Chemistry
- The Treatise on Indian Medicinal Plants
- Compendium of Indian Medicinal Plants
- The Useful Plants of India
- Status Report on Aromatic and Essential Oil-bearing Plants in NAM Countries
- Status Report on Cultivation of Medicinal Plants in NAM Countries
- Indian Science Abstracts on CD-ROM

In-house databases

Computerized databases help in organization of data and its efficient retrieval. NISCAIR has developed expertise in the design and development of databases. In addition to development of in-house databases, NISCAIR has designed and developed databases for other organizations as well. The contents of these databases vary from bibliographic to multimedia.

National Knowledge Resource Consortium (NKRC): It has 10,000 online journal and list of 28 Publishers online.

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6.2.5 NISCAIR's Online Periodicals Repository

User can now access full text articles from research journals published by NISCAIR. Presently, full text facility is provided for all of the seventeen research journals, which are the following:

- Journal of Scientific and Industrial Research (JSIR)
- Indian Journal of Biochemistry & Biophysics (IJBB)
- Indian Journal of Biotechnology (IJBT)
- Indian Journal of Chemistry, Sec A (IJC-A)
- Indian Journal of Chemistry, Sec B (IJC-B)
- Indian Journal of Chemical Technology (IJCT)
- Indian Journal of Experimental Biology (IJEB)
- Indian Journal of Engineering & Material Sciences (IJEMS)
- Indian Journal of Fibre & Textile Research (IJFTR)
- Indian Journal of Marine Sciences (IJMS)
- Indian Journal of Pure & Applied Physics (IJPAP)
- Indian Journal of Radio & Space Physics (IJRSP)
- Indian Journal of Traditional Knowledge (IJTK)
- Journal of Intellectual Property Rights (JIPR)
- Natural Product Radiance (NPR)
- Annals of Library and Information Studies (ALIS)
- Bharatiya Vaigyanik evam Audyogik Anusandhan Patrika (BVAAP)

Raw materials herbarium & museum

NISCAIR has set up a herbarium and museum housing economically important raw materials of plant, animal and mineral origin from India at one place, to cater to the needs of scientists, researchers, industrialists, students and the public at large. The Herbarium houses over 8000 specimen of economic and medicinal plants of India and the museum comprises over 3000 samples of crude-drugs, animal and mineral specimen.

6.2.6 National Union Catalogue of Scientific Serials in India (NUCSSI)

National Union Catalogue of Scientific Serials in India (NUCSSI) is the first indigenous database that serves as an ideal tool to access journal holdings information. Journals are the main source of Science and Technology information. NUCSSI is a data repository of a large number of unique journal titles and library holdings belonging to major universities, S&T institutions, R&D units of industries, higher institutes like IISc, IITs and professional institutes spread all over the country.

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6.3 DEFENCE SCIENTIFIC INFORMATION AND DOCUMENTATION CENTRE (DESIDOC): AN OVERVIEW

The Defence Scientific Information and Documentation Centre (DESIDOC) started functioning in 1958 as the Scientific Information Bureau (SIB) a division of the Defence Science Laboratory (DSL), which later became Defence Science Centre and is now known as the Laser Science & Technology Centre (LASTEC). The DRDO library, which had its beginning in 1948, became a Division of SIB in 1959. After reorganizing its activities on 4 May 1967, the SIB was renamed as the Defence Scientific Information and Documentation Centre (DESIDOC) under the administrative control of DSL.

It became a self-accounting establishment of DRDO on 29 July 1970. DESIDOC provides scientific and technical information required by the scientific and technical community in DRDO headquarters and laboratories across the country for R&D purposes. Today, DESIDOC is the central resource institute for providing scientific information, documentation, library, reprographic, translation and printing services to the DRDO HQ/labs/estts and other establishment of Ministry of Defence and coordinates DRDO scientific information programmes. DESIDOC had set-up its publishing wing, bringing out many publications including the Defence Science Journal, Popular S&T series, R&D digest and so forth.

During the early 1980s, it was felt to bring out an in-house bulletin, published monthly, dedicated to popularize the library and information activities and services of DESIDOC to the outside world. So, the in-house bulletin DESIDOC Bulletin was brought out in January 1981. The 1981 issues of DESIDOC Bulletin covered such items as library activities, translation, meetings, courses organized, details of papers published by DESIDOC personnel, advertisements and so forth. It was dedicated solely to covering the activities/services of DESIDOC.

From January 1985 onwards, it started covering activities/services of other Technical Information Centres (TICs)/Libraries of DRDO. Each issue started including one article on state-of-the-art in an area of documentation/information technology. Also from 1985 onwards, DESIDOC Bulletin was made bi-monthly. The issues from 1985 onwards covered 'articles' along with sections such as 'News and Notes' 'DESIDOC Activities' 'Current Literature in Information Science' and other related information. In January 1987, 'Focus Articles' were started publishing articles on topics of interest in the field of LIS. From 1987, the objective was to bring out current developments in information science and technology to the notice of the information specialists in the Ministry.

Along with other sections a new section 'New products' was introduced. In January 1991, the DESIDOC Bulletin was changed to DESIDOC Bulletin of Information Technology with the scope to include one focused article. It started covering article and section such as Information Technology Events covering the

forthcoming events, Information Technology Scan covering new technologies applicable to LIS centres; Current Literature Survey covering new articles in the field of Library and Information Science; Book Reviews covering reviews of recently released books and DRDO Information activities. In 1994, research and review articles were invited from eminent professionals/experts in LIS fields for contributing to the journal. Then special issues were also brought out from January 1995 onwards. Consequently, in 1995 five special issues were brought out which was an outstanding achievement. All the issues were highly appreciated. During that period, papers were invited from authors to contribute research papers for the journal.

In the meeting of Editorial Board held on 19th September 2007, it was suggested to change the name of DESIDOC Bulletin of Information Technology to DESIDOC Journal of Library and Information Technology to attract more quality papers. The title of the Journal was changed in January 2008. The Journal also received new ISSN number in December 2007. It was also decided that the Journal will only cover focused articles which were peer-reviewed. The objective of DESIDOC Journal of Library and Information Technology is to bring recent developments in information technology applicable to library and information science, to the notice of librarians, documentation and information professionals, students and others interested in the field. In 2013 issue, it completed 33 successful years of its continued publication. Guest editors were specially invited to bring out special issues covering topics like scientometrics, online exhibitions, knowledge organization, corporate social responsibility, intellectual property rights, semantic web, ontology, digital preservation and so on.

Information is an important component of research and development projects. The importance of information becomes vital for the areas of strategic importance, viz., defence research and development, since it is related to national security. The scientist needs an efficient information network to control the repetition of research works.

The works on research and development started in 1948 after the establishment of defence organization. In 1958, this organization was given the name of Defence Research and Development Organization (DRDO). This organization is responsible for the development and production of defence equipment and weapons.

DESIDOC has been working as an independent organization under DRDO since 1970. Its directorate is situated in Metcalfe house, Delhi.

6.3.1 Functions and Objectives

As a central information agency under DRDO, the DESIDOC has a vast collection of scientific and technical information obtained through the published and unpublished sources, and by making its use in various ways, it implements this collection of information in many forms. Functioning under the auspices of DRDO,

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the DESIDOC provides necessary help and assistance in the activities of technical directorate, laboratories and other organizations. The manifesto of DESIDOC includes the following activities:

(1) To function as a centre for information and documentation and consolidate the need and requirements of the defence research and development and other organizations.

(2) Collection, collation, and dissemination of the technical information for the benefit of the organizations related to defence research and development.

(3) Collection, collation, and dissemination of the foreign and the Indian scientific and technical information and to work as the depository of all types of reports.

(4) To maintain close contact with INSDOC and all other national services.

(5) Translation of foreign literature and reports and making them available to the scientists engaged in the defence research and development.

In addition to the above, the following works are also the responsibility in DESIDOC:

(1) To maintain an up-to-date research and reference library for the use of the scientists engaged in the research and development works.

(2) To provide book catalogue to the scientists of defence laboratories and organization.

(3) To make available the summary of the specific subjects to the scientists engaged in the defence research and development.

(4) Translation of scientific and technical documents of other languages into English.

(5) To give advice to the technical information centres and libraries of the DRDO and other organizations.

(6) Training on documentation.

Presently, DESIDOC is responsible for the development of data bank and information system for the defence science and techniques. It conducts research and development and also provides training and advice to the technical information centres and other defence organizations. At present, DESIDOC is providing reprography services also in addition to translation services.

6.3.2 Activities of DESIDOC

The major activities of DESIDOC are the following:

(1) **Selective Dissemination Services (SDI):** It is a type of individual service which is attributed and provided to the researchers and high level managers according to their interested areas of work. The 15 profile SDI service produced by computer is being organized at present. There is a plan to

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present more than 100 profiles from the fulfilment point of view of the various projects of research and development.

(2) **Patents information alert:** Patents are regarded as the important source of information for the research and development work. It is published in the form of quarterly periodical. Description of Indian and foreign patents is given in it.

(3) **Defence report abstract:** The technical reports are regarded as the important source of primary information in any research and development organization. This abstract report is considered very useful from this point of view and is published in two languages.

(4) **DESIDOC list:** This is a fortnightly publication on indexing in which the articles published in the periodicals pertain to the topics on defence science and interest.

(5) **Presentation of reports:** DESIDOC publishes the following publications for providing know-how to the specialists and other users related to this field.

(i) Defence Research and Development in coming decades

(ii) Chinese Space Programme

6.3.3 Organization of DESIDOC

DESIDOC has been divided into various departments for the fulfilment of its objectives and activities:

1. **Library department:** Qualified information scientists and the latest information sources are necessary for the collections of information for defence projects. To fulfil this requirement, a library was established under DESIDOC which is known as the Defence Science Library. This library was earlier established in 1948 before DESIDOC came into existence. This was run under the Defence Science Laboratory.

   This library provides information as the research and development activities related to defence science. In 1948, its library had 400 books.

   (a) **Collections:** This library has a huge stock reading material related to defence science and technology, viz. aeronautical science, rockets, missiles, war material, explosives and so forth.

   (b) **Special collection:** The defence science library has a vast collection of old reference books on the one hand and on the other hand, the latest and up-to-date reference books have also been stocked. This library has in its stock some rare reports pertaining to the Second World War era. These are as under:

   - British Intelligence Objective Sub-Committee Report
   - Combined Intelligence Objective Sub-Committee Report
   - Royal Aeronautic Establishment Report.

(c) **Acquisit Section:** This department is responsible for the collection of literature only. This department also works as a central acquisition centre and it acquires scientific and technical books and magazines and reports for the technical directorates.

- Collier Encyclopedia (24 volumes)
- Oxford English Dictionary.
- Work Book Encyclopedia (22 volumes)

2. **Technical section:** This section is responsible for making available the books, magazines because the classifications and cataloguing is also done by this section.

6.3.4 Automation in Editorial and Printing Processes

Prior to 1991, only handwritten manuscripts were submitted. Then, papers were began to be accepted in comp scripts (in e-format). WordStar software was used for manuscript processing. In 1992, Ventura was used as publishing software. Later, Ventura 5 and Corel Ventura 8 were introduced, which were used until 2006. In 2007, PageMaker version 4.0 software was used for publishing and subsequently, newer versions were used. In 2011, Indesign version CS5.5 (7.5) software was used as DTP (Desktop Publishing) software. Since, mid-1990s the manuscripts were being received in typed format or word-compatible format. Presently, all the manuscripts are received in word/rtf/pdf format. From 2007, the journal started using Open Journal Systems Software to further speed up the editorial and refereeing processes, thereby reducing the time taken in submission and acceptance of papers. It assists every stage of the refereed publishing process through its online interface, from submissions to online publication and indexing. The authors can register themselves on the journal's website and can track the progress of their papers online. The reviewers can also register themselves. A database of reviewers is maintained through OJS (Open Journal Systems), along with their expertise. The reviewers are selected through this database and request is sent through this system only. The reviewers send their review reports through it. A quick upload option that bypasses this system also exists for publishers that are in favor of their current workflow or would like to mount archival issues through which the back volumes were published in a single go. E-mail notification and commenting ability for readers and reviewers is available and is extensively used.

Editorial Boards

In 1987, an in-house Editorial Board (EB) consisting of scientists/officers of Defense Scientific Information and Documentation Centre (DESIDOC) was formed to set the tone and direction of the publication's editorial policy. In July 1997, the first Editorial Board consisting of outside experts was formed and the constitution of the Board was published in July issue onwards. The journal has an Editorial Board with the Director of DESIDOC (Ex-officio Chairman), Editor, DJLIT (DESIDOC Journal of Library & Information Technology) is the member secretary of the

Board. The Editorial Board comprises some eminent scientists, researchers, and personalities from the area of library and information science. The main functions of the Editorial Board are to look into the overall review of the journal and progress, suggest on future special issues, identify experts for contributing papers for DJLIT, policy matters of the journal, and to improve the overall quality of the journal. It was decided that the Board will meet on regular intervals.

The first Editorial Board had Dr. S. S. Murthy, Director, DESIDOC (Chairman) and Dr. J.S Arora, Advisor, BTIS (Biotechnology Information System), Department of Biotechnology, New Delhi; Shri A Arunachalam, visiting Professor, IIT, Chennai; Dr. A. Lahiri, Advisor, DSIR (The Department of Scientific and Industrial Research), Ministry of Science and Technology, New Delhi; Dr. T.B Rajashekar, Associate Chairman, NCSI (National Conference Services Inc), IISc (Indian Institute of Science), Bangalore; Shri Harijit Singh, Senior Advisor, Ministry of Environment and Forests, New Delhi; Dr. N. Vijyaditya, Deputy Director General, NIC (National Informatics Centre), New Delhi; Dr. T Viswanathan, Director, INSDOC (Indian National Scientific Documentation Centre), New Delhi as members and Shri Ashok Kumar, Editor as Member Secretary. To bring in fresh ideas, the Editorial Board was reconstituted occasionally. Changes in the Editorial Board were observed in January 2001, January 2002, July 2005, January 2007, May 2007, January 2009, September 2010, March 2011, and January 2012. The current Editorial Board was reconstituted in May 2013. The Editorial Board meets from time to time to lay down broad editorial polices for the journal and to direct its progress through suitable advice. The first meeting of the EB was held on 21st May 1998. The last meeting of the Editorial Board was held on 13th August 2013.

Reviewing process

The manuscripts submitted to DJLIT are reviewed for possible publication. The journal follows a double blind system of reviewing. The Editor reviews all submitted manuscripts. Manuscripts with insufficient originality, serious scientific flaws, absence of importance of message, weak analysis, or problems in presentation are rejected. The primary aim of the peer review process is to maintain quality control and protect the reputation of the journal in a transparent manner. Every effort is made to ensure that manuscripts are reviewed efficiently and to a high quality. The exact duration of time depends on many factors, such as whether peers agree to review a manuscript, how quickly they submit their reports, how fast the response is received from authors, and so on. Within a period of ten to twelve weeks, the contributors are informed regarding the acceptance/rejection/ revision of manuscripts. Presently, the rejection rate of DJLIT is more than 65 percent. It is also one of the very few journals that covers the incidental charges met by the referees and pays a token honorarium to the referees and guest editors of the journal. These unique measures made the referees and guest editors more involved in their tasks leading to the improvement of the overall quality of the contents of the journal.

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Special Issues of DJLIT

The DESIDOC Journal of Library and Information Technology is a journal of library and information technology but with time a large number of sub-areas have emerged. So, it is likely that a reader may not get even a single paper of interest on a particular topic. Hence, to attract the submission of quality papers and increase the visibility of the journal, the Editorial Board and editorial team of the journal decided in 1994 to bring out issues related to library and information science with eminent experts in the field as guest editors. The September 1992 issue of the journal was the first special issue dedicated to the memory of Dr. S. R. Ranganathan, father of library movement in India, published on the occasion of his birth centenary that is, 12 August 1992. Five articles were published, which were invited from his students, disciples, and those who were in close contact with him. The next special issue was published in January 1995 on the topic of marketing of information and document delivery under the Guest Editorship of M.N. Seetharam of NAL (National Aerospace Laboratories), Bangalore. The guest editor invites articles, reviews, evaluates, and edits them and sends them to DESIDOC for further editing and processing. At that time, less number of articles on the selected topics were published from highly experienced senior information professionals. The issue of May 2014 was a special issue on 'Indian Contribution in Scientometrics' under the Guest Editorship of Dr. B. M Gupta, Scientist (Retired) in NISTADS (National Institute of Science Technology and Development Studies), CSIR (The Council of Scientific and Industrial Research). All the special issues of DJLIT have been highly appreciated by the user community and maximum readability has been observed for these issues on the analysis of data.

Coverage in indexing and abstracting databases

DESIDOC has taken initiatives to include the bibliographical details as well as full-text in many international databases. These efforts provide greater visibility and reach to DJLIT. It also provides wider international publicity of the journal as well as submission of quality papers from India and abroad. These databases provide the contents of the journal free of cost or at some cost to the readers. The journal is presently covered by over a dozen major indexing and abstracting agencies including SCOPUS, LISA, LISTA, EBSCO Abstracts/Full Text, The Informed Librarian Online, DOAJ, Open J-Gate, Indian Science Abstracts, Indian Citation Index, Full text Sources Online, WorldCat, Index Copernicus, and OCLC.

Bibliographic and citation studies

A citation can be defined as an extract or reference to a book, paper, or author, especially in a scholarly work. On the other hand, the Impact Factor (IF) of an academic journal is a measure reflecting the average number of citations to recent articles published in the journal. It is basically used to find the status of a journal in a particular field. Journals with higher impact factor are considered more important compared to journals with lower impact factor. The impact factor was devised by

Eugene Garfield. Many studies have been carried out on DJLIT (earlier DBIT) to understand the growth pattern in terms of coverage, readership, authorship, subject analysis, citation analysis, scope, and others. Dr. Mohinder Singh, Editor in Chief, in his editorial on 'Celebrating 25 Years of Publishing of DESIDOC Bulletin of Information Technology' in DBIT issue, published in September 2005, has mentioned that:

> Twenty-five years of continuous institutional support of the Journal indicates the significant role the Journal plays in the DESIDOC's long-standing commitment to library and information professionals and students. The Journal continues to be a prime resource in the interdisciplinary field of information technology is quickly expanding its scope beyond geographical boundaries to reviewers, contributors, and subscribers around the world.

The topics covered by DBIT are based on feedback which has come through the editors and users about the current state of usefulness of IT for library and information professionals throughout the world. Since its launch over 25 years ago, the journal has been dedicated to the enrichment of knowledge and the advancement of library services. It prepares its readers to understand and embrace current and emerging technologies affecting library and information functions and the information needs of the users. From the automation of library services to the evaluation of sources and models for delivering more effective library services, it provides indispensable information to all types of libraries which experience change.

6.3.5 Printing Process of the Journal

The journal has been using the in-house printing unit of DESIDOC for printing the journal. The letter press process was used until 1984. In 1984, the printing process was changed to offset and phototypesetting facility was used to produce the layout. In 1990s, with the arrival of computers, the printouts/final camera ready copy was supplied to the printing unit for offset printing, which is a commonly used printing technique. The first issue that was produced using DTP software, Ventura, on laser printer, was in May 1992. Later, NovaSharp Crystal 125, a polyester-based, daylight-working, zero-process, dry-to-dry film for making offset positives/ negatives using a desktop computer and a laser printer was introduced. The image density booster solution enhances the UV density of the image, which is comparable with silver sensitized graphic art films and therefore, suited for exposing pre-sensitized offset plates. These films are used to get the negatives of the whole issue and supplied to the printing division. Currently, Pdf files (digital copy) of the final issue are provided for digital printing. Now, the Computer to Plate (CTP) imaging technology is used to print DJLIT. The printing is done in four colors. Finally, binding and distribution of the journal take place.

Policies of the journal

Every journal has a set of policies. A set of policies comprising principles, rules, and guidelines formulated or adopted by an organization to reach its long-term goals are typically published in a booklet or other form that is widely accessible.

Policies and procedures are designed to influence and determine all major decisions and actions and all activities take place within the boundaries set by them. Policies have been formulated from time to time to maintain the quality and authenticity of the journal.

Availability and subscription

The pricing/subscription policy for the journal was formulated and started in January 1994 (For individuals ₹ 50/- and for Institutions ₹ 100/- per annum). With the pricing of the journal, the mailing of free copies was stopped. However, complimentary copies were provided to DRDO users, national libraries, besides mandatory requirement of deposit centers. However, the print copies are available at nominal cost of ₹150 for individual and ₹ 450 for institutions. Presently, five complimentary copies are provided to the guest editor of special issue and one copy to each author per issue and editorial board members.

Exchange agreements

The exchange policy of the journal helps the journal to improve the quality and content. Moreover, it helps in the publicity of the journal. The journal is right now being exchanged with eight journals, namely, Paradigm, Synergy, University News, Journal of Educational Planning and Administration, Annals of Library and Information Studies, Mangalmay Journal of Management and Technology, Information Studies, and Indian Journal of Information and Library and Society.

Advertising and promotional aspects

To reach a wider audience, it is necessary to market the journal. Several steps have been taken so that the journal reaches the remotest part of the country and abroad. Any new development about DJLIT is now available through LIS Links, one of the prominent professional networking sites on library and information science. The brochure of DJLIT is published every year and is provided to the subscribers on many forums. It is also distributed in major events like trade fairs, conferences, book exhibitions, and so on. The cover page of the journal was also changed in January 2008 issue.

6.3.6 Future Perspectives

The main aim of DJLIT is to publish high quality articles for the benefit of LIS community and students. To meet the standards of the journal contributions are invited from reputed institutes of India and abroad. Letters have been sent to eminent professionals in the field of library and information science to contribute papers for DJLIT. The main hurdle the journal is facing now is the problem of plagiarism which DESIDOC is trying continuously to tackle. The reviewers are extremely busy in their pursuits, but to serve the society there is need for the reviewers to provide thoughtful, fair, constructive, and informative critique of the submitted work in a timely manner on the scholarly merits and scientific value of the work. It is felt that education is required for the authors regarding

writing the papers, copyright policies and open access policies. Also it is highly important for the scholarly publishers to publish and disseminate the knowledge in the most timely and efficient manner. The journal has made sincere efforts towards the enrichment of knowledge in the field of LIS. It enhances readers' understanding and prepares them for embracing current and emerging technologies affecting library and information functions. The credit to bring this publication of international level, entirely goes to the guest editors, editorial team, editorial board, eminent reviewers, authors, and valuable readers, who are continuously supporting in this endeavour.

Check Your Progress

1. When did NISCAIR come into existence?
2. List any two functions of NISCAIR.
3. What is NUCSSI?
4. When was DESIDOC established?
5. What is the main objective of DRDO?
6. Who devised the Impact Factor (IF)?

6.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. The National Institute of Science Communication and Information Resources (NISCAIR) came into existence on 30 September 2002.
2. Two functions of NISCAIR are the following:
   - To provide formal linkages of communication among the scientific community in the form of research journals in different areas of S&T.
   - To disseminate S&T information to general public, particularly school students, to inculcate interest in science among them.
3. NUCSSI is a data repository of a large number of unique journal titles and library holdings belonging to major universities, S&T institutions, R&D units of industries, higher institutes like IISc, IITs and professional institutes spread all over the country.
4. The Defence Scientific Information and Documentation Centre (DESIDOC) started functioning in 1958 as the Scientific Information Bureau (SIB) a division of the Defence Science Laboratory (DSL), which later became Defence Science Centre and is now known as the Laser Science & Technology Centre (LASTEC).
5. The Defence Research and Development Organization (DRDO). This organization is responsible for the development and production of defence equipment and weapons.
6. The impact factor was devised by Eugene Garfield.

6.5 SUMMARY

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- The National Institute of Science Communication and Information Resources (NISCAIR) came into existence on 30 September 2002 with the merger of the National Institute of Science Communication (NISCOM) and Indian National Scientific Documentation Centre (INSDOC).
- INSDOC was also host to the National Science Library and the SAARC Documentation Centre.
- One of the core activities of NISCAIR is to collect, organize and disseminate S&T information generated in India as well as in the world which has relevance to the Indian S&T community.
- Automated libraries are slowly shifting to electronic libraries that will eventually lead to the establishment of digital libraries.
- Computerized databases help in organization of data and its efficient retrieval. NISCAIR has developed expertise in the design and development of databases.
- NISCAIR has set up a herbarium and museum housing economically important raw materials of plant, animal and mineral origin from India at one place, to cater to the needs of scientists, researchers, industrialists, students and the public at large.
- National Union Catalogue of Scientific Serials in India (NUCSSI) is the first indigenous database that serves as an ideal tool to access journal holdings information.
- The DRDO library, which had its beginning in 1948, became a Division of SIB in 1959.
- DESIDOC has been working as an independent organization under DRDO since 1970. Its directorate is situated in Metcalfe house, Delhi.
- As a central information agency under DRDO, the DESIDOC has a vast collection of scientific and technical information obtained through the published and unpublished sources, and by making its use in various ways, it implements this collection of information in many forms.
- In 1987, an in-house Editorial Board (EB) consisting of scientists/officers of DESIDOC was formed to set the tone and direction the publication's editorial policy will take.
- The manuscripts submitted to DJLIT are reviewed for possible publication. The journal follows a double blind system of reviewing. The Editor reviews all submitted manuscripts.
- The DESIDOC Journal of Library and Information Technology is a journal of library and information technology but with time a large number of sub-areas have emerged.

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- A citation can be defined as an extract from or reference to a book, paper, or author, especially in a scholarly work.
- Every journal has a set of policies. A set of policies comprising principles, rules and guidelines formulated or adopted by an organization to reach its long-term goals and typically get it published in a booklet or other form that is widely accessible.
- The exchange policy of the journal helps the journal to improve the quality and content. Moreover, it helps in the publicity of the journal.
- To reach a wider audience, it is necessary that the journal is to be marketed. Several steps have been taken so that the journal reaches the remotest part of the country and abroad.
- The main aim of DJLIT is to publish high quality articles for the benefit of LIS community and students. To meet the standards of the journal contributions are invited from reputed institutes of India and abroad.

6.6 KEY WORDS

- **Scientometrics:** It is the study of the quantitative aspects of the process of science as a communication system.
- **Reprography:** It is the process of reproducing graphics through electrical or mechanical means such as photography or xerography.
- **Citation:** It can be defined as an extract from or reference to a book, paper, or author, especially in a scholarly work.
- **Herbarium:** It is a collection of dried plant specimens usually mounted and systematically arranged for reference.

6.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the main functions of NISCAIR?
2. List the productions of NISCAIR.
3. What is the need and purpose of establishing NISCAIR?
4. Mention the activities of DESIDOC.
5. What are the future perspectives of DJLIT?

Long-Answer Questions

1. Describe the formation of NISCAIR.
2. Discuss the formation of DESIDOC.

3. Explain the functions and objectives of DESIDOC.
4. Analyse the process of automation in editorial and printing process of DJLIT.
5. Examine the salient features of DJLIT.

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UNIT 7 INFORMATION SYSTEMS EXISTING AT THE NATIONAL AND INTERNATIONAL LEVEL

Structure

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7.0 INTRODUCTION

In the previous unit, you studied about the information systems existing at the national level namely, NISCAIR and DESIDOC. This unit will provide detailed discussion on the information systems existing at the international and national level namely, NASSDOC, AGRIS, MEDLARS and INIS.

7.1 OBJECTIVES

After going through this unit, you will be able to:

- Prepare an overview of the functions, library services and publications of NASSDOC
- Discuss the formation of MEDLARS
- Explain the background and development of the AGRIS network
- Analyse India's contribution to AGRIS
- Describe the aims, objectives and subject coverage of INIS

7.2 NASSDOC: AN INTRODUCTION

Recognizing the contribution of social science research in national development, Government of India, initiated several programmes after independence. One such initiative was setting up of the Indian Council of Social Science Research. The Council recognized the following disciplines for supporting social science research in the country: Economics (including commerce), Education, Management (including Business Administration), Political Science (including International Relations), Psychology, Public Administration, and Sociology (including Criminology and Social Work). The Council also supports proposals on social science aspects of the disciplines of Anthropology, Geography, History, Law, Library and Information Services and Linguistics. The Council accorded documentation, bibliographical services and publications, as a priority programme for dissemination of social science information to the researchers in the country and set up the National Social Science Documentation Centre (NASSDOC).

In 1970, ICSSR established a Division, National Social Science Documentation Centre (NASSDOC). The objective of NASSDOC was to give information support service and provide library to researchers and scientist working in different genres such as in social sciences; academic institutions, policy making, planning and research units of government departments, business, industry and autonomous research organizations and various others.

NASSDOC also offers guidance to ICSSR Regional Centre's library and supported Research Institutes of ICSSR. The library helps in overcoming the major challenges of this technology driven world. With the help of digital libraries, WEBOPAC, online databases/e-resources, the access to information has become easier for masses. These online databases have progressed with time in this digitized world of information.

The literature material is being doubled in a decade or less time, in the present times. Human beings, whether literate or illiterate, feel the necessity of having reading material on social sciences, and this demand is always on the rise. The recommendation for setting up a national science documentation centre was first of all made in the library discussions on the research work on social sciences organized under the joint aegis of 'Indian Council of Affairs' and 'Indian School of International Studies.' Keeping in view this aim, the ICSSR was established in 1969. The Social Sciences Documentation Centre was accordingly established in 1970. On 13 January 1986, it was renamed as the 'National Social Sciences Documentation Centre.

7.2.1 Functions of NASSDOC

The following are the functions of this Centre:

- To collect/compile reference material and research material.
- To provide special document catalogues to the researchers on their request at a nominal cost.
- To make available important reading material to the researchers.
- To provide script, basic material and reprography services.
- To provide information related to documentation on the journals published in India on social sciences, to the international documentation institutions.
- To provide help to the social sciences institutions in establishing documentation and information centres.

7.2.2 Library Service of NASSDOC

The library and reference service of NASSDOC is meant for research scholars. The library has a collection of 5000 PhD theses and 3500 research project reports. It also has a reasonably good collection of bibliographic sources and other forms of reference material such as subject encyclopedias, directories, yearbooks, statistical compendium, research surveys, and works on research methodology/

survey design. The collection is augmented by 12000 volumes of back issues of periodicals. NASSDOC has a mandate to preserve old issues of prominent Indian social science periodicals. The theses collection is extensively used by the newly registered doctoral students who want to familiarize themselves with the content and structure of a PhD dissertation. Moreover, as a national body, NASSDOC is also required to maintain a collection of documents that are specifically meant for researchers and normally not available in general purpose academic libraries.

One part of this 'not easily available' sort of document is government reports which fall under the following four categories:

- Administrative reports (or annual statement of working of an agency/ government department)
- Statistical serials/publications
- Commission and committee reports
- Research report

Traditionally, the government publishers thousands of reports every year. There is no bibliographic control over these publications and a majority of them remain confined to government offices. There are diverse practices in different agencies with regard to printing, distribution, and release of these documents and this has generated a genuine demand for bibliographic control and provision for better access to these publications. Users' surveys have revealed that social science researchers particularly those studying development related issues are avid users of these reports. It has been found that there are uncoordinated fragmentary collections of government reports in most of the ICSSR supported 27 research institutions' libraries. The collection of the NASSDOC library is also fragmented. Keeping this in view, the NASSDOC has started a resource sharing initiative among prominent social science libraries. The purpose is to ensure the availability of reports and other forms of grey literature that are frequently requisitioned by the researchers.

The NASSDOC has its own library. This library remains open throughout the year except three days (26 January, 15 August and 2 October). The reading room of the library remains open from 8 a.m. to 6 p.m. This document centre has approximate thirty thousand documents. This library has in its stock theses, research papers and so forth. The following material is found in this library:

(i) **Reference material:** This library stocks dictionary of social sciences, encyclopedia, book list, index and abstracts.

(ii) **Periodicals:** Approximately ten thousand editions of research journals on social sciences are available in the library. The library subscribes 1,800 journals, 25 newspapers on social sciences and 50 general types of journals.

(iii) **Publication of ICSSR:** The publications of the Social Sciences Research Council are available in this library.

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(iv) **Thesis and research reports:** The unpublished Ph.D. for the benefit of the Ph.D. students and other social sciences researchers.

(v) Microform in documents: The following publications are available in the library in the microform:

- Annals of Indian Administration
- Anthropological Society of Bombay Journal
- Bombay Geographical Society Journal
- Economics Working papers
- Gujarat Research Society Journal
- Sociological Abstracts
- Bibliography of Mughal India
- Social Action

(vi) **Inter-Library Centre:** Under this project, this centre has collected the periodicals from more than 38 libraries of Delhi and has kept them at one place.

(vii) **Exchange Programme:** This centre is doing an important work to expand the network of its services. Presently, exchange of approximately 23 journals is being done among approximately 1,000 institutions.

(viii) **Data Bank:** Database document depots were established keeping in view the importance of database for social science research.

(ix) **Documentation Programme:** This type of programme is either conducted by the centre itself or by some special institutions.

7.2.3 Publications of NASSDOC

- Union List of Social Periodical: This list was published in four volumes in 1971-1972 listing the available journals in the libraries of Andhra Pradesh, Mumbai, Delhi and Karnataka. The list published from Delhi is updated from time to time.
- Union Catalogue of Social Sciences Periodical: The work on the compilation of catalogues commenced in 1970 and this work was completed in 1976. Up til now, its 32 volumes have already been published.
- Union Catalogue of Newspaper in Delhi Libraries: This publication contains the catalogue of 252 daily newspapers.
- Directory of Social Sciences Research Institution and Directory of Professional Organization in India.
- Mahatma Gandhi Bibliography: This was later published in Bengali, Hindi, Sanskrit and Urdu Languages.
- Area Studies Bibliography: Its publication started in 1979. The research works of various states have been described under it.

- Language Bibliography: This is published in Gujarati, Hindi, Kannad and Udiya languages. This document contains 6,000 references in Hindi language, 2,000 Gujarati, and 300 in Udiya and Kannad languages.

Social science literature is a vast subject and it includes different types of sources in print and digital mode that are maintained by the libraries and archives. It is not possible for a single library to function as a repository of all literature. Thus, NASSDOC has redefined its role and it is now functioning as a facilitating agency. The primary objective is to provide access to research information through print and electronic sources. NASSDOC has also initiated a project titled Social Science Libraries Network (SSLN) to promote resource sharing among prominent libraries of the country. As a national body, NASSDOC is required to cater to the needs of different groups that constitute social science research community in the country. Apart from university departments, there are NGO's, research institutions and other stakeholders. These groups are diverse in nature in terms of their proficiency in English and regional languages, skill in the use of computers and communications technology and use of research tools and techniques. Keeping this in view, NASSDOC is expected to retain some of its traditional services like bibliography on demand/literature search, document delivery, and study grant. NASSDOC has developed bibliographic tools that include abstracting periodicals, surveys of literature in different subjects, union catalogue of holdings of periodicals and so forth. There is hardly any feedback from the users' group in terms of their utility. Now, there is a need to undertake a study to ascertain literature growth and use pattern in social sciences in India. NASSDOC is playing an important role in providing the social workers with the information, reference, and documentation services and in making available the research material to the researchers.

7.3 MEDICAL LITERATURE ANALYSIS AND RETRIEVAL SYSTEM: MEDLARS

Let us now study about MEDLARS.

7.3.1 Background

The United States National Library of Medicine (NLM) is a part of the National Institutes of Health (NIH), which is located in Bethesda, Maryland. NLM is the biggest medical library across the world. It collects information on health sciences and related areas that includes physics and chemistry. The goal of the library is to collect material and provide information and research services in all areas of biomedicine and healthcare. The NLM has more than 7 million materials, which include journals, technical reports, books, manuscripts, microfilms, images and photographs. The NLM library has the finest medical history collections of old and rare medical works present all over the world. The library provide information support services with the help of reading room facilities, or inter-library loan facilities.

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The National Library of Medicine (NLM) is one of the free, research-based healthcare resources for medicine in the US covering most of the health science libraries.

In 1964, Medical Literature Analysis and Retrieval System (MEDLARS) was established as a computerized storage and retrieval system at the NLM. It helps in providing bibliographic access to the huge collection of biomedical literature at NLM. MEDLARS became functional along with the first computerized issue of Index Medicus. Index Medicus is a monthly subject or author index guide for the articles published by the NLM. This index guide has covered more than 4,000 journals in the past 125 years. The last issue of Index Medicus, Volume 45 was published in December 2004. The information available in the publication of Index Medicus/ is also available in the MEDLINE database. MEDLINE database is one of the major components of PubMed, which is accessible via the World Wide Web. Other databases of MEDLARS provide information on monographs (books), audio-visual materials, and on various specialized subjects such as toxicology, environmental health, and molecular biology. MEDLINE is the National Library of Medicine's bibliographic database, which includes information on medicine, nursing, dentistry, health care system, veterinary medicine, and preclinical sciences. MEDLINE is accessed through the NLM Gateway and PubMed. PubMed is a facility of the National Library of Medicine that contains over 15 million citations for biomedical articles since 1950s. These citations are generally from MEDLINE and other life science journals. PubMed includes links to many other sites that provides full text articles and other related resources. NLM also has a number of databases and other e-resources that can be accessed online. These include TOXLINE, NLM Catalog, Medline Plus, Clinical Trials.gov, DIRLINE, Genetics Home Reference, Meeting Abstracts, HSR Proj, OMIM, HSDB and NCBI Bookshelf.

In 1957, NLM planned the mechanization of the Index Medicus; for manipulating all the information to produce subsidiary products. By 1960, an exhaustive specification was prepared and by 1961 a proposal request was sent to 72 companies for developing the system. This led to the contract with General Electric Company. In March 1963, the computer (a Minneapolis-Honeywell 800) which was to run MEDLARS was delivered to NLM. The cost to develop MEDLARS was $3 million at the time of its completion in 1964. At that time, no other computer with operational electronic storage and retrieval system of its magnitude existed in public. This computer operated from 1964 till January 1975 until MEDLARS II replaced it. Input sources into MEDLARS included biomedical and other health science journals, books, technical reports and so forth.

MEDLARS in the computer readable bibliography database. It is considered as the largest international source for providing international level library information. The literature pertaining to the subjects other than medicine science is also catalogued. This has, thus, proved to be useful to the social workers, political

science specialists, professionals and commercial people, in addition to the specialists of medicine science. It proves to be useful even for a person who is remotely concerned with medicine science and healthcare fields.

Index Medicus is the largest printed international catalogue on the articles of research journals in the field of medicine science and the related fields. Its publication is being done by the National Library of Medicine of USA since 1960. This document titled 'Index Medicus' is available in the libraries.

The On-line searching form of MEDLARS developed in 1966. The On-line was adopted as national service in 1972 in the form of 'Medlie'. To begin with, its field of operation was limited, but after 1977 it expanded its field. Any information on medicinal science can be had through the medium of Index Medicus and MEDLARS as the references are updated. Other catalogues like, Population Index. Index to Dental Literature and International Nursery Index with its other parts Compile, Ioxline, and Swiline are included in it.

7.4 INDIAN MEDLARS CENTRE (IMC)

NIC and ICMR have jointly set up the Indian MEDLARS Centre to cater to the information needs of medical community of India. We all know that Indian contribution in the areas of biomedical research and healthcare has been significant and conforming to international standards. Unfortunately, only a small fraction of it is available for reference through international bibliographic databases. The ICMRNIC Centre for Biomedical Information (Indian MEDLARS Centre or IMC) has developed a bibliographic database of peer reviewed Indian biomedical literature. This database covers prominent Indian journals, which are selected from more than 200 journals. Over the time, more journals will be added with quality to the list. It is proposed to cover the journals from 1985 onwards in this database.

7.4.1 IndMED

This database covers prominent peer reviewed Indian biomedical journals. It is designed to provide medical professionals/researchers/students and the medical library professionals a quick and an easy access to Indian literature covering biomedical field. This database is covering prominent peer reviewed Indian biomedical journals. It is designed to provide medical professionals/researchers/students and the medical library professionals quick and easy access to Indian literature covering biomedical field.

7.4.2 Medline Search

Under this, you get four citations. Out of the four titles of the journals under Index Medicus, three citations become clear. The fourth citation can be classified through the International Nursery Index on-line search. The material of 3,000 journals on biomedical and related fields is catalogued under it.

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7.4.3 Input

Under this catalogue, the literary list of the reviews of medical science are given according to the subject and the writer. The January number contains cataloguing language, which is called the Medical Subject Heading. In addition, it contains list of the journals, the articles of which are included in the catalogues. A dictionary of cataloguing words has been prepared which contains 8,100 entries on cataloguing which are revised every year. One-third of the journals are fully catalogued. Each article is accorded 12 Subject headings on an average. Some of the journals are catalogued in an intensive way. There is difference in the number of subject headings pertaining to machine readable and the printed forms. Four or five subject headings are mentioned in the Index Medicus. The remaining articles are stored in the computer, which can be accessed through MEDLARS or MEDLINE.

It takes only 15 minutes to catalogue any article. Its inspection and editing is also carried out and it can be published like the conventional catalogues.

7.4.4 Output

Material is edited online. The mechanization process starts here. Two magnetic tapes are prepared from the documents every month. The cataloguing analysis of these journals results in:

- Printing copies of Index Medicus
- Preparation of Magnetic tapes

Both type of material is useful for the dissemination of information to the scientists. To prepare this product in various forms, the following techniques are also used:

- Typesetting is a complicated process, however, off-set plate is prepared with the help of a computer and pages are, thereafter, printed.
- Computer produced microfilm is a microfilm of the computer tape which can be used by the readers. This can be recharged with the help of offset plate and can be made capable to take out prints.

7.4.5 Printout

Using computers one can come across an additional source of citations. A careful search by the users can make available copies of citations and abstracts.

MEDLINE is mostly used in all type of databases because its facilities and advantages are more with respect to the other machine-readable journals.

7.4.6 Document Delivery

MEDLARS does not undertake the delivery of document, it provides description of the citation references of documents. This work is done by the National Medical Library through exchange.

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7.5 INTERNATIONAL INFORMATION SYSTEM FOR AGRICULTURAL SCIENCE AND TECHNOLOGY (AGRIS)

In 1974, the Food and Agriculture Organization (FAO) of the United Nations started, AGRIS, the International Information System for the Agricultural Sciences and Technology. AGRIS became fully operational in 1975 with the first issue of AGRINDEX and was modelled on the INIS pattern to facilitate information exchange and to bring together the world literature dealing with all aspects of agriculture. Presently, FAO is another programme, Current Agricultural Research Information System (CARIS) and AGRIS are functioning collectively.

AGRIS is a cooperative system in which participating member countries add references to the literature produced within their country irrespective of the language. In exchange, they draw on the information provided by the other participants. To date, 242 national, international and intergovernmental centres have participated in the AGRIS/ CARIS programme. AGRIS was established with the following objectives:

- Creation of a single, comprehensive, current inventory of worldwide agricultural literature reflecting agricultural research results, food production, rural development and to help users to identify problems concerning all aspects of world food supply.
- Meeting the information requirements of users requiring agricultural information by offering specialized subject retrieval services, providing documents on request, current awareness and selective dissemination of information services.
- Collaborating with new and existing specialized secondary information services so as to increase efficiency and eliminate unnecessary duplication.

7.5.1 Background and Development of the AGRIS Network

AGRIS has been operational since 1975. Its main aim is "to build an information system in the field of agriculture science and technology and related subjects". It is a system of collaborative network of agricultural institutions of the world. The basic principles on which AGRIS was established as an agricultural network are the following:

- AGRIS is an international/global system that is entirely international in scope as all United Nations Member Countries are participating in the programme.
- Multilingual with English as a carrier language.
- A centralized collection of bibliographic details of publications, outputs and activities of agricultural research programmes of various United Nations Member States.

- Special emphasis is on non-conventional (grey) literature in Member States; a global system which is participatory as it is based on a designated national AGRIS Input Centre in each United Nations Member State and other related agricultural international organizations.
- An information system supported by Food and Agricultural Organization FAO) which has complete coordination with regard to application of tools and methodologies, data processing, training, and other technical back-up activities.
- A system where all UN Member States have common ownership of agricultural data along with facility of easy access to the collective information base maintained at the AGRIS headquarters.

The subject areas of AGRIS include various aspects of agriculture, including forestry, food, environment, animal sciences, aquatic sciences and fisheries, human nutrition and all other aspects related to agricultural sciences from participating countries all over the world. AGRIS centres input information from periodical literature, monographs, reports, patents, standards, on standardized data input formats. The covered literature also includes unique material such as unpublished scientific and technical reports, theses, conference papers, government publications and more.

Approximately 1,30,000 records are added each year with keywords in English, French and Spanish. The centralized processing is then done at the AGRIS Coordinating Centre in Rome. The AGRIS information system has until date 242 participating centres located in various United Nations Member States. Each AGRIS National Centre acts as a focal point in the concerned country or region not only for executing the documentation of scientific and technical literature, but also for the development of agricultural information management.

In the last three decades, AGRIS has been quite successful in achieving its initially stated goals, but there have been some problems faced by the participating centres, which at times hamper the overall progress of the network. Some of these problems are:

- **Access to the original documents**

All AGRIS records comprise bibliographic reference. The abstract is usually available for only about 30 percent of AGRIS records. The access to the full-text of the documents, however, is only possible through document delivery (for example, by post or fax). Therefore, most developing countries have not been able to offer this service properly and this leads to many problems.

- **Incomplete coverage**

In the last few years, a review of the input statistics of literature received from Asia/ Pacific region, Africa and Latin American/Caribbean regions to the central AGRIS database shows slight decline in the number of records input to the

database. This has been in contrast to the statistics gathered from other sources that show a fast upward trend of global production of documentation and other outputs related to agricultural development and food security, which too is a cause for alarm.

• Agriculture related systems other than AGRIS

As per the chief objective of AGRIS, its database receives all inputs from the United Nations Member States only. However, many national bibliographic databases, and even collections of electronic full-text documents pertinent to the scope of AGRIS, exist outside the framework of AGRIS, and, thus, are involved with FAO.

• Lack of structural and institutional linkages

The overall setup lacks network linkages due to structural and institutional barriers. Thus, the existing AGRIS system lacks proper coverage due to its centres not being linked in any significant way to the wider community of organizations and programmes working in food security or rural development. Since its inception, the chief objective of AGRIS has been capacity building, improving access and exchange of information in the area of agricultural science and technology. Besides this, the system also aims to review the present day available technologies and user requirements for the future of development of the AGRIS. Presently, the strengthening of the AGRIS initiative has gone far beyond the creation and development of bibliographical databases. The focus has always been to improve accessibility of science and technology information to facilitate agricultural development and food security.

AGRIS plays a vital role in highlighting the need and importance of agriculture and information related to agricultural activities in the developing and developed countries thereby indicating that agriculture can be a central part of the developments in these nations. Although this effort is entirely based on the awareness and goodwill of the international community, AGRIS can lead to improving electronic publishing of documentation in agricultural science and technology, linking information about institutions, scientists and researchers, and activities, without too much effort and, thus, leading to a collaborative framework. Keeping the above points in view, the AGRIS has revised its principles in collaboration with the Member Countries for the AGRIS network to achieve its objective in the near future. The revised principles take into account the aspects related to adopting a decentralized approach, with more emphasis on national partnerships, improved linkages, capacity building, making available full-text of documents in the field of agriculture science and technology, web-enabled methodologies and tools and need for establishment of standards.

7.5.2 AGRIS Network and AGRIS Resource Centres

Efforts are on to improve the activities of AGRIS Resource Centres and, thus, improve the capabilities of the AGRIS Network. With this in view, a high-level

committee was set up in June 2000, which recommended that AGRIS Input Centres be renamed as AGRIS Resource Centres in order to reflect their revised role. These centres just like the input centres are recommended to be located in various national, regional or international organizations. The Resource Centres are expected to play a key role in capacity building with focus on national and regional partnership. The international network on the other hand would lead to exchange of agricultural information and knowledge with help of the modern available tools and technologies.

Some of the functions that are essential for the AGRIS Resource Centres are the following:

- Adoption and implementation of standards for cataloguing and indexing agricultural information, especially the categorizations schemes, thesauri and the development of standard exchange formats
- Collection, recording and organization of non-conventional and conventional scientific and technical literature relevant to AGRIS which is produced in the region; creation of digital repositories for literature and other types of related scientific and technical information produced in their area, in consultation with FAO
- Maximum use of Internet-based tools for data processing and dissemination
- Other areas where efforts have been made include:
  - o FAO and AGRIS information centre/website
  - o Access improvisation on documentation related to Science and Technology
  - o Strengthening and establishment of standards
  - o The Central AGRIS website/database
  - o Deployment of new methods and WebAGRIS tools

7.5.3 Information Activities

The information collected from various input centres from all over the world is processed by AGRIS and is available to users in the form of various current and ongoing agricultural information projects in both AGRIS and CARIS. Some of these are as follows:

7.5.4 WebAGRIS

It covers the current and ongoing agricultural information projects in AGRIS and CARIS and is considered as networking for AGRIS in the future. The target users are those that require information related to all areas of agricultural and rural development.

7.5.5 AGRIS AP

AGRIS Application Profile (AP) gives the Guidelines for Description of Information Objects for the International Information System on Agricultural Sciences and

Technology. This document contains specifications about the metadata that should be exchanged and disseminated through the AGRIS system.

7.5.6 Electronic Discussion Forum

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This is the discussion group workspace for the exchange of ideas on using the AGRIS AP, WebAGRIS. The ideal target audience consists of coordinators and facilitators of established or incipient communities, as well as groups of individuals with shared interests in agricultural and rural development.

7.5.7 AGROVOC

AGROVOC is the multilingual international agricultural thesaurus. The terms in this dictionary are available in English, French, and Spanish. Each key term included in the AGROVOC is either a descriptor or a non-descriptor. AGROVOC is also available online, where it is referred to as AGROVOC Online.

AGRIS Information Products

Some of the AGRIS Information Products include:

(a) AGRIS and CARIS on CD: This includes the bibliographic references, CARIS Project Data, the AGROVOC Thesaurus, and the FAO Catalogue.

(b) AGRIS Manuals: Several manuals of AGRIS are available for immediate downloading for use by the resource centres.

(c) AGRIS and CARIS: It is a FTP site, which makes available AGRIS and CARIS data.

(d) FAO Documentation: All the Food and Agricultural Organization documents starting from 1980 to 2000 are available with complete text from the document repository of AGRIS.

AGRIS categorization schemes

These are categorization schemes for information in the areas of agriculture, nutrition, forestry, and fisheries. The categorization schemes available from AGRIS are the following:

- AGRIS/CARIS Subject Categories, which is a list of 17 AGRIS/CARIS Subject Categories.
- Countries Codes, which is a list of member country codes
- Language Codes, which is a list of language codes
- AGRIS/CARIS Categorization Scheme

7.5.8 Services in India

India has been actively participating in AGRIS from the very beginning of its inception. The participating AGRIS/CARIS institution from India is the Agricultural Research Information Centre. On an average, 3500 bibliographic entries are submitted to AGRIS database as Indian input every year.

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The Agricultural Research Information Centre, every month, receives from FAO updated machine-readable AGRIS outputs. Retrieval is then provided to agricultural scientists requiring information in the country. A computerized SDI service is also made available to agricultural researchers of India.

This institution was established by the Food and Agricultural Organization (FAO) for the exchange and dissemination of the information related to science and technology.

7.5.9 Features

The following are the features of AGRIS:

- It is an international cooperative system.
- It is a computerized information storage and retrieval system.
- Selection and compilation of the information to be included in this system is done at the local level by the national and regional input centres.
- Adequate terminology has been used for subject indexing.
- Latest techniques of information science have been used for the maintenance and management of information in this system.
- The services like CAS and SDI are provided by this system.
- This system keeps organizing training programmes from time to time.

7.5.10 Need

Though, there was a boom in the publication of literature related to agriculture and technology, it was not possible to provide timely information to all the scientists. It was, therefore, felt that a system should be established at the international level to facilitate publicity and dissemination and exchange of information.

Keeping in view the important role played by the scientific and technology information in the agricultural research and development, the Director General of the FAO constituted a team of specialists in 1969. This team, after due deliberations, advised in 1970 to establish an international level, agricultural science and technological information system.

This system can be divided in two parts, based on their activities:

- AGRIS Level-I
- AGRIS Level-II

1. AGRIS Level – I

It became fully functional in 1975. In this centre, established under the cooperation of FAO, various governments, and institutions, detailed and comprehensive catalogue is formed on the bibliographic information related to science and technology. For this purpose, the relevant reading material published in various

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countries and regions is collected and selected by the national or regional centres, which is then classified and catalogued in the standard version.

At present, this system is being provided regular inputs through 128 national centres and 17 international centres. These inputs can be sent in the form of magnetic tapes, punched cards, optical identification cards, inputs cards, or floppy disk and so forth. The following information is provided by AGRIS Level I:

(i) **AGRINDEX:** It is a monthly index journal. In it approximately 11,000 references are included, which are selected from more than 7,000 periodicals and other publications of 50 languages. The entries are classified in 17 main subject headings. The entries are arranged based on numerical code provided according to geographical area and matter.

(ii) **AGRIS on magnetic tape:** Its base material is received in the form of readable magnetic tape. The information printed on it is like the reflection of AGRINDEX. The information on these tapes is written as per ISO-2709, which can be processed through a computer.

(iii) **AGRIS online services:** The AGRIS base material can now be accessed in remote places and its services can be obtained. Presently, this service is available on the following host computers, which can be accessed through telex, telephone and packet, and the switching network, and the stored information can be obtained.

- o International Atomic Energy Agency, Vienna
- o Dutch Medicine Documentation and Institute, Germany
- o Dialogue, America

(iv) **AGRIS on CD-ROM:** The problems can be easily solved with the development of laser technology and fiber optical. Under this technology, a CD-ROM has been formed which resembles any audio CD. A vast collection of information can be stored in it. In this CD of 12 cm diameter, 50-60 crore bits of information can be stored. This disk is known as 'CD-ROM – Compact Disc-Read Only Memory.

2. AGRIS Level – II

The team of specialists in their recommendations given to the Director General of the FAO had suggested to activate AGRIS at two levels, so that the information requirements of the users could be met more efficiently. According to them, Level-I was to provide knowledge on the current researches and Level-II was to provide knowledge on the current researches and the Level-II was to provide special information services and it was proposed to be a coordinated system of special information services, information centres, information analysis centres and basic material inventory.

To activate AGRIS Level-II, the subjects like Veterinary Science, Foresting and Tropical Agriculture were selected and various study groups were constituted.

The other organizations outside the jurisdiction of FAO helped in the formation of special information analysis centres, which are providing information services, which were envisaged for Level-II, viz, micro level subjects like, crops – wheat, paddy, or special aspects like, irrigation and so forth. These centres have been formed with the help of the International Development Research Centre, Canada, and Consultative Group on International Agriculture Research, America, and these have been established in the national and international research centre where the research work is already conducted on the related fields.

The following special information centres functional in the various parts of the world are good examples:

- Essaka Information Centre, Columbia
- Tropical Grain Legume Information Centre, Nigeria
- International Irrigation Information Centre, Israel
- Coconut Information Centre, Srilanka
- International Buffalo Information Centre, Thailand
- Semi-Arid Tropical Crops information Centre, India

These centres are successfully working and are efficiently fulfilling the information requirements of the developing countries.

7.5.11 India's Contribution to AGRIS

The Ministry of Agriculture of India had decided in 1974 to give its full support to this system by being its active member. To fulfill this, the Agriculture Research Information Centre under the Indian Council of Agriculture Research has been giving its inputs to AGRIS since 1975 on the published material related to agricultural science and techniques. By the end of 1984, this centre had already sent its inputs to AGRIS on approximately 30,000 references. This centre sends approximately 350 references every year. Studies reveal that India's contribution on the basic material to AGRIS ranges from three to 4 per cent.

7.6 INTERNATIONAL NUCLEAR INFORMATION SYSTEM (INIS)

INIS stands for International Nuclear Information System. INIS is sponsored by the International Atomic Energy Agency (IAEA), Vienna that started functioning in 1970 with 132 members. It is a cooperative and computerized abstracting and indexing system which provides worldwide coverage of the literature on the peaceful uses of nuclear energy. It processes and merges the input provided and redistributes the information in machine-readable form and in print form.

INIS processes most of the world's scientific and technical literature that comes under the scope of its subject. INIS maintains a bibliographic

database that presently covers over 2.5 million abstracted, indexed records and a comprehensive collection of over 600,000 of full-texts that are not easily available through the commercial channels. This makes it the world's most comprehensive and leading information source on the peaceful applications of nuclear science and technology.

The advent of computer as a major tool in information processing and possibility of creating machine-readable databases, have now opened up new opportunities for the development of international information systems. In these systems, there is one system named International Nuclear Information System (INIS), which has shown the way for embarking upon other similar systems such as AGRIS, DEVSIS, SPINES and so forth. INIS is a mission oriented information system covering more or less the entire field of nuclear science. INIS started its functioning in 1970, sponsoring by IAEA, Vienna. INIS is one of the practical examples of how international cooperation in the development of computer based information system can be achieved.

7.6.1 Aims and Objectives

INIS has its objective of achieving maximum economy in time, money and efforts and avoiding duplication in handling nuclear science literature. The main purpose of establishing INIS was to assist IAEA in fostering the exchange of scientific and technical information on peaceful uses of atomic energy; to encourage the exchange and training of scientists and experts in the field of atomic energy; and to cater to the information needs of the developing countries.

7.6.2 Organization

INIS is now a large decentralized, non-commercial information network consisting of 87 countries and 17 international and inter-governmental organizations. The organization of INIS consists of the three levels.

(i) The first level is the INIS Centre or Secretariat of Agency.

(ii) The second level is represented by the National and International INIS Centre Organization.

(iii) The third level comprises the individual or local users of INIS.

17.6.3 Subject Scope

INIS subject coverage has been developed keeping in view the information needs of the international user community for whom the interests and activities of the International Atomic Energy Agency are relevant especially with regard to peaceful applications of nuclear science and technology. The chief subject areas are nuclear reactors, reactor safety, nuclear fusion, applications of radiation and radioisotopes in medicine, agriculture, and industry and pest control. Besides the above, some related fields are nuclear chemistry, nuclear physics and materials science.

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7.6.4 Literature Coverage

The literature coverage by the INIS Database includes bibliographic citations and abstracts from relevant scholarly journal articles, R & D reports, papers presented in seminars and conferences, books, patents, theses, laws, regulations and standards. Besides these, the INIS inputting centres located all over the world regularly scan over 2,400 periodicals for articles relevant to the nuclear science field. An important feature of the INIS is the very fact that most of the abstracts of INIS records are in English as a carrier language. This is what has made INIS so popular internationally. Additionally, the INIS Database also contains bibliographic references to various literature types that include journal articles, books, reports, patents and others. INIS Database can be accessed by individual users and institutions of the Member States of INIS and the other cooperating institutions of INIS.

7.6.5 Input Processing

For processing the input to the INIS database, the following procedure is followed:

- Literature of each INIS member state collected by a designated national inputting centre that submits input to the INIS Secretariat in pre-prepared machine-readable form usually through e-mail or on diskette or magnetic media. The standardized format in which inputs are to be submitted conforms to the guidelines as provided by the INIS reference Series.
- Almost all the inputting centres send data though the 'FIBRE' (Friendly Inputting of Bibliographic Records), which is a PC based input preparation package especially designed for the purpose by INIS. FIBRE is a tool that not only helps the INIS Centres to streamline their input preparation but also ensures data of higher quality and consistency thereby reducing the costs through lower correction efforts and results in improving the processing time.
- After the input reaches the INIS Secretariat, bibliographic description of records is processed thoroughly by checking programmes in order to identify the errors and omissions, which are corrected by specialists employed by the INIS Secretariat. The input is then converted with the help of computer programmes into an internal working format and is made ready for final processing.
- Prior to final processing, the inputs are checked for the indexing and abstracting of records, which are subjected to a continuing quality control, based on an Expert System. For this, the system identifies records with a high probability of error for scrutiny by subject specialists of the INIS Secretariat. Lastly, towards the end of each processing cycle, a final consolidated output file is created which becomes the input to further programmes that firstly create the INIS output files in the INIS exchange

format (ISO-2709) and eventually create the INIS Database for online and CD-ROM retrieval.

Besides the procedure discussed above, an important activity carried out at the INIS Secretariat is the processing of Non-Conventional Literature (NCL) submitted by the INIS members. Here, the full-text of such literature is received in electronic form or hard copy and is then processed for distribution in the form of microfiche, CDROMs or electronic mail.

7.6.6 INIS Products and Services

INIS makes available different products and services which are available to the end users in various INIS member countries. These vary from country to country and in each country, it is the responsibility of the designated National Liaison Officer to make available detailed information about available INIS products and services in that particular country. The various products and services of INIS include the INIS Database and INIS Non-Conventional Literature. Let us know some details of the available products and services of INIS.

7.6.7 INIS Database

The INIS database is one of the leading information sources for worldwide-published scientific literature on the peaceful applications of nuclear science and technology and other related fields. It is available from the year 1970 till the present. In the database, over 2.5 million scientific and technical bibliographic references have been indexed and abstracted in English as the carrier language and all this is according to the agreed rules and standards. The INIS Database also includes the economic and environmental aspects of all non-nuclear energy sources published since 1992. The database not only contains validated and high quality references but also has comprehensive international coverage.

7.6.8 INIS Non-Conventional Literature (NCL)

Easy access to the full-text of the non-conventional literature has remained one of the key features of INIS all these years. It is a well-known fact that the literature represented in the INIS Database belongs to two chief categories, that is, conventional and non-conventional. The conventional literature is commercially available through normal distribution channels, such as books and journals. On the other hand, the non-conventional literature includes the scientific and technical reports, patent documents, conference papers and theses, which are usually not readily available through commercial channels.

7.6.9 Reference Series

INIS Reference Series tells us the rules, standards, formats, codes and authority lists on which the International Nuclear Information System is based. The various reference series are in the form of manuals, which are being published since 1969 and are an essential tool for users of the system, which includes cataloguers, indexers,

abstractors or searchers. These reference manuals are being revised all the time on continuing basis and are available for purchase worldwide.

7.6.10 INIS Web Services

NOTES

The INIS web services include maintenance of links to websites on the Internet in various fields of interest ranging from nuclear science and technology subject to any other work related to the IAEA. Besides these, INIS also offers subject access to the contents of the IAEA website and the sites of various related international and multinational organizations in the field of nuclear science and technology.

7.6.11 Marketing and Promotion

INIS is carrying out extensive marketing and promotion of its products and services, which is handled by the INIS Secretariat in Vienna and the individual member states in the respective countries. At the IAEA Secretariat, the INIS marketing and promotion activities are carried out with the help of online/ CD-ROM demonstrations, by advertisements, by publishing articles in professional journals and by distribution of material, demo CDs, video films and other promotional tools. INIS member states, on the other hand, are assigned the responsibility for establishing and carrying out promotional activities in the area or regions under their domain in order to make aware the INIS potential to the users desiring information and information services in the field of nuclear science and technology. For this, they are assisted by the INIS Secretariat, which assists by providing general promotional and informational materials about INIS and its databases.

7.6.12 Training

A range of training activities provided by INIS meet a number of objectives that include establishment and improvement of a national information infrastructure, transfer of modern information technology, enabling exchange of scientific and technical information, assurance of high quality and coverage of the INIS Database and facilitation of maximum utilization of INIS output products.

7.6.13 Alert Services

Based on the INIS products, alert services are provided usually in the form of SDI services to the users requiring current information in the field of nuclear science and technology. These services are mostly available through the National INIS Liaison- Officer of the individual INIS member states. Here the alert services are in the form of individual searches, which are performed against individual subject interest profiles of the users.

7.6.14 Document Delivery Service

For providing the document delivery services, INIS has arranged with several INIS national centres, which make available full-texts of INIS non-conventional

literature to users in the individual INIS member state. This service, however, is limited only to the users of the particular INIS member state. For requests received from countries where no such facility is available, service is available by referring to the Knowledge Preservation Group of INIS.

7.6.15 Services in India

From the very beginning, India has been actively associated with INIS (International Nuclear Information System). In India, Library and Information Services Division of BARC (Bhabha Atomic Research Centre) is the National Centre for INIS activities. This centre collects information on the subject and then sends it to the Centre Processing Unit and passes the output to the users. The INIS database can be accessed online through the Internet and CDs, which are distributed by IAEA. The non-conventional literature of INIS is available in the form of CDs and microforms.

Besides the above products, each member state offers a host of individualized services based on the INIS products received from the INIS Secretariat. Details of the exact availability of INIS related services in the particular country are available from the National INIS Liaison Officer.

7.6.16 Salient Features

The salient features of INIS are the following:

- International Information Retrieval (IR) system
- Cooperative venture communication with participants
- Maximum decentralization and minimum centralization
- Adherence to standards and rules
- Computer based systems
- A document retrieval system
- Use of thesaurus for subject indexing
- Indexing and abstracting service with a high quality input
- A dynamic and flexing system
- Machine readable information service and
- A mission oriented system

Some other services provided by INIS

INIS provides the following services to the users of nuclear science.

Document Delivery Service: This service is of particular usefulness to developing countries who have special difficulties in obtaining copies of the full text of documents reported in INIS Atomindx. INIS provides them by an agency to all member states. For this, all hard copies of the non-conventional literature are micro filmed by the photographic unit of INIS.

NOTES

Document Retrieval Service: The national centre of INIS has its own system of information dissemination based on the INIS output. These centres provide various types of information services, two most common are:

(i) Selective Dissemination of information

(ii) Retrospective Search Service and CAS

Online Service: Since 1980 the INIS online service, like magnetic tape service is available only to the member states participating in INIS. More than 880,000 items have been included in the INIS database. This database is available for online searching on the computer centre at the IAEA headquarters. The connection to the INIS database in Vienna can be either through telephone or telex. Alternatively, through networks such as Tymnet.

Thesaurus for Subject headings: INIS subject indexing is controlled by the INIS thesaurus. INIS thesaurus is a dynamic entity and a number of new terms have been added, deleted or changed with time, experience and literary warrant. The entire thesaurus is maintained in machine readable form at INIS headquarters. The thesaurus serves as an important tool in indexing and comprises nuclear physics and reactor technology in great depth.

Indian Participation: India is the first country to join INIS and has been participating in its activities ever since its inception. The Library and Information Service Division of Bhabha Atomic Research Centre (BARC), Bombay is the national centre responsible for INIS activities in India. Due to participation in INIS, the Indian scientists have no longer any problem in having access to nuclear science literature of the world.

Check Your Progress

1. What was the main objective of NASSDOC?
2. List the publications of NASSDOC.
3. In which year was MEDLARS established?
4. What are the subject areas of AGRIS?
5. State the salient features of AGRIS.
6. What was the main purpose of establishing INIS?

7.7 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. The main objective of NASSDOC was to give information support service and provide library to researchers and scientist working in different genres such as in social sciences; academic institutions, policy making, planning

and research units of government departments, business, industry and autonomous research organizations and various others.

2. The publications of NASSDOC are the following:
   - Union List of Social Periodical
   - Union Catalogue of Social Sciences Periodical
   - Union Catalogue of Newspaper in Delhi Libraries
   - Directory of Social Sciences Research Institution and Directory of Professional Organization in India
3. In 1964, Medical Literature Analysis and Retrieval System (MEDLARS) was established as a computerized storage and retrieval system at the NLM.
4. The subject areas of AGRIS include various aspects of agriculture, including forestry, food, environment, animal sciences, aquatic sciences and fisheries, human nutrition and all other aspects related to agricultural sciences from participating countries all over the world.
5. The salient features of AGRIS are the following:
   - It is an international cooperative system.
   - It is a computerized information storage and retrieval system.
   - Selection and compilation of the information to be included in this system is done at the local level by the national and regional input centres.
   - Adequate terminology has been used for subject indexing.
6. The main purpose of establishing INIS was to assist IAEA in fostering the exchange of scientific and technical information on peaceful uses of atomic energy; to encourage the exchange and training of scientists and experts in the field of atomic energy; and to cater to the information needs of the developing countries.

7.8 SUMMARY

- Recognizing the contribution of social science research in national development, Government of India, initiated several programmes after independence. One such initiative was setting up of the Indian Council of Social Science Research.
- In 1970, ICSSR established a Division, National Social Science Documentation Centre (NASSDOC).
- The library and reference service of NASSDOC is meant for research scholars. The library has a collection of 5000 PhD theses and 3500 research project reports.

NOTES

- The United States National Library of Medicine (NLM) is a part of the National Institutes of Health (NIH), which is located in Bethesda, Maryland. NLM is the biggest medical library across the world.
- In 1964, Medical Literature Analysis and Retrieval System (MEDLARS) was established as a computerized storage and retrieval system at the NLM. It helps in providing bibliographic access to the huge collection of biomedical literature at NLM.
- In 1957, NLM planned the mechanization of the Index Medicus; for manipulating all the information to produce subsidiary products.
- Index Medicus is the largest printed international catalogue on the articles of research journals in the field of medicine science and the related fields.
- NIC and ICMR have jointly set up the Indian MEDLARS Centre to cater to the information needs of medical community of India.
- In 1974, the Food and Agriculture Organization (FAO) of the United Nations started, AGRIS, the International Information System for the Agricultural Sciences and Technology.
- AGROVOC is the multilingual international agricultural thesaurus. The terms are in English, French and Spanish. Each key term included in the AGROVOC is either a descriptor or a non-descriptor.
- INIS stands for International Nuclear Information System. INIS is sponsored by the International Atomic Energy Agency (IAEA), Vienna that started functioning in 1970 with 132 members.
- INIS is a mission oriented information system covering more or less the entire field of nuclear science. INIS started its functioning in 1970, sponsoring by IAEA, Vienna.
- INIS is now a large decentralized, non-commercial information network consisting of 87 countries and 17 international and inter-governmental organizations.
- The INIS web services include maintenance of links to websites on the Internet in various fields of interest ranging from nuclear science and technology subject to any other work related to the IAEA.

7.9 KEY WORDS

- **Anthropology:** It is the study of people, past and present, with an emphasis on understanding the human condition both culturally and biologically.
- **Telex:** It was a major method of sending written messages electronically between business groups in the post-World War II period.

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- **Fiber optical:** It refers to the technology and medium used in the transmission of data as pulses of light through a strand or fiber medium made of glass or plastic.
- **Tymnet:** It was an international data communications network headquartered in San Jose, California that used virtual call packet switched technology and X.25, SNA/SDLC, ASCII and BSC interfaces to connect host computers (servers) at thousands of large companies, educational institutions, and government agencies.
- **Microfiche:** It is a subtype of microform, a term used to describe several mediums that provide storage for exact, miniaturized copies of documents.

7.10 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. Briefly mention the library service of NASSDOC.
2. Write short notes on the following:
   (a) IndMED (b) IMC (c) WebAGRIS
3. What is AGROVOC?
4. List the features of AGRIS.
5. What are the aims and objectives of INIS?

Long-Answer Questions

1. Discuss the establishment of MEDLARS.
2. What are the problems faced in the smooth functioning of AGRIS?
3. Analyse India's contribution to AGRIS.
4. Explain the services provided by INIS to the users of nuclear science.
5. Examine the significance features of MEDLARS.
6. Explain the procedure for processing the input to the INIS database.

7.11 FURTHER READINGS

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NOTES

BLOCK - IV

INFORMATION SERVICES

UNIT 8 INTRODUCTION TO INFORMATION SERVICES

Structure

8.0 INTRODUCTION

In the previous unit, you studied about the information systems existing at the national and international level namely, NASSDOC, AGRIS, MEDLARS and INIS. In this unit, you will study about the important applications of the Internet such as World Wide Web, URL, HTTP and MIME, HTML and XML and finally the definition, need and types of reference service.

8.1 OBJECTIVES

After going through this unit, you will be able to:

- Discuss the various information services available on the Internet
- Define reference service
- State the need of reference service
- Explain the types of reference services provided by libraries

8.2 INFORMATION SERVICES

NOTES

The following are the significant applications of the Internet:

1. WWW

The World Wide Web, also known as Web or www or W3, has established itself as the most popular feature of the Internet. It is an incredible source of information. Once you start searching, you can find anything ranging from documents to pictures to software; it almost appears limitless. It provides you with documents, sound files, images, animation, and videos, ability to speak and hear voice, and view programs that run on practically any software in the world. Therefore, it facilitates the rich and diverse communication by enabling you to access and interact with text, graphics, animation, photos, audio, and video. It is very simple to understand how the Web works and what it is. Its implementation is based on client-server system, which employs your personal computer as client, Web browser software as a connection to an Internet service provider, and servers, routers and switches to direct the flow of information.

A browser is a software, which your computer uses to view www documents and access the Internet. The browser program residing in your computer offers the advantages of text formatting, hypertext links, images, sounds, motion, and other features. Internet Explorer and Netscape are some of the widely used browsers. Browsers have sub programs called plug-ins to handle the documents you find on the Web. It may also have other plug-ins stored elsewhere in your computer.

Web is very simple to use. Whenever you wish to visit any website, for example, your institute's Website, simply enter the address or URL of the Website in your Web browser to forward your request to the Web server of the institute to provide you with the intended Web page. The institute's Web server then sends your request on the Internet to find the intended website. Once it is obtained, the Web server returns the same to your computer, where the browser loaded with different plug-ins interprets the data and then displays it on your computer screen. The intended web page, which is now available on your desktop, may have links. On clicking the same, you may visit other pages. In this manner, the information scattered across the globe are linked together.

It now becomes essential to explain as to how the different web pages with different text format and standards could be linked to a particular web page. The binding forces that hold the Web together are the hypertext and the hyperlinks. The hyperlink allows electronic files on the Web to be linked so that you can jump easily between them using hypertext protocol. As you have learnt that Web browsers enable you to access the Web and also distinguish between Web pages and other types of data on the Internet because Web pages are written in a computer language called Hypertext Mark-Up Language or HTML.

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2. URL

Uniform Resource Locator (URL) is a pointer that avails specified resources across the net. The resource simply means information containing files or directories. It is referenced with query to available databases via search engines, such as Google or Yahoo. An example of URL, which appears on the address bar is as follows:

http://aaa.bbb.edu/flower.html

The http is used as protocol, where information resides on domain named as aaa.bbb.edu. The information that resides on host machine is taken as flower.html. The host machine can be protocol dependent or host dependent. Component of URL is known as path component. URL is sometimes specified as 'port'. Port means it is a port number by which TCP connection is possible to the remote host machine. The default port for protocol is used if port is not specified. For example, port 80 is known as default port for HTTP. The two ports, port 20 and port 21 are used by ftp. The alternative port that can be used is as follows:

http://aaa.bbb.edu:80/ flower.html

That is why URL represents the full specification of a page.

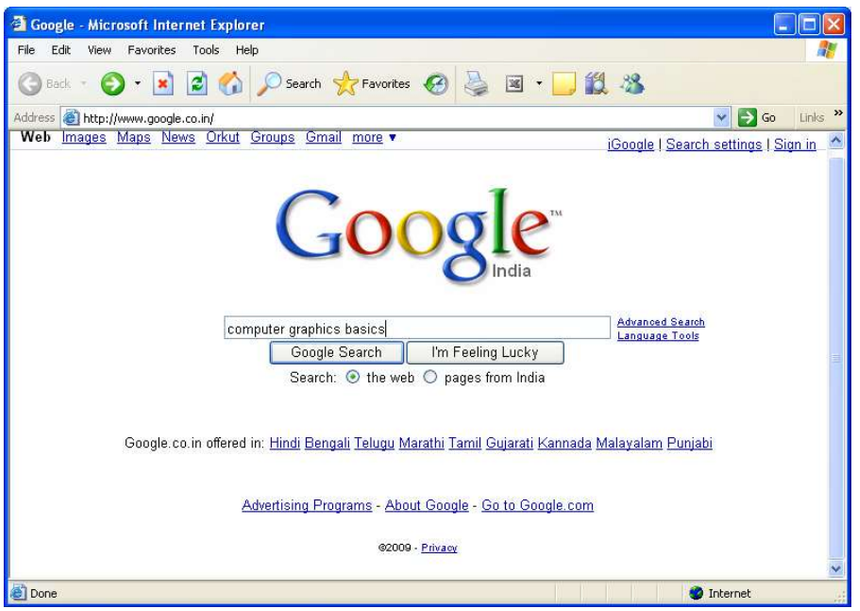
URL Encoding

Table 8.1 shows some specific symbols and characters used by URL. These are, in fact, URL encoding.

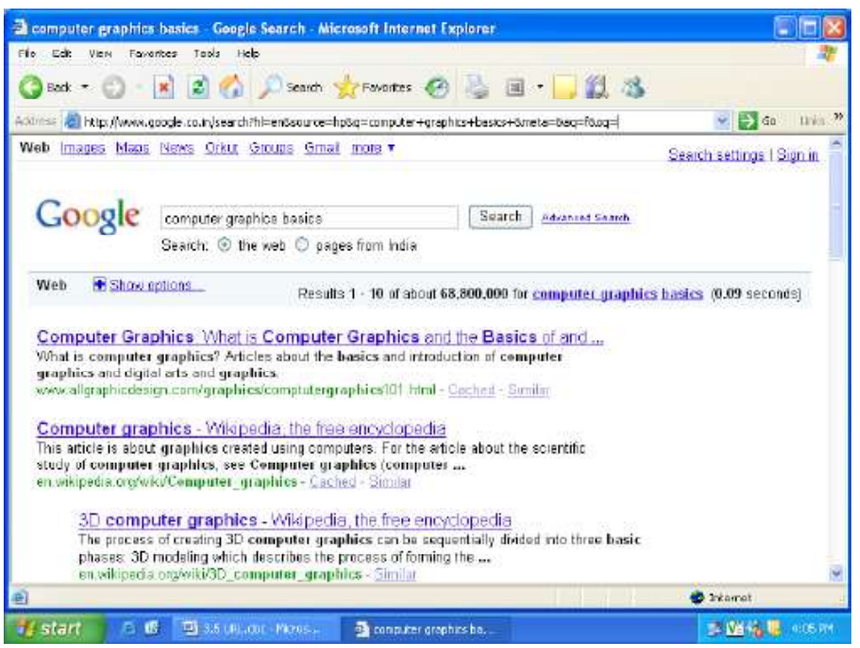
Table 8.1 *Symbols Used for URL Encoding*

Specific Symbols and Characters	URL Encoding
;	%3B
?	%3F
/	%2F
:	%3A
#	%23
&	%24
=	%3D
+	%2B
$	%26
,	%2C
%	%25
<	%3C
>	%3E
~	%7E
%	%25
<space>	+ or %20

If you want to search the information as 'computer graphics basics' in Google search, you just type the text as follows that has to be searched:



After pressing the **<ENTER>** key or clicking on '**Google Search'** button, you can get the resulting URL in the address bar as follows:



If you analyse the result of URL [http://www.google.co.in/search? hl= en&source =hp&q=computer+graphics+basics+&meta=&aq=f&oq=], the result comes as the <space> character between computer+graphics+basics in URL encoded as '+' symbol.

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3. HTTP and MIME

HTTP contains a set of rules to transfer the files of text, video, sound, images, and multimedia files across WWW suite of protocols. This suite is known as foundation protocols. It also incorporates how messages are prepared to transmit and how web browsers and servers respond to the issued commands. HTTP is a set of rules for transferring files (text, image, sound, video, and other multimedia files) on the World Wide Web. It is an application protocol that runs on top of the TCP/IP suite of protocols (which is the foundation protocol of the Internet). It defines how such messages are formatted and transmitted and what actions Web Servers and Browsers should take in response to the commands issued. HTTP is based on a Client-Server principle, where your Web browser acts as HTTP client, making requests to the Web server machines. These server machines contain an HTTP daemon to add the Web pages files in addition to the Web pages files it can serve, an HTTP daemon. A request is also possible with hypertext link. The browser receives HTTP request and sends the IP address to URL. On destination Web server, HTTP daemon receives the request. This request is sent back to the web page. This is a program that is designed to wait for HTTP requests and handle them when they arrive. Typically, when a user (client) makes a request by either typing a URL (Uniform Resource Locator) or clicking on a hypertext link, the browser builds an HTTP request and sends it to the IP address as indicated in the URL. The HTTP daemon on the destination server then receives this request and responds by sending back the requested Web page.

4. HTML and XML

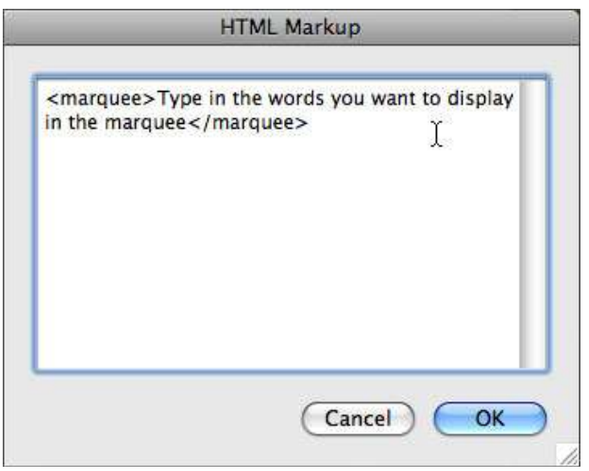
HTML is a Markup language used by the HTML processor for quickly and easily displaying documents on the Web. The program is highly customizable and supports AppleScript. The HTML processor converts hundreds of files in seconds with HTML Markup. For example, the required elements are shown in this sample that bare-bones HTML document:

```
<html>
<head>
 <title>A Simple HTML Example</title>
</head>
<body>
 <h2>HTML is Easy To Learn</h2>
 <p>Welcome to the world of the
 World Wide Web.
 This is the first paragraph.
```

NOTES

```
While short it is still a paragraph!
</p>
<p>And this is the second paragraph.
</p>
</body>
</html>
```

The required elements are the <html>, <head>, <title>, and <body> tags and their corresponding end tags. Screen below presents the HTML markup.



Extensible Markup Language (XML) is a simple and flexible text format derived from SGML (ISO 8879). It was originally designed to meet the challenges of large scale electronic publishing. XML plays an important role in the exchange of a wide variety of data on the Web and elsewhere. Following are the two XML coordination groups:

XML coordination group

The membership of this group consists of the Chairs of the individual Working Groups. Its role is to provide a forum for coordination between the Working Groups of the XML Activity and between the XML Activity and other parts of W3C and between the XML Activity and other organizations.

XML core working group

The mission of the XML Core Working Group is to develop and maintain the specifications for XML itself and closely related specifications such as Namespaces in XML, the XML Information Set, and XInclude. Following is the code for XML:

```
<?xml version=”1.0"?>
<note>
  <to>XYZ</to>
```

```
    <from>ABC</from>
    <heading>Computer Science</heading>
    <body>Information Technology</body>
</note>
```

8.3 REFERENCE SERVICE: DEFINITION, NEED AND TYPES

Let us study the definition, needs and types of reference services.

8.3.1 Meaning and Definition

You have learnt that the primary objective of a library, irrespective of its type or kind, is to promote the use of its resources. You also know that the collection built up should not be allowed to be idle and every document acquired for the library should have at least one reader. Techniques including classification of documents and their subject-wise arrangement on the shelves in a helpful order, providing open access to the shelves, preparation of the library catalog and similar tools, are all indirect forms of assistance to users to find their required documents in the library. However, the more direct method that would promote the use of books or other documents is to bring together the documents and their readers by personal efforts of the library staff. This method of providing personal attention to readers in terms of meeting their specific needs for documents or for any information contained in them has been developed into a specialized activity and given the name 'Reference Service'.

According to the American Library Association Glossary of Library Terms, 'Reference Service is that phase of library work which is directly concerned with assistance to readers in securing information and in using the resources of the library in study and research.' Reference Service is also defined as 'personal service to each reader in helping him to find the documents answering the interest at the moment pin-pointedly, exhaustively and expeditiously'. It also attempts 'to provide the right book for the right reader, in the right way and at the right time, in the right personal way'. Library scientist Margaret Hutchins defines `Reference Services' as those that include 'the direct personal aid, within a library, to persons in search of information for whatever, purpose and also various library activities specially aimed at making information as easily available as possible'.

Well-known library scientist Donald Davinson says that it is 'not just answering questions posed by readers. It is also about the maintenance of the resources banks from which answers to questions are provided for selection. The associated development of close awareness of sources of supply of needed materials is another aspect of librarian's work which needs to be given attention'.

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Library science expert William Katz views 'Reference Service' as 'the behind-the-scene activities of the reference library in the selection, acquisition and maintenance of library stock and its careful recording and administration'.

All the above definitions of 'Reference service' implies the following functions:

- Personal assistance to readers in the use of the library and its collection
- Answer questions that readers ask or give the right sources that provide answer to such questions
- Build up a good reference stock knowing the users' needs, build up reference tools, maintain Reference Service and administer them properly
- Provide all these services with speed and efficiency without any bias, meeting the exact needs of users

Almost every modern library provides these services. However, their nature and scope may vary according to the classes of users. For instance, most of the users of academic and special libraries may have definite purpose seeking information/library support as against what may be in a public library. We shall see how the reference services vary in different types of libraries.

Nature and Scope

By nature of reference service, we mean the wide spectrum of services offered to different classes of users, in response to requests or in anticipation of them. These services may include meeting simple requests for documents, finding answers to straight forward fact-finding queries or to complex questions demanding prolonged search through a wide range of reference sources.

By scope, we refer to the depth and coverage of the subject about which the question is asked and the precision that is required in answering such a question.

The nature and scope of reference service offered in a library are generally determined on the basis of the following factors:

- **Categories of Users**: Children, students, teachers, researchers, and so on.
- **Types of Libraries**: Public, academic and special.
- **Quality and Level of Service Sought:** Location of specific documents in the library help in the use of the library catalog and such other tools, or help in consulting reference books, provide assistance in selecting documents for the study undertaken.
- **Types of Questions:** Fact findings, literature searches, questions relating to a specific area of research, industrial or business activity and similar others.
- Reference and bibliographical tools maintained for effective use.
- Persons visiting the library personally, or enquiring via telephone or seeking assistance through post or other means.

Reference service in most public libraries would be in the nature of assistance to readers in seeking books for study or recreation, answering simple fact-finding questions or enquiries relating to public utilities, and so on. Most users of public libraries may not be engaged in any serious pursuit of study or research or investigation, and their collections are also not geared up to this type of requirements. Of course, there are exceptions, for example, large public libraries of the West.

In university and special libraries, the reference service usually would be of an intensive type. In fact, most modern documentation and information services have evolved and grown in the context of serving specialized users, such as researchers, academicians, writers, industrial and business experts, planners, executives and management specialists.

From what has been discussed so far about reference service, it should be clear that reference service incorporates a number of different functions and a precise definition does not seem to be so essential. It should, however, be noted that all these services can be offered only by trained, experienced and competent staff. A number of different techniques and tools have been developed to provide these services. But before we discuss these aspects, let us examine the need and purpose of reference service in libraries.

8.3.2 Need and Purpose of Reference Service

As you know, historically, libraries have been a part of the social milieu. Most of the human activities, including education and training, research and development, socio-economic growth, industry and business, trade and commerce, politics and international relational, arts and culture, government administration, need active support of libraries. In fact, modern innovative information services which are considered as an extension of reference service place emphasis on intensive user-oriented, need-based reference services. In other words, we shall study the need and purpose of reference service .We shall do so from the following angles:

- Users' information needs and demand for intensive services
- Growth of libraries in all dimensions and their complexities
- Modern tools and techniques developed for library and information services
- Volume and variety of documents , both print and non-print
- Impact of information technology

8.3.3 User's Information Needs

The process of socio-economic and industrial development has been a major thrust in almost every country in the latter half of the 20th century. It has been very much pronounced after the Second World War when many countries of Asia and Africa became independent. The result of this process has been the creation and establishment of new institution in almost every field. Specialized groups of people have been working in these institutions with different functions and responsibilities. This, in turn, has given rise to the need for information and knowledge on various

aspects of the work in which each group has been involved. These developments naturally have brought pressure on the libraries to innovate new types of intensive reference services to meet the growing demand for information. Each group has a distinct purpose for information support. Table 8.2 below gives a broad summary of different groups of persons, their needs and purpose of information, and the type of services offered by libraries in meeting them.

Table 8.2 *Information Need*

Table Group	Information Need	Reference and information Services Provided
Students	Study, examination, extracurricular activities	Reading lists, check lists, general information
Teachers	Teaching, guiding students; writing	Bibliographies, A&I service and interlibrary loans
Researcher	Research	Bibliographic support including CAS and SDI
Engineers	Construction, production and other technical activities	Standards, and patents, indexes, abstracts and handbooks
Medical Practitioners	Bio-medical activities	Bio-medical journals' abstracts and indexes
Lawyers and Judges	Legal activities	Codes, case laws digests and citations
Businessmen and industrialists	Market potential, product demand, product development, economy	Techno-economic and market surveys; regulations, trade literature

- **Information system:** It is any organized system for the collection, organization, storage and communication of information.
- **Hardware:** These are the devices, such as the monitor, processor, printer and keyboard, all of which work together to accept, process, and show data and information.
- **Software:** They are the programs that allow the hardware to process the data.
- **Databases:** They are the gathering of associated files or tables containing related data.
- **Networks:** They are a connecting system that allows diverse computers to distribute resources.
- **Procedures:** They are the commands for combining the components above to process information and produce the preferred output.
- **Bibliographic service:** It is used to identify the records of books, articles and other published materials.

8.3.4 Types of Reference Services

The reference services provided by libraries can be divided into two segments:

(1) **Ready reference services:** The reference workers should always be ready to provide reference services or the desired information on their own to guide the readers in extracting information from the suitable books. Therefore, deficit workers should be ahead with their report on the awaiting services.

The ready reference services have the following three steps:

- Preparation
- Service
- Assimilation

(2) Long range reference services: Long range reference service research level questions are those that require extended searches, perhaps over several hours or days, and sometimes, even longer on continuing basis. Answering such questions takes a long time because a number of references have to be searched regularly during the course of the research work. Therefore, such services is also known as long range reference service. The marshalling of facts and figures from a wide range of secondary and primary sources, together with the need to write background notes and explanations, would call for the highest expertise in reference service. In such instances, the user may be an active researcher, a celebrated author, a report writer, or an industrialist urgently requiring data on complex legal and regulatory matters. It is also possible that the person may be well-versed in his/her subject of enquiry and the reference sources pertaining to the field. The help that a person might seek from the library would be like a research assistance, which would provide all the reference notes and materials that may be needed for their project. No doubt such reference and information support has to be of a high quality. The long range reference services require the researchers and the library employees to invest time and conduct in-depth investigation to find out the desired information. Though this research is a special service provided by special libraries and universities, every library has to provide this service to some extent. To provide this kind of reference service the following steps are used:

- Time
- Sources of information
- Nature of information

(3) **Utility of reference services:** The utility of this service is for the following reasons:

- To advertise the library literature
- The symbiosis of different subjects
- To eliminate language problems

Check Your Progress

1. What is a browser?
2. Name the main functions of reference service.
3. State the categories of reference service provided by libraries.

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8.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. A browser is a software which your computer uses to view www documents and access the Internet.
2. The main functions of reference service are the following:
   - Personal assistance to readers in the use of the library and its collection
   - Answer questions that readers ask or give the right sources that provide answer to such questions
   - Build up a good reference stock knowing the users' needs, build up reference tools, maintain Reference Service and administer them properly
   - Provide all these services with speed and efficiency without any bias, meeting the exact needs of users
3. The categories of reference service provided by libraries are the following:
   - Ready Reference Services
   - Long Range Reference Services

8.5 SUMMARY

- The World Wide Web, also known as Web or www or W3, has established itself as the most popular feature of the Internet. It is an incredible source of information.
- A browser is a software which your computer uses to view www documents and access the Internet. The browser program residing in your computer offers the advantages of text formatting, hypertext links, images, sounds, motion and other features.
- Uniform Resource Locator (URL) is a pointer that avails specified resources across the net. Resource simply means information containing files or directories.
- HTTP contains a set of rules to transfer the files of text, video, sound, images and multimedia files across WWW suite of protocols. This suite is known as foundation protocols.
- HTML is a Markup language used by the HTML processor for quickly and easily displaying documents on the Web. The program is highly customizable and supports AppleScript.
- Reference Service is also defined as 'personal service to each reader in helping him to find the documents answering the interest at the moment pin-pointedly, exhaustively and expeditiously'.
- Almost every modern library provides these services. However, their nature and scope may vary according to the classes of users. For instance, most

of the users of academic and special libraries may have definite purpose seeking information/library support as against what may be in a public library.

- By scope, we refer to the depth and coverage of the subject about which the question is asked and the precision that is required in answering such a question.
- As you know, historically, libraries have been a part of the social milieu. Most of the human activities, including education and training, research and development, socio-economic growth, industry and business, trade and commerce, politics and international relational, arts and culture, government administration, need active support of libraries.
- The process of socio-economic and industrial development has been a major thrust in almost every country in the latter half of the 20th century. It has been very much pronounced after the Second World War when many countries of Asia and Africa became independent.
- The reference workers should always be ready to provide reference services or the desired information on their own are guiding the readers in extracting information from the suitable books.
- Long range reference service research level questions are those that require extended searches, perhaps over several hours, or days, and sometimes, even longer periods, on continuing basis.

8.6 KEY WORDS

- **Uniform Resource Locator (URL):** It is a pointer that avails specified resources across the net. Resource simply means information containing files or directories.
- **Hypertext Mark-Up Language (HTML):** It is a Markup language used by the HTML processor for quickly and easily displaying documents on the Web.

8.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. Write short notes on the following:

   (a) HTTP (b) World Wide Web
2. What are a user's information needs?
3. Briefly mention the kinds of information services available in the present era.

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Long-Answer Questions

1. Discuss the nature and scope of reference service.
2. Explain the types of reference service.
3. What is the need and purpose of reference service? Explain with the help of examples.

8.8 FURTHER READINGS

Lea, Peter W. 1990. *Printed Reference Materials*. Third Edition. London: Library Association.

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UNIT 9 USER NEEDS AND USER EDUCATION

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Structure

9.0 INTRODUCTION

In the previous unit, you studied about the definition, needs and types of reference service. This unit will introduce you to the concepts of user needs and user education, documentation services, current awareness service and SDI.

In the beginning of the 20th century, people looked upon a service library as a reactive library that made available superlative service to a comparatively small user group. Setting up and running a library is an expensive project; however, the sad part is that there is a very small user group out of the vast potential users which is actually interested in utilizing these expensive facilities. Several committees including Parry Committee have mentioned this fact. According to the Parry Committee report, in the United Kingdom, only a few students made active use of

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their academic libraries. The proactive library concept requires that a serious attempt should be made to bring each and every potential user into the library. Whatever be the type of library, it is essential for it to attract the maximum possible users. There is no point of having a well-equipped library if it has no or few users. Any finances put into the training and education of users will be considered to be fruitfully invested if it furthers the appreciation and use of the library. User education does not have the sole purpose of stimulating the use of a library since this is just one information source. In fact, user education is connected with the entire process of information and communication, and a part of this process is the interaction that the user has with a library. It is essential to understand that user education is essential for the purpose of a library and to effectively use the sources of information.

9.1 OBJECTIVES

After going through this unit, you will be able to:

- Define the term user education
- Discuss the development in the field of user education
- Explain the media and methodology used in the user education process
- Describe the methods used for imparting instructions
- Identify the need for CAS
- Evaluate the tools used for CAS
- Explain the techniques used for searching information in SDI

9.2 USER EDUCATION

Several user studies performed in various countries prove that there are but a handful of scientists who actually utilize libraries optimally and have knowledge of different bibliographical tools. It has also been proven that any knowledge or understanding of the use and structure of scientific literature must be taught since it is not possible to gain it intuitively. The Royal Society Scientific Conference has officially recommended that there must be a training on how to make use of scientific information. A survey was included in the Perry Committee report pertaining to the use by the undergraduates of the university libraries across the UK. The report said that only a few students were active library users. Across the word, training programmes have been created and implemented to train and educate library users on effective and optimal use of libraries. Such education is generally known as user education.

More broadly, it is possible to look upon user education to be a programme or process that enables potential users of information to gain awareness on how valuable information is, and motivates them to make use of the various resources of information. It is also advisable that proper instructions should be provided to

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readers to enable them to use libraries to their best. According to well-known subject expert Gordon Wright, one must not teach students to make use of libraries in isolation, but instead teach them to look upon it as being an unending process of education in which facets of communication are mixed together inseparably.

The term 'user education' includes all such efforts and programmes that will, whether collectively or individually, instruct and guide the current and future, and even potential users, keeping the following goals in mind:

- Recognizing own information needs
- Formulating the recognized needs
- Using the information services both efficiently and effectively
- Making an assessment of these services

The entire process of communication and information is associated with user education and the complete interaction of a user with a library is one of its parts. It is essential that user education should become a never ending process, which should begin with school and public libraries. This must also encompass the use of specialized and academic libraries. User education forms a focal point of the very purpose of the existence of a library and of information resources' effective use. In 1948, the Royal Society Scientific Information Conference proposed a pattern for user education programmes and most of the academic user education programmes have adopted that pattern. According to this pattern, there should be one of the courses given to new students for making them familiar with the use of the library, and this should be furthered by advanced user courses which are based on the structure of the literature of their subject field.

9.2.1 Components of User Education

In an ideal situation, user education would be an ongoing process comprising two components—orientation and instruction—which are brought together as per the needs and demands of the users. The concern of orientation is with how a user should be familiarized with the general methods of usage of a library, available services, facilities, layout and organization of the library. Orientation pertains to affective objectives, such as attitudes and feelings, and also to cognitive objectives such as understanding. During such orientation programmes, it is essential to set up the correct environment which will ensure that effective communication is formed between the library staff and the user. At the same time, it is also essential that the library appears to be a friendly and pleasant institution where the user can be comfortable in seeking help. The end result of the orientation should be to make the user have confidence in the competence of the library staff and their willingness to provide help in all situations. The other user education component is instruction (also called bibliographic instruction), which is associated with understanding how to utilize the information resources that a specific library has to offer. It is associated with retrieval of information and the various techniques available for exploiting the different sources of information to their fullest. There are two levels or courses at

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which bibliographic instruction should be provided. These are introductory and advanced course, which is provided as per the level of the user.

User education, on the practical level, comprises the organizing of the various aspects of the courses, such as content of the course, timing of the course, timetabling, optimum group size and optimum duration for the course. Furthermore, though it is essential for the librarians to attract the students to use the library, it is equally essential for teachers to provide students with such experiences which will convince them that it is essential to make use of the library since it will prove to be rewarding for the path of education undertaken by them. The students must be convinced that making effective use of the library will enable them to solve their information related problems effectively. For this to happen, it is essential that the user education programme is combined with some academic teaching programme ensuring that the teaching faculty and the librarian can have better cooperation. This kind of cooperation is capable of leading to the addition of relevant practical work to the programmes being implemented for user education.

There is a very close association that exists between academic programmes and the library in the case of 'course-integrated' user education. There have been different types of proposals for user education programmes that focus on ideal cooperation between the faculty and the librarian. In line with the same, there is the 'library college' concept which propagates that the dominant learning mode of students should be 'independent study in the library, bibliographically guided, intellectually aroused and spiritually stirred by the faculty'.

9.3 USER EDUCATION DEVELOPMENT

The progression in the area of user education is documented well. To take an example, Professor of Library Science George Schlegel Bonn's work 'Training laymen in use of the library' carries a survey of the user education field and has information till the year 1958. There is an update on it by Library Science expert Allan Mirwis who covered academic instruction, as it is conducted in America, in the form of a bibliography from 1960 to 1970.

Well-known Library Science author Deborah L Lockwood's *Library Instruction: A Bibliography* comprises 934 items that are categorized in the following three sections:

(i) General

(ii) Types of libraries

(iii) Methods and formats of teaching

Furthermore, developments have been described by famous author M. N. Tidmarsh in both theory and practice of user education amongst academic libraries across the UK.

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Besides all such records that have been documented, there has been a steady evolution of the concept of user education and it has come to be accepted widely because of the systematic and initiative work done by various prominent people. Let us look briefly at this development pattern of user education.

It is Patricia B. Knapp to whom one can ascribe the origin of the systematic implementation of the user education concept. Knapp has played a major role in the development of library science, especially with her report in 1964, whose main thrust was the 'exploring methods of developing a more vital relationship between the library and college teaching'. Monteith College of Wayne State University sponsored this project. An attempt was also made by Earlham College to make user education programmes in a similar manner. During this time, user education began to be identified with bibliographic instruction and/or course-related library instruction with its own strategy. Here, there were two components of bibliographic instruction—one is associated with the sources for conveying knowledge and the other is associated with developing those skills that are vital for absorbing bibliographic instruction. The various aspects of this kind of bibliographic instruction are as follows:

- Subject analysis
- Indexing and abstracting periodicals
- Library catalogues
- Principles of knowledge organization
- Search strategy
- General types of reference works

The subject of what role a library plays in the area of higher education has been long debated. The 'Library Arts College' concept was introduced by noted US librarian Louis Shores in 1934 and over the years, it began to be known as 'Library College'. The main aim of a 'Library College' is to enhance the effectiveness of student learning, specifically with employing the facilities of a library and its bibliographically expert faculty for library centred independent learning. The purpose of a Library College is to get rid of the instructions imparted in the class room lecture arrangement where a library is a supporting agency, and replace it with a room within the library itself with the process of learning/teaching that depends on the independent individual efforts of each student. Thomas G. Kirk, Patricia B. Knapp and Louis Shores, the pioneers in this field, worked as loners even though they did receive some amount of institutional support in this direction for their experimentation.

The Council of Library Resources and Association of College and Research Libraries in the USA was the one to start the institutionalization of user education. Further promotion and a push forward was given to the implementation of user education in the United Kingdom by the British Library Research and Development Department and the Centre for Research in user studies. It was this institutional

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patronage that led to several significant projects for user education, such as the UNISIST (United Nations International Scientific Information System) Programme for user education.

The main thrust of all programmes pertaining to user education is towards academic institutions. The activities in America in this field focus on under-graduates, while in the UK, it focuses on students pursuing post-graduation or research. The programmes for user education need to be steered in the direction of developmental processes in nations that are less developed. Through the UNISIST programmes, UNESCO (United Nations Educational, Scientific and Cultural Organization) made an attempt to initiate user education programmes in countries that were less developed. The UNESCO General Information Programme (PGI) was promulgated by UNISIST in 1975. Under the objectives of the UNISIST Information Policy, great importance is given to user education. According to the UNISIST document: '…basic training in the use of existing information sources, obtaining feedback from users on the results of information needs, studies, and involving, as wide range of users as possible in any new experimental services.'

The UNISIST Bangkok and Rome Seminars of 1976 concluded that for every nation, user education is a major factor in the country's National Information Policy. It was recommended by the seminar in Rome that National Policy on User Education should be created in correlation with the national education policy and as an integral part of the national policy. Both at national and international levels, several seminars and conferences have been conducted to discuss user education. In 1970, at Loughborough, UK, the Fourth Triennial Meeting of IATUL (International Association of Technological University Libraries) was held. It was one of the earliest conferences on user education and had the theme 'Educating the library user'. The 1st international conference on Library User Education was conducted in Cambridge in 1979 with the theme 'Library User Education: Are New Approaches Needed?'; the second international conference was held in 1981 in Oxford and it pertained to user education across various types of libraries. Some more user education related international seminars were the 1976 Anglo-Scandinavian seminar in Gothenburg, Sweden; workshops held in 1981 at Essen, Federal Republic of Germany; in the same year, another workshop was held at Cranfield Institute of Technology, Melbourne, Australia; and in 1982, a seminar on 'User Education in the Online Age' was held in Gothenburg. Of note is the fact that user education's early development happened mostly in nations that were English speaking countries, mostly Canada, Australia, the USA and Britain. Nevertheless, over the past twenty years, Scandinavia has seen a tremendous spurt in user education programmes. Over the past approximately ten years, there is an involvement amongst nations on Europe with user education's development, and they have put greater effort and attention in this area. Japan is actively associated with the movement for user education. China has also witnessed its end-user training turn into a successful activity.

In India, too, activities have been taking place in this direction. Workshops and seminars have been organized by both INSDOC (Indian National Scientific Documentation Centre), New Delhi, and DRTC (Documentation Research and Training Centre), Bangalore, to promote user education. In 1981, a national conference on user education was organized at Waltair (Andhra Pradesh) by IASLIC (Indian Association of Special Libraries and Information Centres), Calcutta, which led to the creation of a volume of papers on the subject. Efforts have been made by ARI (New Delhi) towards creating a specific course for 'Library Use, Reference Compilation, Scientific Paper Writing and Proof Correction'. The course from ARI does not follow any of the predefined guidelines like the one put forth by UNTSIST. In India, there has been no systematic effort made to institutionalize user education. All efforts that have been there have been sporadic and voluntary. The user education concept was much liked by information professionals and librarians all across the world. With reference to user education, three types of experiences have been found. In the historical perspective, it is considered that the American experience is innovative, since it has created the path that others are now taking. Some people who are considered the pioneers in this field are: Thomas Kirk, Patricia B. Knapp and Louis Shores. The leadership and initiative of persons like them was responsible for America to widely accept user education. Then came the institutional framework which was started by Eastern Michigan University via the many activities that they conducted. A major success in this came as the statement of objectives of the Association of College and Research Libraries where attention was given to user education as well. The user education's institutionalization process got its impetus from funds provided by private foundations.

In the field of user education, the UK has a different story compared with the USA. In the UK, user education programmes are mostly pushed forward by the central body such as the Library Research and Development Department. From institution-making which was largely decentralized in the United States, in the UK, user education has taken on the character of centralization. There is the advantage in centralization of coordination and this has a major hand in planned development. Even though at the level of concept, there is the community across the world to stand behind user education, persons in different nations might provide it a different form and shape based on their specific experiences and requirements.

9.3.1 Purpose of User Education

When one plans programmes for the education of users of a library, it is essential that the goals and objectives that need to be achieved through the programme are clearly defined. It will be required, for example, to define the timing for every stage of the programme as well as the content to be covered at every stage, the media that will be employed for teaching, and the methodology and methods that will be used for the programme. How successful is the plan that has been laid out is tested, prior to actual full-fledged implementation in a specific situation.

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The objectives and goals for the creation of a course can be segregated into three major categories: psychomotor, affective and cognitive. It is mostly in the affective and cognitive category that the objectives of a course for library user education are located. The goals that fall in the cognitive category are mainly associated with the understanding of the concepts. It is possible to arrange the objectives and goals in the cognitive category based on the amount of associated complexity moving from the complex to the simple and from the abstract to that concrete. In the case of the affective category, the objectives and goals are associated with feelings, like whether or not a student wishes to and whether or not he finally does behave in various educationally desirable ways. To take an example, is the student finding pleasure in being involved in making use of library resources for the purpose of locating information?

Objectives and goals that fall in the psychomotor category are associated with such activities that require physical coordination like riding a bicycle or using a laptop computer. Generally, it is found that affective objectives and cognitive objectives share a close relationship. So, in the cognitive category, instructions created for library users should contain the manner in which specific library tools, such as abstracts and catalogues, are to be used when the need arises. In the affective category, the student has to be equipped to be confidant of making use of the correct resources in a library for obtaining the required information. The idea of involving the students while making decisions regarding the objectives and goals of the course is very effective.

In the field of user education, one major development is the increasing realization of the importance of setting objectives and goals when library user education is being planned. Sally Stevenson, John Lubans and several other authors have expressed their concern regarding the missing guidelines as far as instructions in library skills are concerned. In the USA, the ACRL Task Force on Bibliographic Instruction has a major part to play in spreading awareness on the importance of instructional objectives and goals. Also, the ACRL Bibliographic Instruction Handbook of 1979 carries a set of model objectives. All objectives and goals that are created for a library user education programme must be prepared, keeping in mind the objectives and aims of the library for which the programme will be implemented. Moreover, the programme needs should be closely related to the objectives and aims of higher education. Following is how one can express the objectives and goals of a library in a university:

- To contribute for achieving the institutes' aims in the context of teaching of research and learning by acquiring non-printed and print material required for taking care of the current and future needs of information
- To store and register the acquired material in a manner which will enable as well as actively stimulate its use
- To make requisite changes to all sources of information so that they will always fit in with the current needs of the university and the society at large

NOTES

- To help in the integration of the international as well as the national resources for information within the university

As has been mentioned before, one way to stimulate the library users to actively use the information present within the library is to teach these users how the available materials can be used to gather information. Therefore, a user education programme's general goal should be to make the users generally aware of the available resources within the library. Particularly, in the case of such libraries that are special libraries and deal in subjects, such as technology, medicine and the sciences, in which the rate with which the literature increases is very fast, it is critical to ensure that there is user instruction.

Library user education is not part of a separate academic discipline. It comprises a set of skills that can be utilized similarly irrespective of what the subject of academic study might be. Therefore, instruction in use of a library is best imparted when it is made part of the teaching programmes that are there in the academic disciplines. In this light, it is seen that a fair amount of cooperation is needed between the academic and the library staff, and the students as a community for the successful implementation of library user education. Earlier times saw a substantial amount of continuous debate happening on what the objectives and goals of user education should be. Such organizations like the UK based ASLIN and the USA based ACRL tried to come up with their own guidelines and proposals for the same.

Information professionals, such as Hartz Scrivener and Hutton, also put forth their views. Following are the words of Scrivener, summarizing the aims of a library user education programmes at a university: 'The details will necessarily vary in different situations but teaching should establish and promote those traditional skills without which no student can make adequate use of this library: (i) an understanding of library arrangements; physical, bibliographical and conceptual; (ii) a knowledge of sources which will be appropriate in any given situation; and (iii) the ability to interpret his own peed so as to frame relevant question; (iv) an awareness of search techniques including the ability to devise serviceable routines and finally the student needs skill in the art of evaluating his sources and presenting his materials.'

Chalmers University of Technology Library, Sweden, looks at the following as being the key goals of a library user education programme:

- Being able to apply the principles of scientific communication to information retrieval problems
- Being able to employ the various available tools in the library to search out information that will be appropriate for the studies and later work as and when required

After devising the broad goals of the programme, it becomes possible to formulate several specific objectives to fit into the broad framework of the goals. It always comes in good stead if a clear differentiation is maintained between

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library instruction and library orientation. While the purpose of library orientation is to make the students aware that a library exists and that it offers the various services for the benefit of the students and how to make use of the library, the purpose of library instruction is to help students gain the required information for their specific requirements for fully utilizing the available materials and resources in the library, and it also deals with information retrieval problems.

9.3.2 Media and Methodology in User Education

Many have said that education is the process that goes to change learners. There are several factors that affect this process of education. Of all the various factors in this category, there are four basic ones which affect learning: feedback, understanding, activity and motivation. These four factors are also applicable in the case of library user education programmes. What media and teaching methods will be most appropriate is dependent on the teaching/learning situation that exists at that point of time, the subject matter that is under consideration, who the students are and also on who the teacher is. It is not possible that the same method will fit well into each situation. Nevertheless, teaching methods can be broadly categorized as those that are appropriate for group instruction, those that are appropriate for individual instruction, and those that will hold good for both group and individual instruction. For the purpose of group teaching, some of the methods that will be appropriate are: guided tour, lecture, seminar, tutorial and demonstration. Methods that prove to be suitable for the purpose of group and individual instruction are: audio tapes, video tapes, tapes of other kind, illustrations and slides. For purely individual instruction, the appropriate method would be providing individual help; use of self-instructional material, such as tours, signs, and so on; programmed instructions; practical exercises; printed guides; books and other micro media.

Methods that employ auditory simulation, visual simulation or the two of them combined can be used for the purpose of teaching. Methods that make use of just one channel of communication are considered to be less effective than those that employ the use of a combination of sensory inputs. It is a fact that the interaction which takes place amongst the individuals who are connected together due to the learning/teaching situation is also responsible for how the learning process will be affected. The interaction during the learning/teaching process can either be a student-teacher or teacher-student interaction. It is opined by experts that in a situation where there is a programmed instruction, students are seen to be working like they are isolated individuals. In such a case, these students will have no interaction or may have minimal interaction with the teachers or even other students. While that can prove to be of advantage to such students who are introverts, it is not one what will be favourable for those students who are extroverts, and prefer the companionship and the competition of the classroom. There are several different methods of providing library user education. Let us look at them, and also the factors that affect the learning process and the various sensory inputs that are used, and the students-teacher, and student-student interaction. It is important to

note that there is no single method that proves to be appropriate in every situation and for every teaching/learning scenario or even for all individuals. The fact is that for an education programme to be successful there is a need to use several and different media and methods which will supplement each other. Nevertheless, in traditional library instruction for large groups, the method of lecture for individuals and smaller groups and the method of providing individual help in case of such individuals who actually reach out for help is employed.

9.3.3 Methods of Imparting Instructions

The various methods of imparting instructions are discussed below:

1. Lecture

One of the most used and common instruction imparting methods is a lecture. Lectures are considered to be a good way of teaching or imparting instruction to large groups of students. Lecture is one method, in which, two types of inputs are used: sensory as well as auditory. However, there has been a very strong criticism of lecture as a form of communication in education. The greatest disadvantage that the lecture method has is that the speed of imparting instruction is not in the control of the receiver and there is not even any repetition. Hand outs will be required for reiteration. Yet, the advantage of the lecture is that it provides the students with the opportunity to have personal interaction with the lecturer and an opportunity to give and take feedback. When it comes to imparting information regarding bibliographic data, lectures prove to be an ineffectual method. Lectures are appropriate only for providing a general introduction to a course for information retrieval. Also, if the students' group is mature, it will gain from the use of the lecture method, while beginners might be hindered by it.

2. Demonstrations, tutorials, and seminars

Demonstrations, tutorials, and seminars are generally organized for small groups of users/students. When compared to the lecture method, seminars, tutorials, and demonstrations provide an opportunity to the users/students to be actively involved in the process of learning via more interaction between the students and the teaching staff. In the case of seminars, there is a less formal atmosphere and more room for integration between the one teaching and those who are there to learn. One can make use of practical exercises to motivate the students and have them actively involved in the learning process. Progress related feedback is given to the students during the practical sessions. Since, it is not easy to explain the use of various specific tools for information retrieval in the absence of source materials, it becomes prudent to have seminars on library user education. The seminars will be a good means of demonstrating the use of specific tools for the retrieval of information. Demonstrations can be used effectively with small user/student groups for the purpose of teaching the use of the many available information retrieval tools. When employing the demonstration method, the users/students can be given an opportunity to actively search the information on their topic of interest.

NOTES

3. Guided Tour

Generally, this is the approach taken with fresher, when orienting them with how to make use of the library. Such an orientation comes in handy with those users/ students who have little to no interest and motivation to be the users of the library. It has also been suggested that a 'better programme for short library orientation is the self-paced printed or audio tour followed by appropriate exercises. This method brings library users into the actual building where they carry out a series of practical tasks concerned with the location materials, photocopying, use of catalogues and other routines. Self-guided tours have been used successfully in many libraries'.

4. Audio-Visual

Nowadays, use of Audio-Visual (AV) media has been gaining tremendous ground in the learning-teaching process and more specifically, in the education of library users. As early as in the year, 1982, catalogues were published which pertained to AV media and Computer Aided Instruction (CAI) software for user education and librarianship and the information contained in them proved to be useful to the field. In the field of library education, there are not many places, where the use of moving images is imperative to impart appropriate instructions. Therefore, it becomes possible to pass on the information via a series of units, such as printed illustrations, overhead transparencies, or slides. In this light, it would appear that in library user education, the user of printed materials in conjunction with audiotape or the use of slide/tape medium would be more appropriate. There are several advantages to be gained from slide/tape productions, such as controlled over presentation speed, availability at all times, flexibility, easy updation, and the clarity associated with the exposition.

5. Video-tapes

Just like films, even videotapes are a media that contain both motion and audio. Such tapes are reusable, which makes the creation and further updation of the content a less expensive task. Nevertheless, it is extremely time consuming to update video tapes. It is possible to make use of video recording for such an atmosphere that is real, but these requirements are not usually met in library instructions. The actual materials of the video recording can be stored on such media as discs, film, and tape, to name a few. Nevertheless, libraries face the problem of the video materials being standardized so far as the output for the different systems are concerned. In the library education situation, the most appropriate media seems to be the cassette system. In the present time, two forms of TV cassette systems are in use: systems that have only playback and systems that come with playback and recording facilities. Moreover, it cannot be stressed enough that the key problems that arise in this case are due to the problem of lack of compatibility among the various systems. These methods also have advantages like they enable the careful preparation of material and its reusability several times over. Internal TV systems can use displays suitable for audiences of different sizes.

However, the personal contact with teacher or seminar is the last in this method. In this method, it is generally not possible for students to interrupt and get into discussions, or ask questions. So, in reality, this form of instruction makes the student, a passive learner.

6. Programmed instruction

The implementation of programmed instruction can be done via several different media with the use of computers (CIA for automatic display of slides) and printed books. In the case of library instruction, programmed instruction can provide several advantages. To take an example, it becomes possible for user/student to learn and work at the pace that they are comfortable with. It becomes possible for them to actively take part in the learning process. They can even obtain feedback directly for the progress that they are making. It even makes it possible for the teaching staff to get the students' records pertaining to their progress. Yet, it has disadvantages, one being the factor of isolation, when it comes to a student. Students, who are extrovert and who prefer an atmosphere of competition and companionship in the classroom, could be averse to such a learning method. It is mainly used in the United States.

7. Signs and informational graphics

Both informational graphics and sign systems are extremely basic meaning they are available to instructors for providing orientation to users/students regarding library use. The Graphic Information Research unit at the Royal College of Art conducted a study on British libraries, which showed that there was generally a very poor standard as far as graphics were concerned, and also the construction and design of the signs also varied from each other. Nevertheless, in America, in recent times, a decided increase had been seen when it comes to this key facet of user education, as well as several guides and handbooks have been created to cater to it. To quote: 'Librarians started to apply systems approach in which different types of signs are used to illustrate different functions such as orientation, direction, identification, instruction, prohibition or regulation or current awareness. These functions fall into two main types: signs related to direction finding and signs related to the use of library resources. If signs are to be effective for user orientation, they must be carefully planned with regard to position, content and presentation.' Even though it is expensive to produce well designed signs, the expense is worth undertaking since it is a worthwhile investment as the signs will be long lasting, along with their aid in easing the physical barriers in the library.

8. Individual instruction at the reference desk

The belief is that the type of library instruction that is unsurpassed by any other is personalized service at the reference desk. The reason for this is that when a user poses a question at the help desk regarding the use of a specific facility in the library, it shows that the user is motivated to know about it. The user/student will

NOTES

then be involved actively in the process of learning and will get help straight from the expert. There is a drawback to such imparting of instruction. To quote, '…it may provide immediate relief to the students/users, but not necessarily the understanding and background knowledge to cope up with similar situations that the student/user might face in future.' So, which media or method of teaching to employ is dependent on the learning-teaching situation, the training's subject material, and the audience who are to receive the training, along with the staff, which will be part of the process of training. It is preferable if the media and methods for education of library users combine with the active participation of users/students. In actual imparting of instruction, when media and a preferred teaching method are combined, they could form the optimum basis for library user education programmes.

9.3.4 User Education and Information Technology (IT)

Over the past two decades, the use of computers for the purpose of activities related to information has been on the rise. Such use of computers has led to the fast development of online information retrieval systems that are computer based. Computer based information files and database files are being created by several organizations, such as the US National Library of Medicine (Index Medicus) and American Chemical Society (Chemical Abstracts). Databases such as these can be accessed widely and even used for the purpose of searching information. Searches in such databases can be made via local terminals that are connected or linked with the central computer with the help of a telecommunication network.

Efforts in this direction have given rise to several online information retrieval systems, whether or not these systems will get used or how well and to what extent they will be used is dependent on user education in this direction, and on the functioning and availability of this method of information retrieval. In this light, it becomes essential to understand the objectives and goals of online user education and how best to achieve them.

9.3.5 Online Education Groups

There are several groups that are involved with the online education, training and orientation of library users. Some categories of such groups are listed as the following:

- Producers of databases
- End users
- Institutions involved with terminal operation like information centres and libraries
- Intermediaries
- Library schools
- System operators

There is a lot of difference in what motivates these different groups to be involved in this activity. Mostly it is seen that the motivation needed for being involved in these kinds of training programmes is in part financial and closely associated with the sale of a specific product like information system or database. In the case of online user education, the objectives and goals can be put into two primary categories: intermediaries and end users. It is possible to categorize online education programme as being composed of either instruction or orientation components. In the case of orientation, the programme will have the objective of enabling users to become aware of the available services and the computer-based information retrieval services. In the case of instruction based programmes, the objective is to enable users to have a detailed understanding of the way to retrieve information with the help of computerized information retrieval systems.

Key Goals of IT in Library User Education Programmes

(a) To enable an end user to carry out online information searches either himself or with the help of an intermediary, within his own subject field, as and when required, in connection with information needs

(b) To enable an intermediary to carry out online information searches for end users within many different subject fields, from the available databases, on the various information retrieval systems

9.3.6 Methods Used in Online Retrieval Education

The process of online information retrieval is one that is interactive and it requires that specific attention should be given to such methods that will allow the display and experience of this interaction. To provide an effective demonstration of online information retrieval, it becomes essential that moving images are displayed just as they would be generated while actual search is on so that those watching the demonstration see what they will actually meet with while performing their searches. The end goal of online instruction, for the users as well a as the intermediaries, is acquiring the ability to perform effective online information searches. To attain this, it becomes essential that practice is done on an actual system. This is where the concept of 'learning by doing' comes into play and this concept plays just as much an important role in the other methods of library user education. Systems operators have understood the importance of live online instruction and they have themselves been responsible for coming up with several teaching aids. To take an example, in the MEDLINE system, it is possible for a user to ask for instructions interactively when he begins his search and also ask for help when the search process is already underway by providing some of the instructions in the form of a request.

Possibly the most common means and an essential element of intermediaries' training is allowing the intermediaries to work with and observe a searcher who is well versed in performing searches. The actual 'hands-on' training for online searching forms an important part of end user education for performing computerized

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information retrieval. This helps the users/students to have involvement with the process of learning and to even remain motivated. Oftentimes, the method that will be used for teaching is influenced by the learning effects as well as on equipment availability and cost of use.

9.3.7 User Education Programme Evaluation

Evaluation has different meanings for different educational research workers. It is concerned with information gathering regarding an educational programme or course's effects. It makes a comparison between the effects that have been observed against intentions and expectations. To quote: 'Evaluation is concerned with the collection and analysis of information about the input, in terms of educational potential, the variables affecting the educational process, and the end product or output. Evaluation can be directed towards the various aspects of the educational course or programme.' The very fundamental reason for performing evaluation is gathering and analysing of information, whose outcome can then be utilized for the purpose of rational decision-making. In the arena of library user education, evaluation also takes into consideration economic use of specific libraries and information systems in general. For a library user education programme to be successful, its objectives and goals need to be based on an amalgamation of the specific needs of the library staff, the academic staff and the students. Therefore, the evaluation of such a programme will have to measure the realization of the pre-specified objectives and goals and need to be multifaceted. It will need to look at the attitudes towards libraries, information skills, library use, effects of various instructional programmes, and even the specified information or library resources.

Evaluation: Scope

Evaluation might range from the study of details, such as the use of given teaching methods or media through the effects of specific courses and whole library instructional programmes to the extreme of general educational systems.

Evaluation: Methods

For evaluation, generally one of the following three methods are employed:

- Illuminative or responsive
- Psychometric
- Sociological or management

In the case of psychometric evaluation, it is assumed that it is possible to provide different treatment exposure to the control groups and to the experimental groups, while controlling the other variables. The changes are then observed with the help of attitude scales, achievement tests, or psychometric tests. In psychometric evaluation, it is possible that the experimental group is exposed to some course, which is of a new kind, while the control group is provided with the traditional course, and in all other respects, the two groups are treated comparably. Both the

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groups are made to take pre-tests and post-tests and the analysis after the course completion is used to find out the difference between the performances of the two groups. This procedure for evaluation does not look at unexpected results, but just concentrates on measuring output against pre-specified goals.

The sociological evaluation method is used while studying the changes in an organization's structure. Such form of evaluation makes use of questionnaires and interviews. The focus of all the attention is the organization, which is experiencing the change and no comparison is made with a control group.

The term 'illuminative evaluation' was coined by library science theorists Malcolm Parlett and David Hamilton. Illuminative evaluation has not been restricted to the initial formulation or aims; it even has a scope for taking into account unexpected results. The study's most important part is considered to be the actual implementation of an innovation and the focus of the research is on what is actually occurring as a reaction to that innovation. Illuminative evaluation does focus on the testing of an educational programme, but rather the understanding and description of the conditions under which the programme works and its effects on those participating in the programme. In this form of evaluation, information is gathered with the help of explorative interviews and observational studies.

9.3.8 Library User Education Programme: Need for Evaluation

It was observed by eminent theorists Brewer and Hills in 1976, that '… librarians should take evaluation more seriously and to think more professionally about their teaching commitment'. In this light, it has been observed in the recent times that librarians have seriously taken on the task of evaluating their library instruction programmes even though they are not yet done systematically. When bibliographies and handbooks on user education were examined critically, it was found that evaluation has not been well documented in comparison with the other aspects of the programmes. Of note is the fact that where there is systematic and documented evaluation and feedback for programmes, when actually implemented, it will lead to much improved future programmes.

9.4 USER EDUCATION AND USER STUDIES

At each level, the key focus point of every activity related to information is the user. Being a broad concept, the tern 'user' could comprise the producers and also the clients of information. There are several terms used in the Library and Information Science (LIS) literature to refer to users. Most of these terms are synonyms. To take an example, all the following terms including customer, member, client and patron imply the same concept, i.e., the user. According to eminent library science expert Kenneth Whittaker, a user is one 'who uses one or more of the services provided by a library'. Then again, according to well-known author on library science books Claire Guinchat, one should define a user based on two specific criteria:

NOTES

(i) Objective criteria, such as socio-professional category, specialist field, nature of the activity for which the information is sought, reason for using the information system, and so on

(ii) Social and psychological criteria, such as the user's attitudes and values with regard to information in general and his relations with information unit in particular

According to Guinchat, the key factor is the reasons that lead to this specific behaviour in information seeking and communication, and his professional and general social behaviours. According to Guinchat, users can be placed broadly in the following three groups:

(i) Users who do not participate in active life, like students

(ii) Users who hold a job and have information needs that are work related, classified on the basis of their main activities (services, production, development, research, management, and so forth) by branch of activity and/or specialist field (industry, agriculture, civil service, and so forth), and by level of education and responsibility (workers, technical staff, professional staff, and so on)

(iii) The ordinary citizen seeking general information

Another classification is provided by another library science expert Professor J. D. Bernal for users of technical and scientific information based on the type of information services that they require. A key aspect of Professor J. D. Bernal's grouping is to combine agriculturists, medical practitioners, architects and engineers in a single category which is of technologists. Furthermore, managers (industry as well as business) can be looked upon as being a separate group of information users. One more way in which users can be group is based on how they approach information. The classification in this regard could be as follows:

- Potential user – in need of information available from specific services
- Expected user - one who is known to have the intention of using certain information services
- Actual user - one who has actually used an information service regardless of the fact whether he derived advantage from such a service or not
- Beneficiary user - one who derives a measurable advantage from information services

The categorization of users as done by Indian mathematician and librarian Dr S. R. Ranganathan is based on the types of services enunciated by the user. The groups in his categorization are freshman, ordinary inquirer, specialist inquirer and general reader.

It must be recognized by a wise system designer that an information user needs to be an active participant in the system, and it is this user's needs that must be the basis of the design of the system and also further direct the system's design.

So, it is for the information service to anticipate, match and be responsive to this clientele's needs and requirements. There will be some situations where the users are not completely aware of the advantages that can be gained from a specific service or system. This type of situation requires that the system designer guides the user to the pertinent aspects by providing a tailor-made service.

It is possible to distinguish between scientific and technical information system users. Such users fall into three broad groups based on the type of activity they perform. These groups are researchers, technicians and practitioners involved with operational and/or developmental activities in the various technology fields, and planners, managers and other decision-makers who are engaged in coordinating development activities at international, national and even local level.

9.4.1 Characteristics of Users

As the key reason for conducting a user study is to collect information which will help with the design, provision and evaluation of specific information services or products geared towards the needs of specific users, it is imperative that one fully understands the user characteristics. Following is the list of groups under which one must study user characteristics:

1. Individual Characteristics

These user characteristics pertain to those factors in information users which affect:

- How they perceive as well as define the problem and how they describe the information that they require
- The specific manner in which it is most likely that they will make use of the information and what their capacity is for making use of a specific type of information

2. Stages of Information Diffusion

The stages of information diffusion are concerned with how much knowledge an individual (or a group of users) has with respect to some certain innovation or idea. At different stages, a user's information needs will be different due to which it is important that information services and products should be created specifically for every stage. This can only be done when there is a clear perception of the users' capabilities.

3. Environmental or Social Characteristics

Factors that fall within the social system, such as reference groups situation and norms, and which impact the communication and behaviour of an individual are grouped in the category of environmental or social characters pertaining to an individual (or group of) user(s). Having awareness with respect to these factors helps the designers of the system designer to know exactly what the users' information needs will be.

NOTES

4. Communication Characteristics

Elements which are associated with using and diffusing information are referred to as communication characteristics. Information systems, communication channels, information structures and information sources are some examples of communication characteristics. It is essential that we correlate these aspects with other characteristics. The objective of a systematic and proper user study is the collection of all data that is pertinent for the users in respect of aiding in the creation of such an information system which will be efficient and effective. With such data, it is possible to establish some close relationship between the users of information and the designers of information systems.

9.4.2 Documentation Services

The dissemination and flow of information has a wide notion in the field of information world, the basic objective of which is to make the masses aware of the information and knowledge so that they get benefited from it. Benjamin Disraeli (a British statesman of the Conservative Party) had said, "The person who has the best information is the most successful person in general life." The information services, therefore, occupy a unique and important place in the world of information and communication.

9.4.3 Dissemination of Information

The dissemination of information, which keeps the users abreast and updated in the subjects of their interest is known as the current awareness service. It provides answer to the special type of questions and requirement of users. According to Korb, retrospective searching deals with the information of past or which is not current or new.

9.5 CURRENT AWARENESS AND SELECTIVE DISSEMINATION OF SERVICES

The information world is changing rapidly and different approaches and new tools are emerging all the time. With this trend the current and future needs of the library users must be kept in mind and assistance should be provided in order to achieve excellence in their academic pursuits. In this light, libraries should be kept up-to-date as libraries are important sources of information and act as gateways to information resources. Libraries act as centres for creation and recreation of academic activities that fuel the academic institutions. In this regard, libraries should initiate new services with new technologies to enhance the library operations and services in order to provide latest information. This process of keeping the information up-to-date is commonly known as *current awareness*. It is considered as a system to notify the users of the library about the current documents in the library and the information services. It is known by different names such as Alerting

Service or Service for Keeping Update and so forth. This service is a part of documentation service and is meant for information dissemination.

Current Awareness Service (CAS) was also known as *reference service* in its early years. In a real sense, CAS is an extension of referencing services which have been provided by the libraries for a long time. Since the information available is vast and the materials are also available in large numbers, it is not possible for users to be familiar with every item, or to examine everything. This also becomes frustrating for the user. To overcome this frustration, there is a requirement for CAS.

NOTES

There has been a rapid growth in scientific research and technical developments during post-war period. There was an emergence of inter-disciplinary and group research, new technologies and new forms of communication and media which resulted in exponential growth of literature and hence an explosion in the volume of information. It was now difficult to keep track of this increased output of literature through different services such as abstracting or indexing and there was a huge time span between the publication of a paper and it's reporting in the journal which took months or even years to report them. This resulted in the depreciation of abstracting and indexing journal as a medium to disseminate information about the current developments. This time gap could not be ignored by the scientists and researchers and a demand was generated for speedy dissemination and comprehensive coverage. This directed emphasis to the CAS.

We may say that CAS refers to all efforts made to bring into notice the current literature. It is a system of services which ensures that all the information required by the researchers is available to them at the right time and in a convenient manner and format. The objective of this system is to ensure that there is no delay in the research or the research is not conducted inefficiently due to the lack of the availability or duplication of any earlier research.

Current awareness is the knowledge of the development in any field in recent times. There are four types of knowledge involved in the process of current awareness as listed by Kemp. They are the following:

- New theoretical ideas and hypothesis
- New problems to be solved
- New techniques and methods to solve old and new problems
- New circumstances affecting what and how people do

Solnik (1977) believes that "the current awareness bulletin was started in 1929 for researchers and chemists at Hecules Corporation and shifted to the fields of computers in 1960s".

The definition of current awareness given by the International Encyclopedia of Information and Library Science is as - "notify current documents to users of libraries and information services".

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So, we can say that CAS includes tools that are used to keep you updated about the latest professional literature in the field of your interest. CAS is used to alert researchers, scholars and other users about the recently published literature using various methods such as:

- **Telephones:** This is the best method for giving updates about current information.
- **Display:** By displaying the information related to new arrivals to keep the user community aware.
- Routing of periodicals.
- **List of latest periodical received:** By informing the users of library about the periodicals received on monthly basis through e-mails.
- **List of latest additions:** By sending the list of new additions such as newly acquired books, patents, thesis, proceedings and so forth through e-mails.
- **Topical bibliography on demand:** By compiling bibliographical references on a given subject with the help of available electronic and online database and sending it to the users by e-mails.
- **Contents page service:** To send as a common list of the contents of monthly received print periodicals to the library users through e-mail.
- **News clipping service:** by providing the news clippings or newspapers to the users of library.
- **Newsletters and bulletin:** By providing library's own newsletters and bulletin from time to time consisting of all information about new developments, events such as seminars, workshops, or conferences, meetings, book exhibitions and others.
- **Abstract bulletin:** By providing the abstracts of the articles from the most subscribed journals.

9.5.1 Need for CAS

The last few years have experienced an increase in information and have, thus, generated the need for speedy dissemination of information to the scientists to help them in their research work. The rapid dissemination generates the need for CAS. Also the information is generated in large quantity daily which makes it difficult to keep the users and researchers abreast of the latest information in their respective fields of interest. Hence, it is necessary to keep the users informed through CAS.

Besides this general documentation services or abstracting and indexing services are too large scale to supply for libraries for their individual resources because the periodicals and other publications they cover might not be available in the library. Also, for individual library, the abstracting and indexing services are sometimes too limited due to the availability of all the periodicals that are not covered by the service. Moreover, the local libraries are bound to acquire the

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documents in the local language. These documents might be important for the researchers and the coverage of such documents would be certainly meager or nil. So, there is a requirement for local CAS publications.

It has been the practice in various specialized fields to provide updates about the latest publications and not just as a reply to some specific query or request. This practice is meant to help the users keep track of the latest developments in a particular area. Some organizations are providing CAS on the basis of standard user profiles, which are called macro-profiles. These are also called *package services w*hich are available through computerized databases.

9.5.2 Tools for CAS

CAS can be delivered by different methods. The methods can be:

- By subscribing to some commercial and centralized service
- By preparing and distributing bulletins
- By Selective Dissemination of Information (SDI) service
- By circulating content page
- By steering of periodicals
- By exhibiting new arrivals
- By using communication methods such as telephones, SMS, e-mails and so on

Since CAS includes tools to keep the latest professional literature up-to-date, there are different tools available to provide different services. They are:

- **RSS:** RSS stands for Really Simple Syndication. It is a technology, which allows you to subscribe yourself to the updates taking place on the websites. It is a way through which information comes to you instead of searching for the updated information. The symbol used to indicate RSS is an orange symbol. Subscription can be done through RSS feed reader. There are many feed readers available for free. Some examples of RSS feed are Netvibes, The Old Reader, and Feedly.

Fig 9.1 *Symbol of RSS Feed*

- **Search alert service:** This allows you to search the literature using a bibliographic database which can provide a comprehensive and systematic overview of the current developments in the field of interest. There are certain database services such as Ovid, Scopus, CSA, and others, which allow you to set up auto alerts option and send you an e-mail or RSS feed

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and provide you with the latest updates, whenever the database is updated.

- **Journal article alerts:** The alerts can be received about new issues of journals, any new result in the database, or when a particular article is newly cited.
- **Journal Table of Content (TOC) Alerts:** This service sends you the table of contents of any new issue of a journal through RSS feed or e-mail. This service is offered for individual titles from a particular publisher or for multiple journals from the services such as JournalTOCs or ZETCO. These are free services for the updates in scholarly literature. Many e-journal publishers offer you TOC service to provide faster service by giving direct link to full text or abstracts.
- **Citation alerts:** This service alerts you about the citation of a particular article in a new publication. This service is provided by citation database (Scopus and Web of Science) and also by some e-journal publishers such as Elsevier Science Direct.
- **Funding alerts:** This service allows you to find the opportunities for research funding through e-mails.
- **Conference alerts:** This service allows you to keep an eye on the conferences in the area of your interest. For example: Conference Alerts (http://www.conferencealerts.com/) keep you informed about academic conferences worldwide in the chosen subject area through e-mail; AllConference.Com (http://www.allconferences.com/) is a worldwide conference directory that provide free e-mail updates; H-net Humanities and Social-Sciences Online (http://www.h-net.org/) is an international interdisciplinary organization dedicated to developing the educational potential of the Internet and the World Wide Web.
- **Mailing list:** It provides a forum to exchange the ideas among people with similar interests across the globe. It is a useful way to keep yourself updated.
- **New publications:** This service provided by many book publishers allows you to create alert for the subjects of your interest.
- **Web page change:** This service notifies you about the change in a specific web page to remind you to re-visit the page for the latest updates and information through e-mail. Some of the services are ChangeDetection.com (http://www.changedetection.com/monitor.html), TrackEngine (http://www.trackengine.com/servlets/com.nexlabs.trackengine.ui.Login), Google Alerts (https://www.google.co.uk/alerts), etc.
- **News alerts:** This service allows you to e-mail the links to online news items through RSS feed.

With the introduction of computers for library and information services, there is a significant change in the current awareness services. The information is

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easily accessible through computerized information system due to the development in communication technology. Current awareness service plays a vital role in disseminating information in all the fields. This service no doubt provides a shortcut to the users to get the information that they are looking for; otherwise they would have to wade through mountains of books and research papers. It saves the time of the users, which can be used for some other purpose.

The term current awareness service is often used synonymously with selective dissemination of information. However, the term current awareness is a process to keep oneself up-to-date as explained above and the system through which the users are notified about the current documents are current awareness services, whereas selective dissemination of information is a mechanism to provide current awareness to the users based on the requirements of an individual, based on their profile. There are various ways of providing the profiles and it can be done in various forms such as free-text query, a rule sets, or an SQL query. The process of SDI is the inverse of information retrieval, where a user searches for a file of documents, while in SDI, the documents are searched for the files of user's interest.

Due to the explosion of information sources on the Web in all the fields and the difficulties faced by the users in surveying, querying, and filtering of information according to their needs and interests, the SDI system was implemented. Its goal was to deliver new information to users based on their interests, obtained via user's profiles. The concept is being used by many libraries. They have implemented SDI services through which they provide the users with the latest updates of bibliographical information from technical journals.

The concept of SDI was laid down by H. Peter Luhn and was implemented in 1959 in New York, where an IBM 650 data processing system, with some other card machines, reproduction equipment, and human operators, was able to process a small flow of information for around 30 users' profiles. The system was then called SDI 1. The second system was designed in 1960 called SDI 2. It was installed at some remote location and an implementation of third system *SDI 3* started in 1961. During this year, several other systems became operational and were known by their location names. Over the years, the concept of SDI led to a rapidly growing number of system installations.

Later, the concept given by Luhn underwent some significant changes due to innovations in ICT and library services. CAS is offered to the users based on their profiles due to the involvement of working of SDI. This can be defined with the help of the following Figure 9.2.

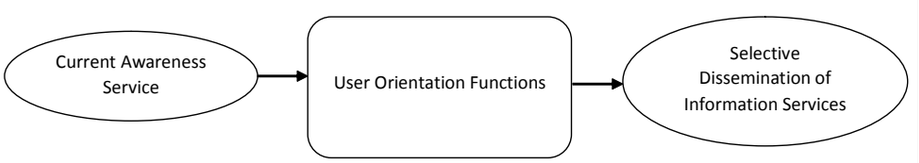

Fig. 9.2 *Working of CAS*

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In the above Figure 9.2, User Orientation Functions involve the following processes:

- Submission of interest of an individual
- Scanning of the received information and comparing the information with the subjects of interest
- Selection of the necessary information, supplying it to the client, and receiving a feedback from the client on the usefulness of the information
- User's satisfaction and if required, modification in the user's profile

Although there are a number of definitions provided by the researchers, a comprehensive definition of SDI based on other definitions can be given as:

SDI can be considered as one of the types of CAS, which involves the screening of documents and extracting the specified information as submitted by the users to meet their requirements and make the information available directly to the users to keep users update about the latest developments in the area of specialization.

9.5.3 Traditional way to perform SDI Service

Since every library is not equipped with computers, they perform manual operations for SDI services. There are several steps that are involved in manual operations:

- **Project Selection:** The first step in performing the manual operation of SDI services is selecting important projects that have to be considered for SDI system. The selection is made on preferential basis.
- **Project Profile:** A project profile is prepared based on the user's profile.
- **Document Profile:** Document profile is prepared on the basis of selected projects and user profiles by scanning the documents.
- **Comparing and Matching:** The document profile and user profiles are compared and matched.
- **Assessment:** The result is assessed periodically.

There are some sequential operations involved in the manual SDI services.

SDI Services Online

With the widespread use of the Internet, libraries have reinvented and transformed their processes to become "digital libraries". The addition to the information resources is the progressive incorporation of ICTs into information services. Scaling of information through traditional way is not feasible. So, libraries are required to acclimatize the new work environment to improve the techniques for providing services. The key intention of using SDI services is to provide specific relevant information to the users/researchers. This requires an exact matching mechanism. The problem in text database system is that there is no possibility of exact matching of information as there are increased chances of co-occurring of words without

being related to each other. This could be a hindrance in providing SDI services and a system was required that could provide exact matching technique and this was possible with information filtering technique.

Following guidelines have been proposed for preparing online SDI services by P.S. Kawatra in his book *Textbook of Information Sciences*.

- Acquiring user's profile and storing them
- Processing incoming material
- Matching user's documents
- Handling of cards

He has also proposed some guidelines for modified online SDI service as the following:

- User's demographic profile, profession and subject interests are surveyed.
- New and earlier materials are reviewed.
- Relevant publications are matched with subject interest of users.
- Selected materials are processed by abstracting, extracting, reviewing and analysing or compiling.
- Packets of materials in different forms are sent to users.
- Users are asked to fill out feedback forms to confirm the usefulness of the packages and to update the profiles of users.

The operations of SDI services are divided into two parts: Online and Manual.

Online operations

Online operations are those that are carried out by computerized database system. The following are the steps involved in online operations:

- The first step is the initial step of SDI services, which includes the process of scanning of new arrivals, recording, and storage of user's profile into the database. The operations of inputting new articles involve keen and exhaustive examination and scanning of new documents received in the library for maximum subject coverage. Recording and storage of user's profile consists of different functions from opening a profile in the user's name to filling it up until submission.
- The next step is information matching with the functions, specification of documents, time limit, and language specification. The document specification is the process involving information matching, where the information is examined in the whole record in the database centre for exact matching with the subject matter. The searching of documents is completed in three steps by searching the whole record for the subfields and then exact matching from the result of subfields.

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- The last step consists of confirming the information about the enquired query by sending notification to the user and obtaining user's feedback at the information centre for final matching in terms of their need for information and then finally, delivery of the large textual information.

Manual operations

The manual operations are those that are performed manually and are quantitatively and qualitatively based on capabilities and nature of requirements of users. The four steps of manual operations are: preparation of search profile, selection of qualitative information, selection of quantitative information, and distribution of voluminous information.

The whole operation is designed to meet the users' need for the core information using information matching technique. In case the related information is not available in-house, it can be collected from some other information service centre. This is another external operation of the SDI programme. The information obtained from the other information centre may be online or in printed form.

9.5.4 Techniques for Searching of Information in SDI

There are many searching techniques available for SDI services. They are the following:

- Confined searching (related to searching within previous results)
- Keyword searching
- Boolean searching
- Range searching
- Phrase searching
- Free-text searching
- Hyper-text searching
- Truncation

Confined searching technique is preferred for information matching for online SDI functions.

Specialties of SDI Services

The specialities of SDI services include:

- Existence of terminological dictionary or thesaurus of database to search the information with exact spelling of the term to be searched, where all the terms are organized in some logical relationship
- Availability of tool-tips to the nearest similar spelled words during inputting a term in free text searching. This feature gives more information related to the subjects in advance as well as ensures the correct spelling of the searched term.

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- It provides an automated indexing system, where all the terms are connected to the related source of reference. On the arrival of a new term as a field of keywords or subject heading, the term is automatically stored in the database, and arranged in an alphabetic sequence.
- The online SDI services facilitate the possibility to save the search profile to be executed again later. It also saves the search result under some suitable subject headings for general purposes.

Objectives of SDI Service

The basic objectives/ purpose of adopting SDI services are the following:

- To provide latest information to the users on the subject of their interest
- To notify about the current information clearly on a particular subject
- To expedite the service within short span of time
- To acquire the required information through scanning of journals, current awareness bulletin and other resources

Need for SDI Services

- To handle the available literature that is growing exponentially and increasing at double rate every decade
- To minimize the time spent by the user on the search process
- To satisfy the needs and requirements of the researchers
- To provide a user friendly service to the users

Once the required information is gathered based on the needs of the users, the selective information is distributed to the users through letters, e-mails, or through bulletin board for the common requests.

Check Your Progress

1. Define the term 'user education'.
2. What is the main aim of a library college?
3. State the two essential inputs of a lecture.
4. What are the key goals of IT in library user education programme?
5. Mention the various methods used for the delivery of CAS.
6. What are the techniques used for searching of information in SDI?
7. Who introduced the concept of Selective Dissemination of Information Services (DSI)?

9.6 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

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1. The term 'user education' includes all such efforts and programmes that will, whether collectively or individually, instruct and guide the current and future, and even potential users.
2. The main aim of a 'Library College' is to enhance the effectiveness of student learning, specifically with employing the facilities of a library and its bibliographically expert faculty for library centred independent learning.
3. Lecture is one method in which two types of inputs are used: sensory as well as auditory.
4. The key goals of IT in Library User Education Programmes are the following:
   - To enable an end user to carry out online information searches either himself or with the help of an intermediary, within his own subject field, as and when required, in connection with information needs
   - To enable an intermediary to carry out online information searches for end users within many different subject fields, from the available databases, on the various information retrieval systems
5. The various methods used for the delivery of CAS are the following:
   - By subscribing to some commercial and centralized service
   - By preparing and distributing bulletins
   - Selective Dissemination of Information (SDI) service
   - By circulating content page
   - By steering of periodicals
   - By exhibiting new arrivals
   - By using communication methods such as telephones, sms, e-mails and so forth.
6. There are many searching techniques available for SDI services. They are the following:
   - Confined searching (related to searching within previous results)
   - Keyword searching
   - Boolean searching
   - Range searching
   - Phrase searching
   - Free-text searching
   - Hyper-text searching
   - Truncation
7. The concept of Selective Dissemination of Information Services (SDI) was introduced by H. Peter Luhn and implemented in 1959 in New York.

9.7 SUMMARY

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- Several user studies performed in various countries prove that there are but a handful of scientists who actually utilize libraries optimally and have knowledge of different bibliographical tools.
- The term 'user education' includes all such efforts and programmes that will, whether collectively or individually, instruct and guide the current and future, and even potential users, keeping the following goals in mind:
  - o Recognizing own information needs
  - o Formulating the recognized needs
  - o Using the information services both efficiently and effectively
  - o Making an assessment of these services
- In an ideal situation, user education would be an ongoing process comprising two components—orientation and instruction—which are brought together as per the needs and demands of the users.
- User education, on the practical level, comprises the organizing of the various aspects of the courses, such as content of the course, timing of the course, timetabling, optimum group size and optimum duration for the course.
- The progression in the area of user education is documented well. To take an example, Professor of Library Science George Schlegel Bonn's work 'Training laymen in use of the library' carries a survey of the user education field and has information till the year 1958.
- It is Patricia B. Knapp to whom one can ascribe the origin of the systematic implementation of the user education concept.
- The Council of Library Resources and Association of College and Research Libraries in the USA was the one to start the institutionalization of user education.
- The UNISIST Bangkok and Rome Seminars of 1976 concluded that for every nation, user education is a major factor in the country's National Information Policy.
- In India, there has been no systematic effort made to institutionalize user education. All efforts that have been there have been sporadic and voluntary. The user education concept was much liked by information professionals and librarians all across the world.
- The objectives and goals for the creation of a course can be segregated into three major categories: psychomotor, affective and cognitive.
- Library user education is not part of a separate academic discipline. It comprises a set of skills that can be utilized similarly irrespective of what the subject of academic study might be.

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- Many have said that education is the process that goes to change learners. There are several factors that affect this process of education. Of all the various factors in this category, there are four basic ones which affect learning: feedback, understanding, activity and motivation.
- One of the most used and common instruction imparting methods is a lecture. Lectures are considered to be a good way of teaching or imparting instruction to large groups of students.
- Just like films, even videotapes are a media that contain both motion and audio. Such tapes are reusable, and this makes the creation and further updation of the content a less expensive task.
- Over the past two decades, the use of computers for the purpose of activities related to information has been on the rise. Such use of computers has led to the fast development of online information retrieval systems that are computer based.
- Evaluation is looked upon as having different meanings for different educational research workers. It is concerned with information gathering regarding an educational programme or course's effects.

  For evaluation, generally one of the following three methods are employed:
  - o Illuminative or responsive
  - o Psychometric
  - o Sociological or management
- The dissemination and flow of information has a wide notion in the field of information world, the basic objective of which is to make the masses aware of the information and knowledge so that they get benefited from it.
- Current Awareness Service (CAS) was also known as *reference service* in its early years. In a real sense, CAS is an extension of referencing services which have been provided by the libraries for a long time.
- The last few years have experienced an increase in information and have, thus, generated the need for speedy dissemination of information to the scientists to help them in their research work.
- CAS can be delivered by different methods. The methods can be:
  - o By subscribing to some commercial and centralized service
  - o By preparing and distributing bulletins
  - o Selective Dissemination of Information (SDI) service
  - o By circulating content page
  - o By steering of periodicals

- By exhibiting new arrivals
- By using communication methods such as telephones, sms, e-mails and so forth.

- The concept of SDI was laid down by H. Peter Luhn and was implemented in 1959 in New York where an IBM 650 data processing system, with some other card machines, reproduction equipment and human operators, was able to process a small flow of information for the profiles of around 30 users.
- Once the required information is gathered based on the needs of the users, the selective information is distributed to the users through letters, e-mails, or through bulletin board for the common requests.

9.8 KEY WORDS

- **Orientation:** It basically implies familiarization for something.
- **Psychomotor:** It relates to the origination of movement in conscious mental activity.
- **Computer aided instruction (CAI):** It is a program of instructional material presented by means of a computer or computer systems.
- **RSS:** It is a kind of web feed which permits users and applications to access updates to online content in a standardized, computer-readable format.
- **Boolean search:** It is a type of search allowing users to combine keywords with operators (or modifiers) such as AND, NOT and OR to further produce more relevant results

9.9 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. Mention the components of user education.
2. List the online education groups.
3. What are the methods used in online retrieval education?
4. Write a short note on documentation services.
5. What is the need of having Current Awareness Service (CAS)?
6. State the objectives of SDI services.
7. Identify the need of having SDI services.

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Long-Answer Questions

1. Discuss the development in the field of user education.
2. Explain the media and methodology adopted in the field of user education.
3. Describe the methods used for imparting instructions.
4. How is user education programme evaluated?
5. 'SDI can be considered as one of the types of CAS.' Do you agree with this statement? Give reasons for your answer.
6. 'The operations of SDI services are divided into two parts: Online and manual.' Discuss.

9.10 FURTHER READINGS

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UNIT 10 BIBLIOGRAPHIC SERVICES

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Structure

10.0 INTRODUCTION

In the previous unit, you studied about the user's needs, user education, documentation services, current awareness service and SDI. This unit will introduce you to the functions and uses of a bibliography. In addition, the unit provides a brief discussion on the Indian National Bibliography (INB) and the British National Bibliography (BNB).

A bibliographer's work, particularly, the results of analytical and historical studies resulting in descriptive details and systematic listing and recording is of great value to scholars in the areas of linguistics, literature, history, and other human studies. It also provides the basis for textual criticism. But this kind of high levels of investigation and intellectual pursuits is not warranted in the case of practical applications of knowledge as in social sciences and in pure sciences.

10.1 OBJECTIVES

After going through this unit, you will be able to:

- Discuss the functions and uses of a bibliography
- Prepare an overview of the Indian National Bibliography (INB) and the British National Bibliography (BNB)
- State the planning and compilation of a bibliography
- List the types of bibliography

10.2 FUNCTIONS OF A BIBLIOGRAPHY

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The most important functions of bibliography are:

- **To save the time of the user:** It saves the time of the user by providing relevant literature otherwise it would consume more time to collect the material or information. However, for bibliography even a scholar faced with such a vast amount of literature would use his way, wasting much time before he is able to read even of past of which he is required to study.
- **Easy access of information:** Information is vital to the development of various fields of knowledge. Therefore, it is essential that relevant information be brought to the attention of professionals, administrators and researchers, who have urgent need of it.
- **It acts as a bibliographic tool:** No modern library can function without bibliographical tools like bibliography.
- **To assist an enquirer:** To know the total outcome (current and retrospective) of material on particular subjects or topics, irrespective of the language, the origin or the physical nature of the items, and
- To explain issues concerning the variations and differences of texts of works, their editions and versions.

10.2.1 Uses of a Bibliography

The uses of a bibliography can be summarized as follows:

(i) To serve as a tool for book selection.

(ii) To help in identification and verification of bibliographic details of documents both old and current.

(iii) To help in inculcating reading habits, publication of relevant reading list is a must.

(iv) To help in location of material, in terms of place of publication, location, in the library of point of purchase.

(v) To save the time of the scholar by providing him the comprehensive list of documents on his subject of research.

(vi) To have bibliographical control of vast mass of documents produced in conventional and non-conventional forms and by manual and mechanical means, i.e, in short to control knowledge explosion.

(vii) To provide quick and easy access to information contained in documents to a user or scholar-- to keep him update.

(viii) To keep the scholar informed of the latest additions made to his subject by giving him the means of new publications given in the publisher's subject for it is an index compiled systematically.

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(ix) To make available a list of books known to exist in a certain library or else in a certain field of study such as a definite period of time, or a specific subject, or a given language, or a certain form of exposition or an individual author, and so on.

(x) To discover the life-story of books as a physical object, in respect of its printing, paper and other aspects of gross body of book.

(xi) To avoid duplication of research; in case of a researcher, bibliography enables him to find out what has already been written on his subject and allows him to keep himself well informed and up-to-date.

(xii) To promote the use of books and other materials by the publication of subject bibliographies and author bibliographies.

(xiii) To assist the user in locating the existence of or identifying a book or any reading material this may be of interest to the reader.

(xiv) To serve as a key or guide to the literature of the subject, for it is an index compiled systematically.

The UNESCO and the Library of Congress, in their survey report, 1950 have stated the following aims and functions of bibliography.

- "It's aims is to make it possible for intellectual workers, to learn of publications recording the developments in their fields of interest not only in their own countries but also all over the world;
- promote the effectiveness of a particular project in research;
- contribute to the cultural development and enjoyment which are derived from records of learning and culture;
- assist in promoting useful applications of existing knowledge and in making the applications which have been developed in one country, widely known to all countries."

Quick and easy access to information is vital to the development of various fields of knowledge. In this respect, bibliography plays a vital role. A scholar can very well know about the existence of document/documents in a particular field of knowledge. He can also identify a document by knowing its bibliographical details. It can serve as a books selection tool for the librarians. In well-established libraries, the bibliographical details help in locating the material. It is useful to a general reader and research scholar as well.

Bibliographic organization and services recognize no national or political boundaries. This is true because a book has universal value. Notwithstanding the practical impediments, it has to be made available for all and at all times. The 'Universal bibliographic control' actually is a plea as well as a plan. It points out to the mechanisms of announcing to the world wide output of materials for spreading

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awareness and also the means for accessing. Thus, a wide ranging variety of bibliographies are needed. Briefly stated, they are:

(i) Current and retrospective (national, regional and language) bibliographies

(ii) A variety of trade bibliographies,

(iii) A host of special bibliographies (on the basis of a wide variety of categories) and

(iv) Bibliographies of bibliographies.

10.3 INDIAN NATIONAL BIBLIOGRAPHY (INB)

The Indian National Bibliography (INB) has been conceived as an accurate, comprehensive and authoritative bibliographical record of current publications in the 14 major languages of India including English, based on the books received by the National Library, Kolkata, under the provision of the Delivery of Books Act, 1954.

The Indian National Bibliography Committee appointed by the Government of India, decided to have an authoritative bibliographical record of current Indian publications in all major Indian languages. It records material received in the National Library, Calcutta, under the Delivery of Books and Newspapers (Public Libraries) Act, 1956. As per the Act, every publisher has to deliver a copy of their publications to National Library, Calcutta and three other repository libraries within 30 days from the date of publication. It is mainly responsible for the implementation of two schemes, namely:

- Compilation and Publication of the Indian National Bibliography (both Roman Script and in the respective language scripts). This is a monthly record of current Indian publications in 14 languages including English based on receipts in the National Library, Kolkata
- Compilation and Publication of Index Indiana (in Roman Script), an Index to select articles appearing in current Indian periodicals presently in six languages.

On the basis of the recommendations of an expert group in the Ministry, the publication of the Indian National Bibliography and Index Indiana has been fully computerized. The monthly volumes of INB, since June 2000 appear regularly.

The INB records, since its inception in 1958 have been retro converted into electronic data. The entire data along with recent records will be made available online. It started publication from October – December 1957 and was published on a quarterly basis up to 1963; afterwards, its frequency altered from a quarterly basis to a monthly basis.

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Scope

It includes all publications produced in the following major Indian languages, namely Assamese, Bengali, Gujarati, Hindi, Kannada, Malayalam, Marathi, Oriya, Punjabi, Sanskrit, Sindhi, Tamil, Telugu, Urdu, and English. The following categories of publications are excluded:

(i) Musical scores

(ii) Maps

(iii) Periodicals and Newspapers (except the first issue of a new periodical or periodical published under a new title)

(iv) Keys and guides to textbooks

(v) **Ephemeral items:** Initially, it was divided into two parts–Part I covered general publications and Part II covered government publications and each part had two sections–alphabetical and classified. Since 1973, the two parts have been combined into one with two sections – alphabetical and classified.

Entry

Each entry consists of the class number, author's name, full title, place of publication, publisher's name, year of publication, pages, nature of illustrations, size, nature of binding, price, series, and annotations wherever necessary. The second section is the alphabetical index, giving author's name, title, and subject in an alphabetical order. For subject headings, chain procedure has been followed. Due to variety of scripts prevalent in India, Roman script (English) was decided to be used for the bibliography. The authors' names of books and titles in Indian languages have been translated into Roman script with diacritical marks and then arranged in an alphabetical order under each class. The language of the book is denoted by symbols given at the left hand bottom corner of each entry.

10.3.1 Utility of INB

The INB serves the following functions:

- It records the country's intellectual output.
- It brings together the bibliographical data of 14 languages of India, including English, under one roof.
- It facilitates wide publicity of books and publishers.
- It provides source material for compilation of subject bibliographies and book statistics.
- It is an essential book selection tool for librarians and book sellers.
- It acts as a guide in classification, cataloguing, and so on for library professionals.

10.3.2 Components of INB

The components of INB include following parts:

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(a) INB: Classified Part: Entries in the INB are arranged in a classified sequence as per the Dewey Decimal system of subject classification (22nd edition). The corresponding Colon Classification (6th Edition) is also assigned at the right hand corner below each entry. Chain Procedure is used for subject headings. If more than one entry comes under the same classification number, the entry is arranged according to the alphabetical order with regards to the author's name. If there are two or more works by the same author under the specific classification number, the name of the author is not repeated and the works are arranged alphabetically by their titles under the specific Dewey Decimal Classification (DDC) number.

(b) INB: Author and Title Index: In this part, the entries are arranged according to the alphabetical order. When the author of the book is known, it can be traced using Author and Title Index. If the information in the index entry is found inadequate and more information is required, it refers to the entry in the classified part with the help of the Class Number assigned at the end of the Author Index Entry.

(c) INB: Subject Index: To find the books in a particular subject, one can take the help of the Subject Index, which refers to the classified part by the means of DDC Number assigned against the name of the subject. For example, in the Subject Index under India, all the subjects related to India have been brought together.

10.4 BRITISH NATIONAL BIBLIOGRAPHY

The British National Bibliography (BNB) lists the books and new journal titles published or distributed in the United Kingdom and Ireland since 1950. It also lists forthcoming book titles and hand-held electronic publications for example, CD-ROMs, deposited with the Legal Deposit Office since 2003.

The national bibliography records the publishing activity of the United Kingdom and the Republic of Ireland and as such is a measure of their intellectual output. This has traditionally included printed publications and more recently has been extended to include electronic publications following the extension of legal deposit to this class of material in 2003.

New books and serials have been recorded in the British National Bibliography (BNB) since 1950. The BNB is the single most comprehensive listing of UK titles. UK and Irish publishers are obliged by law to send a copy of all new publications, including serial titles, to the Legal Deposit Office of the British Library. This material is catalogued by experienced staff in accordance with international standards for resource description and access. This work is done in

partnership with the five other British and Irish libraries allowed by law the privilege of legal deposit, under the Legal Deposit Libraries Shared Cataloguing Programme (LDLSCP).

The BNB also contains details of forthcoming books. Under the Cataloguing-in-Publication Programme (CIP) information on new titles appears up to 16 weeks ahead of the announced publication date. Advance information on well over 50,000 titles each year is provided in this way.

The coverage of the BNB has always been selective with the emphasis being on mainstream monographs available through normal book buying channels.

The availability of BNB records was traditionally shown by the BNBMARC hit-rate derived from the currency survey carried out by the UK Office for Library and Information Networking (UKOLN), but this was discontinued from 1st April 2005. A subset of the BNB, i.e. books, serials and forthcoming publications has been published as Linked Open Data.

Extending the scope of the British National Bibliography

Other discrete areas of publishing activity contribute to the national bibliography, not all of which are covered by the British Library. Government and many other official publications, for example, are recorded in the catalogues produced by the Stationery Office. In cooperation with other organizations, Collection Metadata is currently developing plans for further extending the scope and coverage of the national bibliography. For example, records for UK online electronic resources began to appear in the BNB from the third week of February 2003.

10.5 TYPES OF BIBLIOGRAPHIES

Let us study the types of bibliographies.

1. **Annotated bibliography:** An Annotated bibliography is usually a note added to an entry in the author bibliography to elucidate, evaluate, or describe the subject and contents of a document. It requires skills for concise exposition and succinct analysis. It contains two distinct parts, namely, the bibliographical citation and a brief descriptive paragraph including the salient features of the article or subject of the text. This indicates the relevance and accuracy of the document to the reader as per their information needs.
2. **Current bibliography:** A Current bibliography records currently or recently published material, with the intent of reporting the recent literature as it appears. It is an index to new publications in print for a defined period. The lists may be compiled for a subject or for a form like books, periodicals, music, and so on.
3. **National Bibliography:** A National Bibliography is a 'bibliography of documents published in a particular documents written in the language of

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the country'. It tries to list as comprehensively as possible the county's publication output. It is a window to the literature of and on a country. The national bibliographies have a long history and are more popular since the 19th century. The national bibliographies have undergone tremendous changes with the advent of electronic databases. Now, national bibliography of a country is accessible online and is published on DVDs.

4. **Retrospective bibliography:** A Retrospective bibliography lists documents or parts of documents, such as articles, published in previous years, as distinct from a current bibliography. Therefore, a retrospective bibliography lists works that have a common element like subject and are published during a particular period in the past. The retrospective bibliographies have two themes, firstly, they are research oriented that is, they are prepared to open any missing publications. And secondly, didactic, which means they aim to teach the reader what is already known (to others) in a specific subject area.
5. **Serial bibliography:** A Serial bibliography appears at fixed intervals of time, for example, weekly, monthly, quarterly, annually and its mission is to report titles, often both book titles and article titles (as well as dissertations, book reviews, pamphlets, and other types of material) as they appear.

10.6 PLANNING AND COMPILATION OF BIBLIOGRAPHY

Compilation of bibliographies may be done in anticipation or on demand. In any case, the primary requirement for compilation is subject knowledge. The earlier times witnessed the subject experts as bibliographers as in the case of indexes, reviews and others. However, presently trained Library and Information Science (LIS) professionals are ready to accept the task and compile a bibliography with efficiency. Generally, the reference section of a library is bestowed with the preparation of bibliography service. Mentioned below are the basic steps of compilation of bibliography.

Author Krishan Kumar identified the following steps for the preparation of bibliographies:

(i) **Planning:** It involves definition of the subject and its scope; items of information to be included; kinds of entries and their arrangement.

(ii) Search for documents-- from catalogues, books, periodicals and other micro documents.

(iii) Selection of items to be included in the bibliography if it is selective/ elective and not comprehensive.

(iv) Preparation of entries with bibliographical information in accordance to the standard catalogue code.

(v) Arranging the entries in classified or alphabetical or both as per the requirement.

(vi) Preparation of bibliography in typed, mimeographed or print form.

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Check Your Progress

1. Mention two functions of a bibliography.
2. What is the use of a bibliography?

10.7 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Two functions of a bibliography are the following:
   (i) It provides easy access of information
   (ii) It acts as a bibliographic tool
2. A bibliography serves several uses. Some of the important uses are the following:
   (i) To help in inculcating reading habits, publication of relevant reading list is a must.
   (ii) To help in location of material, in terms of place of publication, location, in the library of point of purchase.
   (iii) To save the time of the scholar by providing him the comprehensive list of documents on his subject of research.
   (iv) To have bibliographical control of vast mass of documents produced in conventional and non-conventional forms and by manual and mechanical means, i.e, in short to control knowledge explosion.

10.8 SUMMARY

- A bibliographer's work, particularly, the results of analytical and historical studies resulting in descriptive details and systematic listing and recording is of great value to scholars in the areas of linguistics, literature, history, and other human studies.
- Quick and easy access to information is vital to the development of various fields of knowledge. In this respect, bibliography plays a vital role.
- Bibliographic organization and services recognize no national or political boundaries. This is true because a book has universal value.
- The Indian National Bibliography (INB) has been conceived as an accurate, comprehensive and authoritative bibliographical record of current

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publications in the 14 major languages of India including English based on the books received by the National Library, Kolkata, under the provision of the Delivery of Books Act, 1954.

- Entries in the INB are arranged in a classified sequence as per the Dewey Decimal system of subject classification (22nd edition). The corresponding Colon Classification (6th Edition) is also assigned at the right hand corner below each entry.
- The INB records, since its inception in 1958 have been retro converted into electronic data.
- The British National Bibliography (BNB) lists the books and new journal titles published or distributed in the United Kingdom and Ireland since 1950.
- New books and serials have been recorded in the British National Bibliography (BNB) since 1950. The BNB is the single most comprehensive listing of UK titles.
- An annotated bibliography is usually a note added to an entry in the author bibliography to elucidate, evaluate or describe the subject and contents of a document.
- A current bibliography records currently or recently published material, with the intent of reporting the recent literature as it appears.
- A retrospective bibliography lists documents or parts of documents, such as articles, published in previous years, as distinct from a current bibliography.
- Compilation of bibliographies may be done in anticipation or on demand. In any case, the primary requirement for compilation is subject knowledge.

10.9 KEY WORDS

- **Bibliography:** It refers to a list of the written sources of information on a subject.
- **Dewey Decimal System:** It is a system of classifying books and other publications whereby main classes are designated by a 3-digit number and subdivisions are shown by numbers after a decimal point.
- **Periodical:** It is a publication issued at regular intervals, usually monthly or weekly.
- **Monograph:** It is a treatise on a particular subject, as a biographical study or study of the works of one artist.
- **Mimeograph:** It is a duplicating machine which produces copies from a stencil, now superseded by the photocopier.

10.10 SELF ASSESSMENT QUESTIONS AND EXERCISES

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Short-Answer Questions

1. State the utility of the Indian National Bibliography (INB).
2. What are the categories of publications excluded under the INB?
3. List the uses and functions of a bibliography as stated by the UNESCO and the Library of Congress.

Long-Answer Questions

1. Discuss the scope of British National Bibliography (BNB).
2. Explain the types of bibliographies.
3. Discuss the planning and compilation of bibliographies.

10.11 FURTHER READINGS

Lea, Peter W**.** 1990. *Printed Reference Materials*. Third Edition. London: Library Association.

Sharma J.S. and Grower D. 1987. *Reference Service and Sources of Information*. New Delhi: ESS.

Bell, Simon. 19996. *Learning with Information Systems: Learning Cycles in Information Systems Development*. London: Routledge.

Cooper, M. D. 1996. *Design of Library Automation Systems: File Structures, Data Structures and Tools.* New York: John Wiley & Sons.

Haravu, L. J. 2004. *Library Automation: Design, Principles and Practice*. London: Allied Publications.

Kaul, H. K. 1992. *Library Networks: An Indian Experience*. New Delhi: Delnet.

Kumar, P. S. G. 2004. *Information Technology: Applications (Theory and Practice)*. New Delhi: B. R. Publishing.

NOTES

BLOCK - V
ELECTRONIC RESOURCES & SEARCH TECHNIQUES

UNIT 11 ELECTRONIC RESOURCES

Structure

11.0 INTRODUCTION

Traditionally, the written words were the sources of information in any branch of knowledge, giving rise to the term 'literature' that included all definitive sources of information including journals, encyclopedias, handbooks, textbooks, monographs in series, progress reports, annual reviews, conference proceedings, dissertations and databooks.

Today, with the growth of electronic media and other forms of dissemination of information, the term 'information sources' has replaced the term 'literature'.

In the previous unit, you studied about the types of bibliographies and planning, compilation of bibliography. This unit, will introduce you to the types of electronic services available today and their advantages and disadvantages.

11.1 OBJECTIVES

After going through this unit, you will be able to:

- Identify the Internet information resources
- List the types of electronic resources and their usage
- Discuss the advantages and disadvantages of electronic resources

11.2 INTERNET INFORMATION RESOURCES

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Resources in electronic format (including documents and non-documents) that provide information or an indicator to the information and are accessible over the Internet are referred to as Internet information resources.

Publishers of electronic information resources

Traditional players offering electronic versions of their printed resources as well as new enterprises offering new products and services that are 'born digital' are included under the publishers of electronic information resources. There is a new role of electronic aggregators who are basically subscription agents. Computer-assisted instructions and multimedia interactive educational courseware is gaining popularity with the institutions of higher-learning, especially the distant and continuing education departments, which actively support and contribute to their development and implementation. Internet information resource publishers include the following:

(a) Traditional commercial publishers: Electronic versions of printed resources through websites or through special interfaces and Web-based services developed for this purpose are offered by most of the reputed commercial publishers of printed resources, such as Elsevier Science, Kluwer Academic Press, Academic Press, Springer Verlag, Wiley InterScience, Sage Publications, and so on:

- Elsevier Science Publishers http://www.sciencedirect.com/
- Springer Verlag http://link.springer.de/
- MCB University Press http://www.emeraldinsight.com/
- Institute of Scientific Information (ISI) http://www.Webofscience.com/
- American Institute of Physics (AIP) http://ojps.aip.org/

The technology associated with Web-enabling of contents, hosting, accessing, and their maintenance is highly cost intensive, prompting publishers to use one of the following three methods for publishing their contents on the Internet:

- Large publishing houses develop their own technologies for Web-enabling their electronic contents and maintain their own access interface, content management solutions, and hosting options. They also offer their hosting services to other publishing houses. For example, Elsevier Science.
- Hosting services and access interfaces are hired from other publishers by smaller publishing houses and learned societies.
- Content management and hosting services are provided by technology-intensive companies like 'Catchword' to the publishers for their electronic resources, which includes comprehensive, tailored, electronic publishing, contents management, and access solution.

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(b) **New E-Publishing Ventures:** New electronic publishing ventures and software companies have emerged offering products and services that do not have their electronic counterparts, supporting leading edge technology to meet demands of the market place. Resources, such as online courseware and multimedia information products, are being produced by the new e-publishing ventures.

(c) **Scholarly societies:** Scholarly societies are making electronic versions of their publications available online through their websites. Some have developed their own technology for Web publishing and hosting, while the rest hire technology and hosting services from other electronic publishers. Examples are Society for Industrial and Applied Mathematics (SIAM), Association for Computing Machinery (ACM), IEEE/IEE (Institute of Electrical and Electronics Engineers/Institution of Electrical Engineers), and so on.

(d) **Universities and Institutions:** Specialized collections including online courseware, subject gateways, and portals are hosted by several universities and research institutions. As members of the Networked Digital Library of Dissertations Initiatives, several universities are hosting doctoral dissertations submitted to their respective universities. Universities and research institutions also hire services of commercial ventures, such as Blackboard (http://www.blackboard.com/) and WebCT (http://www.Webct.com/).

(e) **Electronic Aggregators:** Intermediary services that aggregate electronic journals and other resources from different publishers and offer them to their clients through a single interface or search system are called electronic aggregators. Electronic aggregators provide full-text access to electronic journals and other resources through their search and browse interfaces very much like online vendors. Examples are JSTOR (Journal Storage) and OCLC (Online Computer Library Center, Inc.) Electronic Collection Online.

(f) **Non-Commercial Publishers and Individuals:** Various groups and individuals have compiled collections and meta resources that are quite prevalent on the Internet with several meta resources, which are dedicated to providing access to electronic resources offered free of charge on the Internet.

11.3 TYPES OF ELECTRONIC RESOURCES

There are different variations and categories of electronic resources on the Internet. Most of them follow the traditional publishing, while others are innovative in their design and approach. Eventually, more innovative models of scholarly communication will emerge taking advantage of the technological capabilities. The information resources available via the Internet have been categorized by the

National Centre for Scientific Information (NCSI) (http://144.16.72.189/is213/int-sources/RESKT.htm) as described in the following sections.

11.3.1 Primary Sources of Information

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Let us study the primary sources of information in detail.

Electronic Conferences

Electronic conferences are important resources for researchers, and scholars in every discipline are also called electronic forums, electronic user group, listservs, discussion groups, and so on. Through this medium, scholars get to know what topics are being discussed in their field, who are the people involved in these discussions, and as result, they make themselves known within their discipline by their own contributions. Electronic forums are perhaps the first places where calls for papers and other professional announcements appear, and are places for scholars to meet and forge collaborative relationships. Access to Listserv conferences are by subscription and are handled by Software programs, such as 'listserv', 'comserve' and 'listproc' that distribute messages from any member(s) to the whole group. The conferences are not live-time conferences and distribute information via e-mail and messages received by subscribers in their email are known as postings.

The following Internet-based directories can be used to locate listservs in a given discipline:

- Directory of Scholarly and http://www.kovacs.com/directory.html
- Professional E-Conferences Tile Net http://tile.net/
- Publicly Accessible Mailing Lists http://paml.alastra.com/
- Topica: Tool for Finding Discussion Lists http://www.topica.com/
- Google Groups http://groups.google.com/
- Yahoo Groups http://groups.yahoo.com/

Courseware/Tutorials/Guides/Manuals

Online coursewares are basically Web-based educational tutorials or guides that provide higher degree of interactivity, flexibility and benefit of self-pace to the users. There is a great degree of variance in the online courseware in their coverage and quality. Online courseware is designed to provide computer-based training to users over the Internet and is created exclusively for the Web, incorporating all features and facilities offered by the new technology. There are more than 12,000 online courseware available on the Web as listed by Telecampus, Canada (www.telecampus.edu/). 'Web-based Online Interactive Courseware in Information Technology' is a portal under a project sponsored by the Ministry of Information Technology that is available athttp://www.iitd.ac.in/courses/, having 4,000 courseware including 375 courseware in public domain.

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Electronic Journals

Electronic journals, also called 'e-journals', are electronically prepared and distributed journals and newsletters. As a general definition, we can say an e-journal is any journal, magazine, e-zine and Webzine newsletter or type of electronic serial publication which is available over the Internet and can be accessed using different technologies, such as WWW, Gopher, ftp, telnet, e-mail or listserv. Today, most traditional are being published on the Web and in print.

Patents

The design or manufacture of products and processes that are protected and secured for the exclusive profit of the designer or inventor are patents. Patents are for a limited number of years that varies in different countries from fifteen years to twenty years. Full-text of patents registered in their respective countries is provided by the department that controls the registration of patents in a country through their Websites. The United States Patent and Trade Mark Office (http://www.uspto.gov/main/patents.htm) provides information on all patents registered in the US free of cost. Krislyn's Favorite Patents, Trademark & Copyright Sites (http://www.krislyn.com/sites/patent.htm) are examples of meta resources dealing exclusively in patents. Likewise, 'Patent Alert Service' (http://www.vatentalert.com/) is available as a free e-mail service that gives periodical updates about inventions recently patented in the United States and includes descriptions of patents in the fields defined by the user.

- http://patents1. ic.gc.ca/intro-e.html Canadian Patent Database
- http://www.derwent.com/Derwent Patents
- http://www.patents.ibm.com/IBM Intellectual Property Network
- http://www.krislyn.com/sites/patent.htmKrislyn's Patents, Trademark & Copyright Sites
- http://pk2id.delhi.nic.in/sera.html NIC Patent Cell
- http://www.patentalert.com/Patent Alert Service
- http://pctgazette.wipo.int/ Patent Cooperation Treaty Electronic Gazette
- http://www.uspto.gov/main/patent.htmUS Patents & Trademark Office
- http://www.wipo.org/World Intellectual Property Organization

Electronic Preprints and E-prints

Research articles that are made available for distribution through the network in electronic format before they go through the process of peer reviewing are electronic preprints. Ginsparg preprint archive (http://www.arXiv.org/) is a means of communication for a growing number of fields, starting with theoretical high-energy physics and later spreading to other areas of physics, and now also to computer science and mathematics. The Ginsparg preprint archive processes a

substantial 25,000 submissions of the two million weekly hits it receives from institutions outside the United States, including many research facilities in developing regions. Some benefits offered by open archiving are as follows:

- Removal of the cost barrier to high-priced journals
- Reduction of time in announcing research findings
- Provision of access to all with Internet capability

This has resulted in the setup of other e-servers, facilitating the movement of free scientific publishing. Examples of preprint servers in other disciplines are as follows:

- Ginsparg Preprint Archive (ArXiv.org)http://www.arXiv.org/
- UK e-Print archive mirror http://xxx.soton.ac.uk/
- Open Archives lnitiative http://www.openarchives.org/
- PubMed Centra http://www.pumedcentral.nih.gov/
- American Mathematical Society Preprint http://www.ams.org/preprints/ Server
- CERN Preprint Server http://preprints.cern.ch/
- Chemical Physics Preprint Database http://www.chem.brown.edu/chem-ph.html
- Chemistry Preprint Server http://www.chemWeb.com/preprint
- Economics Working Paper Archive http://econwpa.wustl.edu/ wpawelcome.html
- SISSA Preprint Server http://babbaae.sissa.it/
- High Energy Physics Preprint Database http://wwwspires.slac.stanford.edu/ FIND/hep
- Nitride Semiconductor Research http://nsr.mii.mrs.ora/preprints/Preprint Server
- Clinical Medicine and Health http://clinmed.netprints.org/
- Department of Energy's PrePRINT http://www.osti.gov/preprint/Network
- Theoretical http://www.chemie.uniregensburg.de/pub/Chemistry Preprints preprint/GENINFO.html

The term used to describe electronically mounted copies of the final, peer-reviewed versions of journal articles is 'E-prints'. The Open Archives Initiative (OAI) is an important international movement for standardizing archiving procedures for self-archiving, which aims to develop and promote the use of a standard protocol designed for better sharing and retrieval of e-prints residing on distributed archives. 'Self-archiving' is a term used to refer to the process whereby individual authors submit their own papers to a server or archive of their choice. Authors can submit e-prints to a server administered by an 'institutional archive' like an organization or scholarly society, which is most probably their university or research institute.

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Discipline-based archives and other specialty archives are also available like the Electronic Research Archive in International Health (ERA), set up by the long-established international medical journal, *The Lancet*.

Projects (Ongoing and Completed)

Time-bound research undertakings are award individuals, group of individuals and institutions by several agencies with well-defined goals and or tangible products or services. Information is easily available through directories and compilations on projects that are ongoing or those that are completed including:

- Compilations by sponsoring agencies
- Compilations by the institutions that get the projects from various sponsoring agencies
- Other compilations and directories

A list of research projects currently underway in specified fields is available with a brief description of the projects including details of the investigators and place of investigation.

Examples include:

- Boston University: Research Projects Directory http://scv.bu.edu/PROJECTS/
- Knowledge Discovery in Databases: Projects http://orgwis.gmd.de/explora/pages.html
- Science experiments in Physics, Mathematics, http://xxx.lanI.gov/Nonlinear Sciences, and Computer Science
- Signal Processing Information Base (SPIB) http://spib.rice.edu:80/spib.html
- Social Science Research Resources http://socsci.colorado.edu/POLSCI/RES/ research.html

Science/Research News

Science and research news are important sources of information as they provide information for most recent developments which is very important to scientists and technologists. Periodicals devoted exclusively to publish science, research and technical news for a given discipline are available for several core disciplines. Some of the important resources on science and research news include:

- UniSci: International Science News http://unisci.com/
- Earth Research: Research News http://www.earthresearch.com/links.shtm
- Combigenix News http://www.combigenix.com/news/
- Newscenter: Up to the Minute News http://gwis2.circ.gwu.edu/-grice/tech.htm

- MagazineCity.net: Science News http://store.vahoo.com/magazinecitv/3326- 52.html
- The Scientific World Newslab http://www.thescientificworld.com/
- Scoop! Personalised News Service http://www.scoopdirect.com
- The Ultimate News Links Pagehttp://pppp.net/links/news/

Software

Free software and scripts of all kinds and types available on the Internet that can be run, copied, distributed, studied, changed and improved under General Public License (GPL).

Some of the free software sites are as follows:

- Downloads.com http://download.cnet.com/
- GNU Free Software Directory http://www.gnu.org/directory/listing.htmI
- Freeware Home http://www.freewarehome.com/
- Jambo: Free and Shareware http://www.jumbo.com/
- Freeware Palm http://www.freewarepalm.com/
- Zdnet http://www.zdnet.com/zdi/software
- Shareware.com http://www.shareware.com/
- Chemistry Software Exchange http://phse.npac.syr.edu:8015/rib/repositories/
- csir/catalog/index.html
- Engineering Software on the Internet http://www.engcen,com/software.htm

Standards

How materials and products should be manufactured, defined, measured or tested according to proven and accepted methods would define technical standards. The Bureau of Indian Standards (BIS), in India, is an independent national body funded by the Government of India, and is the largest originator of standards. Companies or other organizations, both national and international, may issue standards many of which are free or require subscription on pay-per-transaction basis. Various international organizations, such as ANSI (American National Standards Institute), ISO (International Organization for Standardization), IEEE (Institute of Electrical and Electronics Engineers) and NIST (National Institute of Standards and Technology), issue global standards. In the library field, MARC (MAchine-Readable Cataloging) and its variant are bibliographic standards used most extensively for cataloging of bibliographic records. For rendering, display and printing of bibliographic records, we have AACR II (Anglo-American Cataloguing Rules (AACR). Some important websites with information on standards are as follows:

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- British Standards Institution www.bsi-global.com/
- Bureau of Indian Standards http://www.bis.org.in/
- ASTM International http://www.astm.org/
- American National Standards institute (ANSI) http://www.ansi.org/
- DIN Deutsches lnstitut fulr Normung e.V. http://www.din.de/
- IEEE Standards http://www.ieeexplore.org/lpdocs/epic03/standards.htm
- El Web Standards http://www.ei.org/
- World Standards Services Network http://www.wssn.net/WSSN/index.html

Technical Reports

Scientific papers or articles that provide a detailed account of work done on a particular project is a technical report and are generally prepared by the research workers themselves for submission to their employer, funding agency or to others interested in the work. These reports do not get published in journals or conference proceedings but report literature is issued by research and development agencies, such as NASA (National Aeronautics and Space Administration), NTIS (National Technical Information Service), INIS (International Nuclear Information System), GE (General Electric), RAND (Research And Development), and so on. Some important Internet-based sources of information for technical reports are as follows:

- DOE's Scientific and Technical Literature http://www.osti.gov/bridge/
- National Technical Information Service http://www.ntis.gov/
- NASA Technical Reports Server http://techreports.larc.nasa.gov/cgi-bin/NTRS
- Networked Computer Science Technical http://www.ncstrl.org/Reference Library
- SCS Technical Report Collection http://reports-archive.adm.cs.cmu.edu/
- Marshal Technical Report Server http://mstrs.msrs.nasa.gov/

Electronic Theses and Dissertations

A requirement for the award of Ph.D. degree is the submission of theses to the universities. It is a useful source of information for the new and ongoing research as it contains records of an original contribution to knowledge. Word processing software packages, such as MS Word, LaTex, Word Perfect, Word Pro, and so on, or one of the desktop publishing packages, such as Page Maker, Ventura, and so on, are used to create doctoral dissertations submitted to universities and academic institutions, and are highly valuable collections. These can be easily converted into PDF, Post Script or XML and hosted on the Web. Electronic submission of doctoral dissertations has been implemented by some universities and institutions under the overall umbrella of an international digital library initiative called 'Networked Digital Library of Theses and Dissertations' (NDLTD).

There are 125 members of NDLTD initiatives from all over the world including IIT Bombay and University of Mysore.

- Networked Digital Library of Theses http://www.theses.org/and Dissertations
- Academic Dissertation Publishers http://www.dissertation.com/
- Theses and Dissertations http://www.umi.com/
- UMI Digital Dissertations http://wwwlib.umi.com/dissertations/main
- VT ETDs from the Scholarly http://scholar.lib.vt.edu/theses/

Communications Project Databases, Data Sets and Collections

Abstracting and Indexing Databases (Bibliographic Databases)

A collection of records pertaining to a specific field of study is termed as a database. Bibliographic databases are now available on various media including abstracts of chapters in books, journal articles and conference proceedings. Media with high storage capacity, longevity and ease of transportation, such as CD-ROM and DVD-ROM (Digital versatile disc-read only memory), has encouraged production of several CD ROM-based information products including several bibliographic databases. For example, Silver Platter alone produces more than 250 CD-ROM information products. Online databases earlier available only on CD-ROM or through online vendors are also available on the Web with added functionality and features today. Some Internet-based online databases are as follows:

- AGRICOLA http://www.nal.usda.gov/ag98/
- Beilstein Abstracts on ChemWeb http:/www.chemWeb.com/databases/beilstein/
- ERIC Databases http://ericir.syr.edu/Eric/
- GPO Online: US Government http://www.access.auo.rov/sudocs/db2.htmlPrinting Office Database
- PubMed Medline http://www.ncbi.nlm.nih.gov/PubMed/
- Recent Advances in Manufacturing http://www.eevl.ac.uk/ram/index.html
- SciBASEhttp://www.thescientificworld.com/scibase/
- Energy Files http://www.doe.gov/EnergyFiles/
- PubScience http://pubsci.osit.gov/

Databases are being made Web accessible on subscription by hosts, such as DialogWeb, STNEasy, Engineering Village, and so on.

Citation Databases

Any reference to an article or part of an article identifying the document in which it may be found is a citation. For example, 'cited articles' are found at the end of an article and the article that provides references is called 'citing article'. A citation

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index basically is a list of cited articles. ISI Citation Databases are a collection of multidisciplinary databases of bibliographic information gathered from thousands of scholarly journals and indexed to allow search for specific articles by subject, author, journal and/or author address. The ISI databases includes the article's cited reference list, also called a bibliography, for each article, thereby, allowing the databases to be searched for articles that cite a known author or work. Some important citation indices produced by the ISI (http:// www.isinet.com/) are as follows:

- Science Citation Index Expanded
- Social Sciences Citation Index
- Arts and Humanities Citation Index
- ChemSciences Citation Index
- BioSciences Citation Index
- Clinical Medicine Citation Index 'Web of Science' (http:// www.Webofscience.com/) hosts the citation products and services from the ISI and performs searches on ISI citation databases and navigates easily through the results. The full-text on a publisher's site can be accessed from the list of articles, retrieved from the databases available in the Web of Science. It is also possible to view lists of the article's references, articles that cite the article or articles that are related to or share references or co-citations with the article.

Digital Collections (Images, Audio and Video)

The Internet and Web technology supports multimedia websites including information in the form of text, images, sounds and movies, with a collection of sounds and images, many of which can be used for commercial as well as personal purposes. Special plugins, such as Flash, Macro Media Players, and so on, may be required for some multimedia information products. Examples of multimedia digital collection on the Web are as follows:

- NASA's Multimedia Gallery http://www.nasa.gov/hqpao/library.html/
- The Great Buildings Collection http://www.greatbuildings.com/
- The Nine Planets http://seds.lpl.arizona.edu/nineplanets/nineplanets/ nineplanets.html
- Specialized image search engines available on the Internet help to track down an image. These include:
- AltaVista Image Search http://www.altavista.com/sites/search/simage

  Ditto http://www.ditto.com/

  Excite http://www.excite.com/

  FAST Multimedia Searchhttp://multimedia.alltheWeb.com/

- Google Image Search http://images.google.com/advancedm_image_search

  HotBot http://hotbot.Iycos.corn/
- Ithaki Image and Photo http://www.todalanet.com/images/Metasearch

  IXQUICK http://www.ixquick.com/

  Lycos Multimedia Searchhttp://multimedia.lycos.com/

  Picsearch http://www.picsearch.com/

  Scour http://www.scour.com/

  Yahoo! Picture Gallery http://gallery.yahoo.com/

  Big Search Engine Index to http://www.search-engine-index.co.uk/Images Search Images

Equipment/Product Catalogs

A listing of products along with complete specifications about the product on the Internet is a Web-based catalog. It is especially helpful for corporates in identifying the recent products available in the market in order to purchase them. These are searchable and user reviews of the product are included on the site. Examples include:

- Camie-Campbell Product Catalog http://www.camie.com/brochures.htm
- Sony Electronic Productshttp://www.sonystyle.com/home/home.isp
- Minolta Europe http://www.minoltaeurope.com/products/products.html
- DesignInfo.com http://www.DesignInfo.com/
- System Optimization Information http://www.sysopt.com/
- Marketplaces Providing Product http://www.sourceguides.com/markets/byS/cat/ Catalog Services Catalog.shtml

Scientific Data Sets (Numeric, Property and Structural Databases)

Scientific data sets include numeric, property and structural databases, and contain factual data, such as numeric, property and structural information on the topic indexed. These are considered an authentic source of information for researchers as individual experts or group of experts critically assess the data collections. Important examples are as follows:

- Aladdin Database Serverhttp://www-amdis.iaea.org/
- Data Analysis in the Social Sciences http://uts.cc.utexas,edu/-fackler/data.html
- GrainGenes http://wheat.pw.usda.gov/
- LIGAND http://www.genome.ad.jp/dbget/ligand.html
- The Nuclear Explosions Database http://www.agso.gov.au/information/structure/ isd/database/nukexp_query.html

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Library Catalogs (including Union Catalogs)

Librarians were one of the earliest users of the Internet and started putting their contents on the Web, built meta resources for their home pages and made their library Catalogs Web-enabled. Web interfaces to their Catalogs already exist in most library software packages and several integrated library packages have options for operations using Internet clients. The sites below provide links to the Library's WebPAC:

- LibWeb - Library WWW Servers http://sunsite.berkely.edu/LibWeb/
- The LibDex http://www.libdex.com/
- The British Libraryhttp://www.bl.uk/
- National LibraryCatalogs Worldwide http://www.library.uq.edu.au/ssah/jeast/
- Library of Congress WWW/Z39.50 Gateway http://lcWeb.loc.gov/z3950/
- Library of CongressCatalog http://catalog.loc.gov/
- Supersearch http://www.nbcls.org/
- Melvyl Homepage http://www.melvyl.ucop.edu/
- WebCATS http://www.lights.com/Webcats/

Museum and Archives

Virtual visits of users to a museum to examine exhibits closely from their desktop, can be achieved through virtual museum websites. Moreover, with various tools and techniques, it is possible to rotate an object in any direction. Similar techniques are also being used by art auction sites to promote auction of their art works. Some virtual museum and auction sites are as follows:

- Virtual Library museums pages (VLmp) http://www.icom.org/vlmp/
- Smithsonian Institution http://www.si.edu/
- World Wide Arts Resources http://wwar.com/
- Art Museum Network http://www.amn.org/
- The Virtual Museum of Computing (VMoC) http://www.comlab.ox.ac.uk/archive/other/museums/computing.html#museums

Virtual Libraries

'Virtual library' or 'library without wall' are meta resources or subject portals that extend virtual accessibility of digital collections from several diverse sources without the users even knowing where the resource actually resides. Normally, a virtual library would be huge, linking large collections from all around the globe. However, it could also be only a collection of a few hundred links to digital resources maintained by an individual.

Electronic Books, Online Book Selling and Print-on-Demand

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Electronic Books

An electronic book (e-book) is defined by renowned author J. O. Borchers as a portable hardware and software system that can display a large quantity of readable textual information to the user and let the user navigate through this information. It includes any digital reading material that a user can view on a desktop or notebook, personal computer or on a dedicated, portable device with a large storage capacity (1,500 to 500,000 pages) and the ability to download new titles via a network connection. Traditional book publishers as well as professional and business communities are moving towards digital publications with the market for e-book titles and other electronic documents expected to exceed US$ two billion in the next few years. There are two distinct components in the electronic book market. These are as follows:

(i) Electronic book consisting of digital material or contents

(ii) Electronic book hardware including e-book reading appliance

The contents of an electronic book is textual and graphical files that can be transported on CD-ROM or other storage media or delivered over a network connection. It can be viewed on some combination of hardware and software ranging from dumb terminals to Web browsers, on personal computers to the new reading appliances.

However, there are some e-books that use formats that can be viewed using specific viewing technologies only.

The hardware for an e-book consists of:

- Dedicated e-book readers
- Personal Digital Assistants (PDAs) and pocket PCs (Personal Computers) with book reading software
- Hybrid devices

E-Books on the Web

Project Gutenberg started digitizing public-domain texts for download with the help of a team of volunteers re-keying texts. It offers more than 3,000 public domain titles for free. Many other businesses are now emerging involving a large number of publishers making thousands of book available online for libraries and individuals at relatively lower cost. The three major companies are Questia, Ebrary and NetLibrary who offer ebooks, journal articles and encyclopedia articles besides other services as value additions.

- Questia: the Online Library (http://www.questia.com/)
- Ebrary (http://www.ebrary.com/)
- NetLibrary (http://www.netlibrary.com/)

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Online Bookselling

Amazon.com's online bookshop was a new phenomenon on the Web and has been expanded to include other products, such as CDs, Music, electronics, toys, art works, computers and other store items. Although it does not perform all the functions of a library, Amazon.com was termed as the 'Earth's Biggest Library' (http:// www.infotoday.com/newsbreaks/nb1122-1.htm). Some other prominent online book selling sites are as follows:

- Abebooks.com http://www.abebooks.com/
- Amazon.com Bookstore http://www.amazon.com/
- Barnes & Noble http://shop.barnesandnoble.com/booksearch/isbnInquiry.asp?
- Best Book Buys http://www.bestbookbuys.com/
- Book Finder http://www.bookfinder.com/
- Catalog Site http://www.catalogsite.com/
- Pricescan Before You Buy http://www.pricescan.com
- Studentsbookworld.comhttp://www.studentsworld.com/
- Swotbooks.comhttp://swotbooks.com/
- Varsitybooks.com http://www.varsitybooks.com/

Print-on-Demand

Print-on-Demand books are digitally printed output from electronic files by high-quality laser printers. These books are then bound and cut, that is, replacing traditional paper media with digital print files. Printing is done on demand, when an end user specifies the requirement for printed copies, thus, eliminating the requirement to distribute and stock in printed media without changing the publishing process. Print-on-demand services use the latest technology in photocopying, binding and economical full color digital printing. It can produce hundreds of books with quality as good as that achieved with traditional printing and binding equipment.

Some leading players in the Print-on-Demand field are Barnes & Noble, NetLibrary, IBM, Xerox, Lightening and Sprout.

Reference Sources

There is a wide variety of reference books that have been 'published' on the Web over the years with the commercial publishers converting their most important reference works into Web-based reference services, backed by professional promotion and customer support with some notable achievements. Pioneers in this gradual mobilization of reference resources to the WWW include the Oxford English Dictionary, the Grove Dictionary of Art and the reference works published by the Gale Group.

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The focus of Xrefer (http://www.xrefer.com/) is in reference works. They aggregated and integrated reference works by bringing diverse works together into a common website and then provided users with a search engine that executes searches on the complete aggregated library of reference content. Aggregation of reference works leads to efficient distribution and 'power searching' across a range of titles. Integration ensures that the whole collection of reference material contains index terms and annotations linked to related entries found in disparate sources that would lead to improvements in browsing and navigation.

Dictionaries

Several dictionaries are now available on the Web, both general-purpose and subject specific of which the important ones are as follows:

- Academic Press Dictionary of S&T http:/www.harcourt.com/dictionary/
- DictSearch: Search in Online Dictionaries http://www.foreignword.com/ Tools/ dictsrch.htm
- Dictionary of Phrase and Fable http://www.bartleby.com/8l/
- Important Online Dictionaries http://www.yourdictionary.com/
- Cambridge Dictionary Online http://dictionary.cambridee.orp/
- Merriam-Webster Online http://www.meriam-Webster.com/

Electronic Encyclopedia

Encyclopedias is another item that has proliferated on the electronic front, considering the enormous storage space on the CD-ROM and the sophisticated search software available today. Subsequently, Web versions of these encyclopedias became available. Encyclopedia Britannica, the most scholarly and best known of the English language products, was the worst hit because they neglected the electronic media. The Internet hosts Web versions of several important encyclopedias. A few examples are as follows:

- Encyclopedia Britannica http://www. britannica.com/
- Kirk Othmer Encyclopedia http://ws-edck.interscience.wiley.com:8095/ index.html of Chemical Technology
- Nupedia. Com http://www.nupedia.com/
- Columbia Encyclopedia http://www.bartleby.com/
- Encarta Encyclopedia http://encarta.rnsn.com/
- Important Encyclopedia http://www.encyberpedia.com/cyberlinks/links/ index.html

Biographies

Information about people considered important in various disciplines is available on the Internet called biographies. These are available in a biographical sources or

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through Websites of individuals/organizations. Of the many biographical sources available on the Internet, some of the important ones are as follows:

- Biography.com httu://www.biography.com/
- Genealogy.com http://www.genealogy.com/
- Lives, the Biography Resource http://amillionlives.com/
- World Biographical Indexhttp://www.biblio.tu-bs.de/wbi_en/
- Xrcfer http://xrefer.corn/
- Biographical Dictionary http://www.s9.com/biography/search.html
- Famous Physicists http://cnr2.kent.edu/-manlev/physicists.html

Acronyms and Abbreviations

We use acronyms and abbreviations quite extensively during our day-to-day communication as well as used as part of vocabulary in subject-specific disciplines. Information technology itself has numerous acronyms and abbreviations that have become daily use terms. There are some good resources that will help find acronyms and abbreviations. Examples include:

- Acronyms and abbreviations http://www.ucc.ie/info/net/acronyms/index.html
- Alphabet Soup Explained http://members.aol.com/nigthornas/alphabet.html
- BABEL http://www.cis.columbia.edu/glossary.html
- AF: Acronym Finder http://www.acronymfinder.com/
- StarBits Acronyms, http://cdsWeb.u-strasbg.fr/-heck/sfbits.htm Abbreviations, and so on
- Abbreviations and Acronyms http://www.ulib.iupui.edu/subjectareas/gov/ of the US Government docs-abbrev.html

Thesauri and Subject Headings

A thesaurus can be defined in terms of its functionality as a terminological control device used for translating from the natural language of documents into controlled vocabulary. It can also be defined in terms of its structure as a controlled and dynamic vocabulary of semantically and generically related terms which covers a specific domain of knowledge. To achieve a unity of indexing terminology in their respective field, a number of thesauri of the most commonly used terms in various fields have been published. Words or a group of words under which books and other material on a subject are entered in a catalog in which the entries are arranged in alphabetical order constitute subject headings. Catalogers use lists of subject headings to achieve uniformity. Some standard subject headings used in libraries are: Library of Congress Subject Headings (LCSH), Medical Subject Headings (MeSH), Subject Headings in Engineering (SHE) and Sears List of Subject Headings. Some of the thesauri and subject headings available on the Internet are as follows:

- Roget's Thesaurus http://www.thesaurus.com/Roget_Alpha-lndex.html
- M-W Thesaurus http://www.m-w.com/mw/thesaurus.htm
- Medical Subject Headings http://www.nlm.nih.gov/mesh/meshhome.html
- Roget's Thesaurus Online http://www. bartleby.com/62/

Handbooks and Manuals

Written primarily for practitioners, handbooks are treatises on a special subject containing concise information. The Internet contains several handbooks in various subject specialties, including:

- Country Studies/Area Handbooks http://lcWeb2.loc.aoy/fidlcslcshome.html
- Automotive Learning Online http://www.innerauto.com/innerauto/htm/auto.html
- Earthquake Preparedness Handbook http://www. lafd.org/eqindex.htm
- Foodborne Pathogenic http://vm.cfsan.fda.gov/-mow/intro.html Microorganisms and Natural Toxins Handbook for Digital Projects http://www.nedcc.org/digital/dighome.htm
- Handbook of Forensic Services http://www.fbi.gov/hq/lab/handbook/intro.htm
- Merck Manual of Diagnosis and http://www.merck.com/pubs/mmanual/Therapy

Maps

Maps consist of documents that make plane representation of the earth's surface or its part indicating its physical features, political boundaries, and so on, and constitute a special collection in a library. A large number of Internet sites provide maps and other geographical information. Moreover, with the availability of tools and techniques offered by the Geographical Information System (GIS) and associated geo-coded data, several sites provide computer-based geo-sensitive information also. Some important sites that provide maps and GIS-based information services include:

- DEMIS World Map Server http://www2.demis.nl/mapserver/Mapper.asp
- HRW World Atlas http://go.hrw.com/atlas/norm_htm/world.htm
- Quick Map of the World http://www.theodora.com/maos/abc_world_maps.html
- Maps.com http://www.maps.com/explore/atlas/
- Worldtime http://www.worldtime.com/
- Mapmachine: National Geographic http://plasma.nationalgeographic.com/mapmachine/
- Mapnet Visual Search Engine http:/maps.map.net/start

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- Geosource http://www.library.uu.nl/geosourcel
- USGS NSDI Clearinghouse http://nsdi.usgs.gov/products/gnis.html
- USGS Mapping lnformation http://mapping.usgs.gov/www/gnis/Geographic Names Information System (GNIS)

Organizations and People

There is an overabundance of information about people and organizations on the Internet through websites, which contain information on people or organizations. Compilations like biographical sources and directories containing information on people and organizations are also hosted on the Internet.

Employment/Career Sources

Employers and those who are seeking employment find the Internet to be a good source of information. Some important employment and career sources on Internet include:

- EmploymentSpot.com http://www.employmentspot.com/
- Jobs.com http://www.jobs.com/
- JobStar: California Job Search Guide http://jobstar.org/
- Academic Employment Network http://www.academploy.com/
- Employment Service http://employmentservice.gov.uk/
- Employment.com.au http://www.employment.com.au
- Ajob4scientists.com http://www.ajob4scientists.com/
- IT Careers Web for Indian Prof. http://www.winjobs.com/
- Scijobs.org http://www.scijobs.org/

Funding/Grants Sources

The Internet is a source for information on funding and grant-giving agencies as most of the grant giving agencies have their Websites on the Internet. Additionally, there are Websites that provide information on various grant-giving agencies. Examples include:

- The Regional Alliance: Resources http://ra.terc.edu/resources/
- SRA International GrantsWeb http://www.srainternational.org/newWeb/grantsWeb/index.cfm
- Funding opportunities for training http://www.grantsnet.org/in biological and medical sciences
- 101 Tog College, University andhttp://www.college-scholarships.com/ Scholarship Pages 100college.htm

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Libraries/Information Centre

Libraries are setting up Library Home Pages, which are an integrated interface to various network-based library services which they offer to their users. Collection development of a library depends heavily on information sources on Internet. In the developed countries and also increasingly in the developing world, large numbers of libraries are making their appearance on the Internet. More than 17,000 libraries are listed in the LibDex (http:// www.libdex.com/), which maintains a worldwide searchable directory of library Websites with each record in the index providing links to Web-based Online Public Access Catalogs (OPACs). Some of the important libraries, library catalogs, union catalogs, sources of information for libraries and information centres are as follows:

- LibWeb - Library WWW Servers http://sunsite.berkely.edu/LibWeb/
- The LibDex http://www.libdex.com/
- The British Libraryhttp://www.bl.uk/
- National Library Catalogs Worldwide http://www.library.uq.edu.au/ssah/jeast/
- Library of Congress (LOCIS) http://lcWeb.loc.gov
- Library of Congress WWW/Z39.50 Gateway http://lcWeb.loc.gov/z3950/
- Library of Congress Catalog http://catalog.loc.gov/
- Supersearch http://www.nbcls.org/
- Melvyl Homepage http://www.melvyl.ucop.edu/
- WebCATS http://www.lights.com/Webcats/Organizations/Research Institutes/ Companies/Societies

Information related to organizations, business houses, research institutions, companies, societies and associations are available on the Internet as most of these bodies have their Websites or work through other Websites and they can be accessed using any of the Web search engines. Compilations and directories containing information on institutions and organizations are also available on the Internet. Some of the important sources on organizations/research institutes/ companies/societies on the Internet are as follows:

- Associations on the Net http://www.ipl.org/ref/AON/
- The Nation Directory http://www.thenation.com/directory/
- International Organizations and http://www.uia.org/Website.htmNGO Websites
- Guidestar: The National Database http://www.guidestar.org/of Nonprofit Organizations
- Helping.org http://www.helping.org/

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- Researching Companies Online http://home.sprintmail.com/-debflanagan/index.html
- Hoover's Online - The Ultimatehttp://www.hoovers.com/Source for Company Information
- Thomas Register Online http://www.thomasregister.com/
- iCollege http://www.icollege.com/
- Associations Online Search http://www.info.asanet.org/gateway/ Directory (ASAE) OnlineAssocSlist.html

People/Experts/Scientist Directories

Information about people, experts and scientists are also available on the Internet through their personal Websites or on their institute's site or through various Websites that contain information on people, experts and scientists. Additionally, compilations including biographical sources, telephone directories, regional directories, and so on, are available.

Sites on 'Ask-an-Expert' or 'Ask-a-Scientist' can be used to obtain profiles of leading personalities/subject experts in specific fields including details regarding their areas of expertise, affiliation, contact information, their research interests, and so on. Some of the important sites are as follows:

- AgNIC: Agricultural http://www.agnic.org/Network Information Center
- Profiles in Science-http://www.profiles.nlm.nih.govBiomedical Stars
- Bin Laden, Osama http://www.pbs.org/wgbh/pages/frontline/shows/binladen/
- Caesar, Juliushttp://www.lsi.usp.br/-rbianchi/clarke/Clarke, Arthur C.
- Cleopatra, Queen of Egypt http://www.fmnh.org/cleopatra/
- Einstein, Albert http://www.albert-einstein.org/
- Gates, Bill http://www.microsoft.com/billgates/
- Women in Biology http://pingu.salk.edu/-forsburg/bio.html
- Ask-A-Scientist http://olbers.kent.edu/alcomed/Ask/ask.shtml
- Scientific American: http://www.sciam.com/askexpert/index.htmlAsk-the-Experts
- Lycos Whowhere http://www.whowhere.lycos.com/

11.3.2 Subscription and Access Options

The major concern of publishers is the protection of their economic interests, while providing electronic access to their printed publications. A lot of investment goes into the process of production of a journal involving activities like peer-review, administration, editing, layout design, production, subscription management,

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and distribution. Both electronic and paper media follow almost the same activities for publishing a journal. The difference lies in the production and distribution; the cost is relatively low in the electronic media. Journals on the Internet have varying price models. Some prevalent pricing models are as follows:

(a) Electronic subscription is linked to the print subscription: In most of the cases, electronic subscription to journals is linked to the printed version and may be offered free with print subscription like publications of American Society for Physics and AIChE (American Institute of Chemical Engineers). Alternatively, it may be offered at a fixed percentage over the print subscriptions, such as IEEE's ASPP (All- Society Periodicals Package).

(b) Electronic subscription with campus licenses: Campus-wide unlimited access to subscribed journals on payment of a fixed amount of platform fee can be offered by electronic publishers like Elsevier Science (ScienceDirect).

(c) Electronic subscriptions are bundled: Bundle offer is given by many electronic publishers, in which, they provide access to the entire range of their electronic journals and other publications bundled into one. For example, IEEE/IEE Electronic Library (IEL) and ACM (Association for Computing Machinery) Digital Library offer access to their entire site on a single subscription. There is no provision of subscribing to individual journals or subsets. Academic Press, on the other hand, offers all journals available on their site (Academic's Project IDEAL) for an addition of 10 per cent more than the print subscription to library consortia.

(d) Pay-Per-Look: Experimentation with other models is being conducted by publishers and aggregators. One such model is where a modest fee is charged for searching a database online. Once the user has identified articles of interest, then the full-text version can be asked for on a per-look basis.

(e) Electronic only: Some publishers and aggregators are promoting only electronic versions of their journals by providing discounts to users, who forego the print version.

(f) Consortium licensing: The advantage of a consortium is the union strength it provides to negotiate with electronic publishers for the best possible price and rights. Well-defined policies and offers are available from the most of the publishers for libraries subscribing as consortia. Libraries use the consortia licensing widely across the world and it is also slowly picking up in India.

(g) National licensing: National licenses for core collections can also be negotiated with electronic publishers by arranging national licenses for some of the important full-text resources. Singapore, Taiwan, and the UK are leading on this front.

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11.3.3 Advantages and Disadvantages of Electronic Resources

The advantages of using electronic resources are:

(a) Easy access: Accessing e-resource is easier for the users. They can access the desired material within minutes or even seconds on their desktops, provided equipment is available. Large collections of material can be searched and retrieved simultaneously and instantly. There is an active dissemination of information by alerting the readers at their desktops about the new electronic resource that are accepted into the database. In other words, e-resources allow intelligent full-text retrieval based on past use and interests.

(b) Speed: High speed and efficiency benefit the publishing and distributing of electronic resources. Authoring and publishing systems can be integrated easily by computer-readable text. Also, electronic transmission, especially in the review process, saves valuable time.

(c) Linkages: Linkages can be enabled by hypertext and hypermedia formats among sections within an electronic resources. E-mail contacts would be easier among users, publishers, and suppliers. Users have more creative ways to have their information queries answered. The e-resources are published electronically rather than in paper and no new costs are introduced. Multimedia Innovative ways of presenting research results can be supported by electronic page layout. Interactive three-dimensional models, motion video, and sound are a few other possibilities.

Commenting on the advantages of electronic resources, Dadzie (2007) writes that electronic resources are invaluable research tools that complement the print-based resources in a traditional library setting. Their advantages include:

- Access to information that might be restricted to the user due to geographical location or finances
- Access to more current information
- Provision of extensive links to additional resources related contents. This rapid emergence and development of electronic information technologies, therefore, makes it possible to envision radically different ways of organizing the collections and services that the library has traditionally provided. While the libraries approach a crisis point in financing collection development, these new technologies offer possible ways to mitigate costs and revolutionize ways to access information.

The advantages of using electronic resources are:

(a) Financial constraints: The infrastructure required for displaying, storing, or printing electronic resources are expensive. Downloading and printing will be a costly affair. This means a net 78 per cent increase in economic and ecological costs, which is a relatively expensive way to acquire a single copy.

(b) Social constraints: Electronic interfaces can take a long time to master. Electronic searching, downloading, and printing replace the traditional activities of physically browsing, scanning, and photocopying. The intricate steps to accomplish the previously simple or habitual tasks might frustrate users. People read up to 25 to 30 percent more slowly on a computer screen than on paper.

(c) Technological constraints: The academic community can be divided into 'haves' and 'haves-not' on the basis of their accessibility to equipment and network. The network or connection speed can be too slow. Screen quality of graphics and photos is still primitive, when compared to print. The Open Educational Resources (OER) and Open Courseware (OCW) are some of the recent innovations that are especially relevant for achieving equitable access to quality education. OER are open content that are freely accessible worldwide from a common portal or gateway. Indian institutions have also recognized the importance and impact of OER to bridge the learning divide in the country. Recently, India's National Knowledge Commission (NKC) has called for a 'national e-content and curriculum initiative' to stimulate the creation, adaptation and utilization of OER by Indian institutions.

Check Your Progress

1. What is an e-journal?
2. What are electronic preprints?
3. What is the use of a Web-based catalog?
4. Define the term 'virtual library'.
5. Name the two distinct components in the electronic book market.

11.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. An e-journal is any journal, magazine, e-zine and Webzine newsletter or type of electronic serial publication which is available over the Internet and can be accessed using different technologies, such as WWW, Gopher, ftp, telnet, e-mail or listserv.
2. Research articles that are made available for distribution through the network in electronic format before they go through the process of peer reviewing are electronic preprints.
3. A Web-based catalog is especially helpful for corporates in identifying the recent products available in the market in order to purchase them. These are searchable and user reviews of the product are included on the site.

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4. 'Virtual library' or 'library without wall' are meta resources or subject portals that extend virtual accessibility of digital collections from several diverse sources without the users even knowing where the resource actually resides.
5. There are two distinct components in the electronic book market. These are as follows:
   (i) Electronic book consisting of digital material or contents
   (ii) Electronic book hardware including e-book reading appliance

11.5 SUMMARY

- Today, with the growth of electronic media and other forms of dissemination of information, the term 'information sources' has replaced the term 'literature'.
- Resources in electronic format (including documents and non-documents) that provide information or an indicator to the information and are accessible over the Internet are referred to as Internet information resources.
- Scholarly societies are making electronic versions of their publications available online through their websites. Some have developed their own technology for Web publishing and hosting, and the rest hire technology and hosting services from other electronic publishers.
- Intermediary services that aggregate electronic journals and other resources from different publishers and offer them to their clients through a single interface or search system are called electronic aggregators.
- Electronic conferences are important resources for researchers, and scholars in every discipline are also called electronic forums, electronic user group, listservs, discussion groups, and so on.
- The design or manufacture of products and processes that are protected and secured for the exclusive profit of the designer or inventor are patents.
- Science and research news are important sources of information as they provide information for most recent developments which is very important to scientists and technologists.
- How materials and products should be manufactured, defined, measured or tested according to proven and accepted methods would define technical standards.
- A requirement for the award of Ph.D. degree is the submission of theses to the universities. It is a useful source of information for the new and ongoing research as it contains records of an original contribution to knowledge.
- A collection of records pertaining to a specific field of study is termed as a database. Bibliographic databases are now available on various media

including abstracts of chapters in books, journal articles and conference proceedings.

- The Internet and Web technology supports multimedia websites including information in the form of text, images, sounds and movies, with a collection of sounds and images, many of which can be used for commercial as well as personal purposes.
- Scientific data sets include numeric, property and structural databases, and contain factual data, such as numeric, property and structural information on the topic indexed.
- Virtual visits of users to a museum to examine exhibits closely from their desktop, can be achieved through virtual museum websites.
- Amazon.com's online bookshop was a new phenomenon on the Web and has been expanded to include other products, such as CDs, Music, electronics, toys, art works, computers and other store items.
- Information about people considered important in various disciplines is available on the Internet called biographies.
- A thesaurus can be defined in terms of its functionality as a terminological control device used for translating from the natural language of documents into controlled vocabulary.
- Maps consist of documents that make plane representation of the earth's surface or its part indicating its physical features, political boundaries, and so on, and constitute a special collection in a library.
- Libraries are setting up Library Home Pages, which are an integrated interface to various network-based library services which they offer to their users.
- The major concern of publishers is the protection of their economic interests while providing electronic access to their printed publications.
- Accessing e-resource is easier for the users. They can access the desired material within minutes, or even seconds, on their desktops, provided equipment is available.
- The infrastructure required displaying, storing or print electronic resources are expensive. Downloading and printing will be a costly affair.

11.6 KEY WORDS

- **Self-archiving:** It is a term used to refer to the process whereby individual authors submit their own papers to a server or archive of their choice.
- **Database:** It is defined as a collection of records pertaining to a specific field of study.

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- **Citation:** It refers to any reference to an article or part of an article identifying the document in which it may be found.
- **Thesaurus**: It can be defined in terms of its functionality as a terminological control device used for translating from the natural language of documents into controlled vocabulary.

11.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. Who are subscription agents?
2. Write short notes on the following:
   (a) Scholarly societies (b) Electronic aggregators
3. List some of the patent, trademark and copyright sites.
4. Name the important international organizations which issue global standards.
5. What are scientific datasets?
6. Briefly mention the use of electronic books, Online Book Selling and Print-on-Demand Electronic Books.

Long-Answer Questions

1. What is the significance of electronic conferences?
2. What are technical reports? Give examples of important Internet-based sources of information for technical reports.
3. Analyse the importance of bibliographic database.
4. 'The major concern of publishers is the protection of their economic interests while providing electronic access to their printed publications.' Explain the statement.
5. Discuss the advantages and disadvantages of electronic resources.

11.8 FURTHER READINGS

Lea, Peter W**.** 1990. *Printed Reference Materials*. Third Edition. London: Library Association.

Bell, Simon. 19996. *Learning with Information Systems: Learning Cycles in Information Systems Development*. London: Routledge.

Cooper, M. D. 1996. *Design of Library Automation Systems: File Structures, Data Structures and Tools.* New York: John Wiley & Sons.

Haravu, L. J. 2004. *Library Automation: Design, Principles and Practice*. London: Allied Publications.

Kaul, H. K. 1992. *Library Networks: An Indian Experience*. New Delhi: Delnet.

Kumar, P. S. G. 2004. *Information Technology: Applications (Theory and Practice)*. New Delhi: B. R. Publishing.

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UNIT 12 WEB BASED RESOURCES AND SERVICES

Structure

12.0 INTRODUCTION

In the previous unit, you studied about types of electronic resources namely, electronic conferences, electronic journals, electronic theses and dissertations, citation databases, digital collections electronic books and others along with their advantages and disadvantages. This unit will deal with Web based resources and services as well as their evaluation criteria.

12.1 OBJECTIVES

After going through this unit, you will be able to:

- Discuss the Internet based library and information services
- Explain the advantages and disadvantages of the Internet based library and information services
- Identify the Web based resources and services
- State the evaluation criteria for Web based resources

12.2 INTERNET BASED LIBRARY AND INFORMATION SERVICES

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The library plays a vital role for any organization, be it school, college, university or any business organization. With the advancement in computer and telecommunication technologies in the past few years the availability of information has grown tremendously. These technologies have a great impact on traditional academic libraries with traditional information preservation, organization, provision, access and retrieval. The activities performed in libraries are no longer confined to the traditional ones. There is a profound impact of ICT on libraries and most of the libraries today are networked electronically and Internet (computer and telecommunication technologies) is playing an important role in providing information services and has added a great value to the library and information services. Thus, networking among libraries and information centre has become inevitable. The prime objective of Internet based library and information services is pooling of information resources and their related infrastructure to make them sharable.

The transformation in library system has changed the view of the library resources and library services where web based library services are attending the users round the clock by providing links to various library sites, which are specialized in the topic of interest and can be accessed directly in every corner of the world. The use of ICT in library operations saves considerable amount of time, resources and labour. It brings quality of service and speed up the processing of information services. With the help of Internet, a student at any university or college in India can browse the electronic documents anywhere across the globe through computers, and hence, gets an instant access to billions of resources in the form of books, reports, videos, journals, films and variety of other resources.

The academic libraries in India have set up themselves to provide an ICT based information services platform. The Internet has proved to be a boon for both the libraries as well as the users. It has provided an easy to use and inexpensive teaching tool to the information seekers. The Internet has bridged the information gap between the libraries and information professionals by defining new and different service operations. Some of these are as follows:

- By creating a well-organized, well published and easily accessible library web sites that has extended the use of information technology in traditional librarianship.
- By initiating a bulletin board of library citing complete information about the services provided and products available with them and the various events organized by them.
- By using e-mail services to deliver the information to the users and to communicate with the fellow information professionals.
- By providing access to the various database and OPAC of other libraries located at remote areas.

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12.2.1 Scope of Internet based Library and Information Services

With the involvement of Internet in library activities, resource sharing and cooperative functioning has also become vital which has eliminated the barrier of distance and size among the users. It has also made the acquisition related services such as ordering and purchase of information resources/ documents (books, journals and electronic publication) more speedy and simple. These activities can be carried out through e-mail. Also, most of the booksellers and publishers place their catalogues and leaflets of new publications on their websites which can be easily accessed through Internet. All the publishers of primary journals are providing their journals online. The Internet facilitates the library and information professionals to browse the various sites for all the current publications available with the price and allow them to place the order online. The communication regarding any query or discrepancy can be done through e-mail which saves time, reduces paper work and efforts.

Internet has also made it possible to prepare standard catalogues without much effort. Centralized and online public access cataloguing services are provided by Internet. Union cataloguing has also made it possible to avoid the duplications in holding to a greater extend. The library professionals are allowed to access the Internet resources for verification and downloading the bibliographic information from other organization.

OPAC has also become a popular source of bibliographic information which can be accessed via Internet. It is useful to get information about the organization of knowledge by other institutions.

The circulation of in house documents is also become easy through Internet. The new books document can be placed in OPAC on the same day of acquisition itself after certain technical processing and the readers can browse and reserve the material from their homes or offices that too within seconds after the arrival of the material. Also, subscribed journals by the libraries are accessible from anywhere across the world, the users can get access to the electronic form of journal from their offices or departments without visiting the libraries.

Since the information is increasing day by day on Internet, the information is used by librarians for reference services by the librarians to answer the questions they are asked. These are known as ready reference collection. The availability of various primary and secondary sources of information online made it possible to provide short-range and long-range reference services through Internet. The Internet has proved as an alternative to the traditional face-to-face reference service where there is a provision of chat based e-mail service for virtual reference and web tools such as FAQ are provided on the libraries websites. Real-time reference service is also provided using Instant Messaging (IM) which is a type of virtual communication between two people. Some IMs such as Trillion, Library H3IP, Meebo are providing access to all e-mail IDs while logged into any such platform eliminating the need to login to different e-mail address.

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The Internet has made possible the availability of major libraries online which are accessible directly from any part of the world. It has provided access to the catalogues of various libraries that are attached to universities and colleges and allow them to place a request for their users. To avoid financial crunches, libraries have agreed for resource sharing which is not at all possible without the Internet. Publishers are also providing their journals electronically that has facilitated libraries to subscribe a large collection of journals from different publishers that also support cross journal searching and extensive browsing. Online collection of publications enables the users to search and browse the articles directly from journals subscribed by their libraries. Resource sharing using Internet has remarkably reduced the cost of collections by the libraries.

Resource sharing is also done through Inter-Library Loan (IIL) and traditional IIL operations are time consuming and labour intensive. The Internet has facilitated libraries to share their resources through IIL effectively and efficiently. IIL through Internet offers the following benefits:

- Single solution to manage the activities of IIL.
- The paper work and record-keeping in browsing and lending a material can be effectively managed with reduced paper work.
- Easy to track the status of the request at all stages in IIL process.
- To integrate bibliographic information with online union catalogue using Internet.
- Request and messages through electronic transmission using Internet.

In a way, Internet has become a great help in almost all the activities of library operations. Access to all types of material has become easy and speedy with the help of electronic documents.

12.2.2 Services Available on the Internet

There is a huge impact of Internet on the library services and it has now become an integral part of LIS. Internet is able to provide the library services to the users through their desktops. Some of the services that are available through Internet are as follows:

- **Online information retrieval:** One of the important roles of library is to provide access to the information to the society. To improve the learning activity and teaching, it is important to have access to the comprehensive and current information. Through Internet, libraries are able to access online information resources at some nominal fees. This has become the most utilized service of the libraries.
- **Free browsing:** The large number of information on the Web can be provided by some libraries by providing free browsing to the users through Internet.

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- **Broadband internet centre:** Libraries are providing interconnection through networking with other libraries and information centre to provide access to e-resources. Internet is also used for e-mailing, accessing e-journals, database, and web OPAC.
- **Library homepage for information dissemination:** Libraries are able to provide regular display of information of the latest editions and other information related to academic research through their websites. This service facilitates the researchers and other users to find resources according to their academic and research interests.
- **Dynamic library websites:** Libraries are developing their websites with a link to OPAC to familiarize users with the library activities and to allow users to access the library catalogue remotely through Internet. Users are allowed to perform some library functions such as renewal of books, access of the content page of materials, and ask for a copy to be delivered at their home/work place. Websites also provide the link to other resources that are created by the library.
- **Bulletin board service:** Through this service people are provided an area for discussion called bulletin board by posting messages without sending them to anyone's e-mail. The post is seen by everyone who enters into the area. In campuses, these bulletins are called forum. The latest information about daily news, job opportunities, fellowship, etc. can be posted on these boards. These bulletins are available via Internet under specific category of user discipline.
- **OPAC:** The Online Public Access Catalogue (OPAC) provides facilities to browse and locate information and is known as the gateways to the information in the libraries. The purpose of OPAC was to provide access to the housekeeping activities of the libraries and to provide direct access to the machine readable bibliographic records.

12.3 E-BOOKS

The introduction and growth of e-books has changed the relationships between the libraries, publishers and distributors and also the relationship between the libraries and their users. There are several libraries who are adopting e-book collections on a very large scale. Armstrong and Lonsdale have defined the term e-book as 'any content that is recognizably book like, regardless of size, origin or composition, but excluding serial publications, made available electronically for reference or reading on any device that includes a screen'. Algenio and Thompson-Young have considered that these e-books can be accessed by multiple persons at a time. Moreover, a patron need not go to library in person to borrow a book and the e-books can be downloaded from the website and can be read later offline. Although, there can be a restriction of time limit for the usage of the e-

books and may get terminated after a certain span of time. These e-books can be accessed apart from computers, from other handy devices such as laptops, smart phones, i-pads, notebooks and so on.

Also, it seems to believe that the cost of e-books is far less as compared to the cost of producing the copies of printed books. This is due to the reduced cost of printing and distribution by the publishers. Although, the basic tasks involved in producing e-books are same as that of print books such as acquisition, production, sales and marketing, delivery and finance of books. However, some publishers have stated in their blogs that expense, incurred to manufacturing and distribution is 12 per cent and does not reduce the total publishing cost greatly. In fact, the publishers have highlighted the three new costs associated with e-books. These are digitization that is, producing the books in different formats, quality assurance that is, digital distribution to different retailers or distributers with digital asset management system and different upload protocols. But the production cost of an additional copy of an e-book is lower as compared to the production cost of a printed copy.

12.3.1 Types of E-Books

There are different types of e-books that can be recognized. These are as follows:

- Issue or re-issue of a print book in e-format are called e-hybrid books.
- An e-book created by e-revision or e-feedback and the formally-issued version of which is in the print format.
- E-books, which enhance text with audio, video, or images.
- An e-book with text, images, audio, and video, and are regularly updated as warranted. These are known as e-reference books. A series that combines the latest information is also considered in this type.
- An e-book is published in pdf format and is similar to the printed version. The chapters can be downloaded in this format.
- A web page having an e-book that are readable online in HTML format only.
- An e-book in the form of an app, where the text and other content are published in the form of an app with features such as sound, movement, and other special features.
- An e-book that is available under communication common license

Technology involved

The development of e-books required technical aspects such as hardware, software, and a screen for displaying content. These aspects are discussed below:

- **Hardware aspect:** There is a need for some portable e-book devices for reading purposes. The hardware may include desktops, laptops, and

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multipurpose devices or even dedicated reading devices. These devices are provided with a screen such as a monitor, LCD, or a touch screen.

- **Software aspect:** Some software are required for e-book reading that support special functions such as search, colours/grayscale display, user defined text size, hyperlinks within the books, and so on. Some of the common examples of such e-book software reader are Adobe Acrobat, Microsoft Reader, Palm Reader, Franklin Reader, and so on. Most of the software are available for free download and support several operating systems.
- **E-book creator software:** Special software are needed for the creation of e-books such as Adobe Page Maker, Adobe Acrobat Capture, Adobe Frame Maker, Adobe Design, and so on.

E-Book standardization

It is necessary to standardize the format of e-books as there are far many variables such as operating system, executable software, memory space, and so on that are associated with e-books. Attempts have been made to standardize the e-books. The Open eBook Forum (OEBF), which is an association of software and hardware companies, publishers, authors, users and other related organizations of e-books, has established some common specifications for e-book system, including products and applications that are beneficial for the content creators, makers of reading systems and of course, the consumers that help them in adopting e-books. They have attempted to provide common e-book format. The common formats of e-books are Adobe PDF, DAISY Digital Talking Books and Microsoft Reader, which are equipped with Digital Rights Management (DRM) technology (an access technology to protect copyright material and also limits the usage of digital media and devices).

E-Book licensing

The e-books are leased rather than purchased. There are three types of e-book leases that are offered by the publishers and vendors:

- **Annual access:** An annual fee for one year's access is paid by the libraries and the lease gets renewed every year.
- **Permanent access:** A one-time fee is paid by the libraries.
- **Pay per use:** Based on the number of uses (pages viewed, titles viewed, and so on), the library is billed or a prepaid account is debited. This may also be an annual fee platform. The e-book licensing can be modelled into three broad categories such as print, database, and open access licensing arrangements. The first model allows the access to an e-book with one user at a time. The restriction has been implemented on printing, copying, saving, and sharing of e-books on the reading devices by DRM. This restriction of viewing and printing limits has affected the access to e-books.

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The second model, the database model, has been developed to overcome the DRM restriction by enabling simultaneous access to e-book contents. The third model, Open Access (OA) has been developed to allow the access to the content of e-book freely with few restrictions.

12.3.2 Distribution of E-Books

The e-books are sold either directly to the consumer or through different suppliers that includes retailers such as Amazon, Barnes and Noble and Apple and through different suppliers such as Ingram. Earlier till 2010, the *wholesale model* was used by the publishers to sell e-books where a retail price was fixed by publisher and used to sell the book to the intermediary at a heavy discount, which was usually 50 per cent. The retail prices of e-books were usually fixed to the lowest price incurred for the print book. After the availability of paperback edition the publishers would lower the price of e-book. The trend is still follow by some small publishers.

In 2010, an *agency model* was introduced for the sale of e-books where the publishers made deals with Apple, who was introducing its new Apple Tablet. The agency which would usually be a retailer would get a commission from the publishers in doing so. This method gained a greater degree of control over e-book pricing as compared to the pricing over print book and the publishers were gaining permanent edge over the ebook margins.

Advantages of E-Books

There are many advantages of using e-books. They are discussed as follows:

- One of the most important advantages of e-books is that there is a provision to store thousands of books into your electronic device without any worries of managing them on the multiple bookshelves taking a huge space in your house. Portability is also associated with e-books.
- The accessibility and availability of the e-books are more convenient and speedy.
- Moreover, there is a possibility to customize the display brightness, font size and style, links and annotations. There is a provision of seamless integration of multimedia in e-books.
- The accessibility of e-books from remote placemake it possible to purchase single copy and make it available in multiple locations at any time round the clock.
- The instant delivery is another feature of e-books with no loses or damage to the titles.
- The process of publishing an e-book is also quicker as compared to print book.

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- The content can be changed easily at any point of time and new edition can be distributed through Internet instantly. The cost of printing, inventory, binding and so on can also be eliminated and the storage space in the warehouses can also be saved.
- The material can be accessed equally by on-campus students as well as by distance learning students.
- E-books can be updated on daily, weekly or monthly basis providing latest information on current affairs.

Disadvantages of E-Books

There are some cognitive disadvantages of e-books. They are as follows:

- Researchers have studied and found that reading text onscreen takes 20-30 per cent more time as compared to reading on paper.
- Researchers have also found increased workload reading an e-book which is a combination of factors such as feeling of exhaustion, increased stress and concluded that more mental efforts are required for reading on screen than paper.
- Also, print readers digest information more quickly and more deeply and remember things by associating with texts as compared to screen reading.
- Some e-books are costly for downloading.
- Selection, acquisition and management of e-books can become complex and expensive if necessary procedures are not made a routine.

Barriers of E-Books

There are certain barriers in e-books which hinder the users to opt for e-books.

- User's reliability on printed text is more, and hence, neglects the benefits of e-books.
- The policies for purchase/subscription of e-books are different form print book and are difficult to understand.
- The cost of e-books from foreign publishers is high for Indian readers.
- Internet access also contributes to the barrier in India.
- Suspect for online products.
- Lack of awareness in information literacy program for e-books.
- Non-standardization of hardware/software required for various types of e-books.
- Lack of common platform for e-books.
- Building of a strong e-book collection is difficult as many of the titles are not available in e-format.
- Licensing issues may affect the availability of e-books across the countries.

12.4 E-JOURNALS

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The term journal as described by the Encyclopedia Dictionary of Library and Information Science is 'the record of proceeding of transactions of a learned society'. 'It is a publication in any medium issued in successive parts bearing numerical or chronological designations and intended to be continued indefinitely' – as defined by AACR2. It is considered as an information shell in a subject. Journals have important role in information management for information creation and dissemination. It consists of research papers, review articles and scholarly communication.

With the emergence of ICT in the recent years, there are ways of providing information to the society at lower cost with easy and reliable mechanism. Publishing industry has brought about the development where information is also created and offered digitally and is referred to as electronic documents. One such sophisticated form of this type of information is e-journals. The term e-journal or electronic journal denotes a broader category of e-publication that include journals, e-zine, web-zine, magazines, newsletter or any type of electronic serial publication and is available on Internet which is accessible through different technologies like www, ftp, gopher, telnet or e-mail.

Although there is no universally accepted definition of e-journals, some researchers have defined e-journals as:

> 'Any serials produced, published and distributed nationally and internationally via electronic networks such as Binet and Internet'
>
> – As defined by **Gail Macmillan.**

> 'E-journals are available electronically via a computer or a computer network, that they may or may not be published in some other physical medium, but that are not CD-ROM's'
>
> – As defined by **Jones.**

The above definitions state that e-journals are periodicals which can be made available over Internet as individual titles. The term e-journal is interchangeably used with paperless journal or virtual journal. E-journals can be accessed online by more than one user simultaneously with timely access. Similar to other electronic documents, e-journals save physical storage.

12.4.1 Characteristics of E-Journals

The few characteristics of e-journals are as follows:

- Serial publication that is available in digital format.
- Located on Web and accesses over World Wide Web (WWW).
- Can either be available for free or by subscription.
- Available formats for e-journals are: ASCII text, HTML pages or PDF (Portable Document Format).

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- Accessibility from any place.
- Available in downloadable format.

12.4.2 Types of E-Journals

The different types of e-journals are:

- Also, called classic e-journals, these were originally distributed through e-mail and are now available on the Internet. These journals can be accessed free of cost.
- These types of journals are available in print as well as electronic form. There is sometimes a difference in the content of the two versions in a way that either electronic version contains some supplement issue or the electronic version is released before printed. The electronic version may be a collection of full text or it may consist of only table of content or some selected articles from the printed version.
- Some e-journals are called database and software models, in which the articles are stored in publisher maintained centralized database and the access permission is given to the subscriber to locate the database and download the article. There is an expiration date associated with the software.
- Some commercial publishers have full text of the journals available on CD-ROMs. Libraries often need to subscribe to both the CD-ROM and print form of such journals.
- There are full text e-journals, where the complete articles are available online instead of summaries and abstract.
- Some e-journals are available only online with no counterparts such as CD-ROMs or printed version.

Access to e-journals

The e-journals can be accessed mainly through Internet, although there is a mechanism to access e-journals through CD-ROMs as well. The following are the different ways to access e-journals provided by the publishers:

- Free access to the e-journal by subscribing to the print journal
- Libraries can completely access all the e-journals through exclusive subscription of electronic form, without having to subscribe to the counterpart print version.
- Selective access to the few chosen e-journals by subscribing to them from the publishers as per agreed terms and conditions
- Consortium access by forming a consortium of institutions with common requirements and interests. This provides the access to the expensive and international e-journals, which otherwise is not possible for many libraries in India.

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There are also three types of access modes available for e-journals. They are as follows:

- **Remote access:** This type of model allows publishers/vendors to host the journals through their websites and provide the right of access to the patrons including individuals or institutions, which are subscribed with the publishers for the e-journals. The rights to access can be provided through user-id-password, IP enabled intranet, or both.
- **On-Site access:** The e-journals are delivered by the publishers through CDROMs or by their website, or through FTP option to the subscribed libraries. The e-journal in turn is hosted by the library within the campus. This way, library can host the journal through LAN with wider and better bandwidth, within the campus as compared to the access through Internet.
- **Access through database:** The publishers are creating the content in the electronic format and maintaining a bibliographic database over the years. The users can access the articles of their interests through these databases.

12.4.3 Creation of E-Journals

The basic steps involved in creating e-journals are as follows:

- **Planning:** The first step is planning. In this case, the hierarchical structure, navigation and logical composition of e-journal is planned.
- **Content creation:** Content of any literature is an essential part and has to be created carefully.
- **Realization:** It involves the designing of the structure of HTML, deciding links between pages, sending to the server and testing.

Advantages of E-Journals

E-journals are published in an electronic format and have various advantages over printed journals. They facilitate a new relationship between information and knowledge and offer new form of scholarly practice. They offer many advantages to users as well as publishers. The following are some advantages of e-journals:

- The e-journals offer the most attractive features of navigation and searching and provide better retrieval capabilities as compared to paper format. The article can be retrieved through any word of the article.
- Instead of hours and days, it takes some minutes to access e-journals than printed journals as it reduces the printing and mailing time.
- They are readily available at your desktop and can be read by more than one person at a time.
- They can be made attractive by including multimedia and graphics including audio-visual materials.

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- They provide the user with the facility to link directly to references cited in the articles through the creation of hyperlink both internally and to other publications.
- Since there is no space restrictions, the publishers can print any number of articles in e-journals and the length of the articles has no restrictions.
- E-journals provide tremendous searching capabilities based on titles, authors, keywords, subjects, full text, abstract and so on. The publishers allow viewing the abstract of an article to decide the worth of an article.
- They are available 24x7 and can be accesses remotely by the users. It reduces the efforts of patrons to visit the library to obtain a copy of the article. It also omits the geographical barrier for the user.

Disadvantages of E-Journals

Following are some disadvantages associated with e-journals:

- The e-journals involve reading from the device screen and long reading may cause eyestrain.
- There is an additional cost investment initially as special equipment (electronic devices) such as computer or other handheld devices are required to read the journals.
- Also, access to e-journals need electricity, telephone lines, Internet, appropriate hardware and software which might be a problem to people living in India.
- Since the technology is not far distant, there is a small percentage of electronic articles available and so it might be possible to have no access to some of the e-journals.
- Maintenance of e-journals requires more facilities and an expert and trained staff.
- Threat of duplication as it is very easy to make copies of e-journals.

Adversities of E-Journals

There are certain issues and apprehensions which are associated with e-journals in spite of so many advantages of e-journals. They are as follows:

- The peer review of the articles in e-journals for the authenticity and quality of the information being reviewed.
- The comprehensiveness of e-journal.
- The easy downloading of e-journals.
- The limit to the number of views and the flow of information with heavy traffic.
- Online help for users.

Examples of E-Journals on Web

There are thousands of e-journals available on web. They are presented in many languages and are of different themes and interests.

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12.5 INTERNET

The Internet is a global network and is not owned by any single individual, company, institution, or country, but is a combined effort of networks available on the Earth. The Internet is a connection or interconnection of many different networks of computer hosts, clients and servers that collectively provide and use information and connection services. Thus, the Internet is a way for computers to communicate. These days, the Internet seems to be everywhere. Web addresses appear on TV serials, millions of people are connecting to the Net every day. Many businesses are beginning to rely on Net not only for communication and information but also for the transportation of certain types of products, such as software or writings. More and more companies, schools and other organizations are installing internal network and relying on e-mail as one of the ways for sharing information.

Thus, Internet is a network of networks scattered all over the world. It allows millions of people all over the world to communicate and to share their ideas and information. The Internet is a wonderful information technological tool which can provide information faster beyond imagination.

Physically, the Internet alludes to numerous computers connected to each other talking a common language or protocol known as Transmission Control Protocol Internet Protocol (TCP\IP). Basically, the Internet is used for so many activities such as communication of information, file transfer, browsing, bulletin board, WWW (World Wide Web) and so forth.

Computer is an essential component of the Internet. Computer allows access of information through the Internet. Sitting at one place, one can move around the world, visiting various libraries and getting whatever is requested within no time. The Internet provides online access to information and has become the need for each and every library.

12.5.1 Components/Equipment Required for Connection

The best way of taking Internet connection is to take dial-up connection using modem and telephone lines. And the second way of connecting with the Internet is the serial Line Internet Protocol or Point to point Protocol connection. When our computer is linked with Internet then the name of our computer becomes Transmission Control Protocol/Internet Protocol (TCP/IP).

In India, VSNL is providing connections like shell or Terminal dial up and TCP/IP, which we call accounts. The rate of fee for shell accounts is determined by VSNL which presently is ₹ 5000 for 500 hours, whereas TCP/IP accounts are

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costly, the rate of which are ₹ 15000 per 500 hours. The registration fee for each individual is ₹ 500.

The following are the required hardwares for taking an Internet connection.

- **Computer:** Computer is the main and essential component of the Internet, at least one IBM-PC 486\Pentium Macintosh or Unix machine.
- **Modem:** It is recommended for modem with speed 14000 bps to 28800 bps.
- **Internet browser SW**
- **Programme:** The Company which is providing this service, special programmes are provided by that company, such as in India it is VSNL.
- **Telephone:** As the information is transmitted through telephone lines, therefore, it is very essential for connection.
- **Service provider:** The service providing company such as VSNL in our country, provides Internet connections paying service charges to the company. The company creates an account for every user and the user is asked to keep his account protected by a password. Once the account is created, the individual gets access to the Internet.

12.6 WEB BASED SERVICES

The services and facilities of the Internet are no longer restricted to information storage and retrieval. In the recent years, the Internet has extended its scope to telephone, marketing and various entertainment sectors such as sports, film music, healthcare, environment, newspapers and magazines, books and journals, education, business, employment, tourism, journalism and several useful fields.

We can conclude here some main and useful services and facilities offered by the Internet to its users all over the world.

12.6.1 Browsing

A browser is a program on your computer that enables you to search ("surf") and retrieve information on the Worlds Wide Web (WWW), which is part of the Internet. The Web is simply a large number of computers linked together in a global network, that can be accessed using an address (URL, Uniform Resource Locator, e.g. http://www. truemanbooks.com for this book's publisher), in the same way that you can phone anyone in the world given their telephone number.

URLs are often long and, therefore, easy to type incorrectly. They all begin with http://, and many (but not all) begin with http://www. In many cases the first part (http://, or even http:/ www.) can be omitted, and you will still be able to access the page.

You do not need to know how the telephone network functions to be able to make a phone call. However, you ought to know how to use your telephone apparatus and the finesses (Software) it contains. Your computer is the equivalent of the telephone, and a browser is the equivalent of the software that modern telephones contain. (A browser can also be used to handle electronic mail. create and edit information on the Internet, and to contact discussion groups).

Searching the Web

If you do not know the telephone number of the person you wish to ring to, you need a telephone directory. The Web provides two methods of searching for pages providing the information:

- Sites presenting Web pages sorted by category and subcategories, for example, Yahoo (several sites, including http://www.yahoo.com and http://www.yahoo.in).
- Site offering search engines that return lists of Web pages containing text that matches a search word or string, for example, Google (http://www.google.com), Alta Vista (http:// Many web sites offer both, or a combination of these alternatives.

Before you conduct a search, it is important to consider, among others, the following points:

- Is your choice of search term adequate, too restrictive or too general?
- Is the search you have planned to undertake most suited for a search engine that categorizes websites, so that you can browse through appropriate subcategories when the first results are returned?
- Are you more interested in using a search engine that merely returns all the Web pages it has found containing the search term?
- Have you read the Search Help pages that most search pages offer? These will tell you how the search engine conducts the search, and therefore how you ought to plan your search.
- Bear in mind the fact that engines differ in their coverage of the Internet, their speed and whether they are largely compiled manually by people or automatically by 'robots' that scan the Internet.

A search strategy must include knowledge of how the search engine you have planned to use handles Boolean Logic and other similar search terms.

12.6.2 Web Browsers

A Web browser is a software application for retrieving, presenting and traversing information resources on the World Wide Web. An information resource is identified by a Uniform Resource Identifier (URI) and may be a Web page, image, video, or other piece of content. Hyperlinks present in resources enable users easily to navigate their browsers to related resources. A Web browser can also be defined

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as an application software or program designed to enable users to access, retrieve and view documents and other resources on the Internet.

Although browsers are primarily intended to use the World Wide Web, they can also be used to access information provided by Web servers in private networks or files in file systems. The major Web browsers are Firefox, Chrome, Internet Explorer, Opera and Safari.

Search Engines

A Web search engine is designed to search for information on the World Wide Web. The search results are generally presented in a line of results often referred to as Search Engine Results Pages (SERPs). The information may be a specialist in Web pages, images, information and other types of files. Some search engines also mine data available in databases or open directories. Unlike Web directories, which are maintained only by human editors, search engines also maintain real-time information by running an algorithm on a Web crawler.

A search engine operates in the following order:

- Web crawling
- Indexing
- Searching

Web search engines work by storing information about many Web pages, which they retrieve from the HTML itself. These pages are retrieved by a Web crawler (sometimes also known as a spider) – an automated Web browser which follows every link on the site. The contents of each page are then analysed to determine how it should be indexed (for example, words can be extracted from the titles, page content, headings, or special fields called meta tags). Data about Web pages are stored in an index database for use in later queries.

Google is the most popular search engine worldwide. Yahoo!, Bing and other search engines are more popular in the US than in Europe.

In the People's Republic of China, Baidu is the most popular search engine and in Russian Federation, Yandex is the most popular search engine.

12.6.3 Evaluation Criteria for Web Based Resources

1. **Authority:** To check the authentication of the content by whom it has been created or developed or used by ?" such types of authentication need to be check…

   For example

   - What is their authority?
   - Do they have expertise or experience with the topic?
   - What are their credentials and institutional affiliation?
   - Is organizational information provided?

- Does the URL suggest a reputable affiliation with regard to the topic--personal or official site; type of Internet domain (i.e., .edu: educational institution; .org: non-profit organization; .com: commercial enterprise; .net: Internet Service Provider; .gov: governmental body; .mil: military body)?

2. **Objectivity:** The material must have objectivity about its purpose of presenting "Is the purpose and intention of the site clear, including any bias or particular viewpoint?"

   For example

   - Are the purpose and scope stated?
   - Who is the intended audience?
   - Is the information clearly presented as being factual or opinion, primary or secondary in origin?

3. **Accuracy:** It is important to check that "Is the information presented accurate or not?
   - Are the facts documented or well-researched?
   - Are the facts similar to those reported in related print or other online sources?
   - Are the Web resources for which links are provided quality sites?

4. **Currency:** The content or any topic which has been discussed or being searched by a person that should have its relativity of the current scenario it should have the question like "Is the information current?"

   For example

   - Is the content current?
   - Are the pages date-stamped with last update?

5. Usability: It site should be checked as" Is that the site well-designed and stable?
   - Is the site organization logical and easy to maneuver?
   - Is the content written at a level that is readable by the intended audience?
   - Has attention been paid to presenting the information as error-free (e.g., spelling, punctuation) as much as possible?
   - Is there a readily identifiable link back to the institutional or organizational home page?
   - Is the site reliably accessible?

This way it can be say that the Website or data which can easily be found that must be checked on the above discussed criteria before accepting with truth. In case, the content is being used without verification then this may reduce the trust level of the content or published data or facts.

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Check Your Progress

1. State the benefits of resource sharing through Inter-Library Loan (IIL) via the Internet.
2. What are the services available to the library through the Internet?
3. List the types of e-books.

12.7 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. IIL through Internet offers the following benefits:
   - Single solution to manage the activities of IIL.
   - The paper work and record-keeping in browsing and lending a material can be effectively managed with reduced paper work.
   - Easy to track the status of the request at all stages in IIL process.
   - To integrate bibliographic information with online union catalogue using Internet.
   - Request and messages through electronic transmission using Internet.
2. Some of the services that are available through Internet to the library are as follows:
   - Online information retrieval
   - Free browsing
   - Broad band internet centre
   - Library homepage for Information dissemination
   - Dynamic library websites
   - Bulletin board service
   - OPAC
3. There are different types of e-books that can be recognized. These are as follows:
   - Issue or re-issue of a print book in e-format. These types are called e-hybrid book.
   - A book created by e-revision or e-feedback and the formally-issued version of which is in the print format.
   - E-books enhance text with audio, video or images.
   - A book with text, images, audio and video, and are regularly updated as warranted. These are known as e-reference books. A series that combines the latest information is also considered in this type.

12.8 SUMMARY

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- The library plays a vital role for any organization, be it school, college, university or any business organization. With the advancement in computer and telecommunication technologies in the past few years the availability of information has grown tremendously.
- The library plays a vital role for any organization, be it school, college, university or any business organization. With the advancement in computer and telecommunication technologies in the past few years the availability of information has grown tremendously.
- The academic libraries in India have set up themselves to provide an ICT based information services platform. The Internet has proved to be a boon for both the libraries as well as the users.
- With the involvement of Internet in library activities, resource sharing and cooperative functioning has also become vital which has eliminated the barrier of distance and size among the users.
- OPAC has also become a popular source of bibliographic information which can be accessed via Internet. It is useful to get information about the organization of knowledge by other institutions.
- The Internet has made possible the availability of major libraries online which are accessible directly from any part of the world. It has provided access to the catalogues of various libraries that are attached to universities and colleges and allow them to place a request for their users.
- There is a huge impact of Internet on the library services and has now become an integral part of LIS. Internet is able to reach the library services to the user's desktop.
- The introduction and growth of e-books has changed the relationships between the libraries, publishers and distributors and also the relationship between the libraries and their users.
- It is necessary to standardize the formats of e-books as there are far many variables such as operating system, executable software, memory space, and so on that are associated with e-books.
- The term journal as described by the Encyclopedia Dictionary of Library and Information Science is 'the record of proceeding of transactions of a learned society'.
- The e-journals can be accessed mainly through Internet, although there is mechanism to access e-journals through CD-ROMs as well.
- E-journals are published in an electronic format and have various advantages over printed journals. They facilitate a new relationship between information and knowledge and offer new form of scholarly practice.

NOTES

- The best way of taking Internet connection is to take dial-up connection using modem and telephone lines.
- A browser is a program on your computer that enables you to search ("surf") and retrieve information on the Worlds Wide Web (WWW), which is part of the Internet.
- A Web browser is a software application for retrieving, presenting and traversing information resources on the World Wide Web.

12.9 KEY WORDS

- **OPAC:** It is an online bibliography of a library collection that is available to the public.
- **Journal:** It is a publication in any medium issued in successive parts bearing numerical or chronological designations and intended to be continued indefinitely.
- **Internet Protocol:** It provides a standard set of rules for sending and receiving data over the Internet.
- **Uniform Resource Identifier (URI):** It is a strings of characters used to identify names or resources on the Internet.

12.10 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. Write a short note on the scope of Internet based Library and Information Services.
2. What are the technical aspects involved in the development of an e-book?
3. How are e-books distributed to the consumers?
4. Identify the barriers which restrict the users to opt for e-books.
5. List the characteristics of e-journals.
6. Name the equipment required for getting an Internet connection.
7. How does a search engine operate?

Long-Answer Questions

1. 'The Internet has proved to be a boon for both the libraries as well as the users.' Do you agree with this statement? Give reasons for your answer.
2. Why is it necessary to standardize e-books?
3. Discuss the advantages and disadvantages of e-books.

4. How can e-journals be accessed?
5. Explain the advantages and disadvantages of e-journals.
6. Describe Web based services.
7. Analyse the evaluation criteria for Web based resources.

NOTES

12.11 FURTHER READINGS

Lea, Peter W**.** 1990. *Printed Reference Materials*. Third Edition. London: Library Association.

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UNIT 13 REFERENCE LIBRARIAN: AN OVERVIEW

NOTES

Structure

13.0 INTRODUCTION

In the previous unit, you studied about Web based resources and services and their evaluation criteria. This unit deals with the role, skills and competencies of the reference librarian.

From the beginning of librarianship, the role of the reference librarian has been defined by the need of the patrons for human mediation. Reference librarians apply critical-thinking skills, emotional intelligence, teaching ability and question analysis to connect the user with appropriate resources. While some libraries developed variations (such as tiered models), the traditional model, involving face-to-face interaction between a patron and a librarian who answered every type of question from one or more multipurpose service points, prevailed throughout the "paper era."

13.1 OBJECTIVES

After going through this unit, you will be able to:

- State the role of a reference librarian
- List the essential skills of a reference librarian
- Discuss the competencies of a reference librarian

13.2 REFERENCE LIBRARIAN: AN OVERVIEW

NOTES

In this age of Information and Communication Technology (ICT), the role of the reference librarian has become all the more relevant and challenging. Due to information overload, users are at times confused about which information source to use. In other words, it can be understood, that the primary task of every reference librarian is to help users to overcome different kinds of barriers (such as time constraint) and to achieve their goals using relevant information and ideas.

The Information Commons

One response to technology was the development of the Information Commons (IC). Beagle defines a library IC as a "new type of physical facility" or section of a library "specifically designed to organize workspace and service delivery around an integrated digital environment" along with the support technology. The physical library space is coordinated to become an extension of student study areas, and workspaces are organized to accommodate collaboration. Therefore, the physical commons is designed to incorporate a cluster of access points to the digital arena. These access points facilitate the trained staff to help users with their query, navigation and processing of information. In this "functional integration," some reference librarians continued to assume the role of general-information provider, technical expert, referral assistant, point of contact and help centre. As a result, librarians have become jacks-of all-trades.

From Information Commons to Learning Commons

The terms Information Commons (IC) And Learning Commons (LC) may easily be confused. Scott Bennett, author, however, defines an LC as a place that brings people together not around informally shared interests, as happens in traditional common rooms, but around shared learning tasks, sometimes formalized in class assignments. The core activity of a learning commons would not be the manipulation and mastery of information, as in an information commons, but the collaborative learning by which students turn information into knowledge and sometimes into wisdom. Libraries often create new LCs during an extensive renovation or new building project, where money is flowing and new space can be added. Though some might consider the LC a necessary response to a changing environment, a high performance LC requires the luxury of a committed university administration and community; a budget big enough to build, renovate, or reorganize existing reference space; and the ability to bring together units or groups with disparate knowledge and culture. The most visible and highly touted feature of the LC, in comparison to the IC and other reference models, is the number and variety of stakeholders both within the library and within other campus groups and units. Intended to foster collaboration, communication and easy access to assistance, the added physical space might be a new environment for reference librarians.

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13.2.1 The Role of Reference Librarian in the Development and Implementation of the Learning Commons

The frontline reference librarian's role in initiating, planning, implementing, and operating LCs is unclear. Scholarly articles about LCs often focus not on reference librarians but on the students at the centre of the LC or on the other stakeholders, such as the university administrators. While literature does not acknowledge the fullness of the reference librarian's role, a few pale signs appear. The reference librarian service on LC planning and implementation committees does appear to be common. For example, the University of Massachusetts Dartmouth's LC Planning Committee, in its final report, notes that in addition to the original library representative, "the Library's Information Services Department requested that two additional librarians from their department serve on the committee." In the case of the LC, they have written that "evidence-based information exchanges between librarians and their faculty and student constituencies continue to fuel collaborative partnerships."

Positioning the library for change reference, librarians can also help libraries move incrementally toward the LC model. Elements of the LC can be developed and implemented as space and available resources allow. These might include adding staff who help students in word processing and computer skills, hiring student assistants with specialized computer skills, developing closer relationships between reference and instruction units, or sharing staff between reference and media service desks.

13.2.2 Collaboration is Vital

Implementing the LC model involves restructuring the organization, learning new skills and creating new spaces. Given its nature, the evolution of the LC model will usually require a major transformational effort by numerous stakeholders. In some areas, such as the allocation of space or resources, reference librarians have limited roles to play. For example, they might perform specific tasks, such as weeding older paper collections and helping reconfigure existing service points. How the reference department adjusts and copes with a new space, however, is a critical component of a successful LC. Reference librarians can help create an organizational culture that embraces change, communication and collaboration.

13.2.3 Skills

The essential skills required for a reference librarian are the following:

- Critical-thinking skills
- Quick comprehension skills
- Ability to teach
- Good communication skills
- Emotional intelligence

13.3 COMPETENCIES

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Competency refers to the knowledge and skills that enable an individual to perform efficiently in a workplace. An assessment of competencies is essential. The task force has focused on identifying the underlying behavioral tendency that lead to successful performance in organizations providing reference and user services to patrons. The competencies provided in this document are only those that are critical to excellent reference and user service to patrons. These competencies for reference and user service are designed to be understood and used in the broader context of the American Library Association (ALA) statement of core competencies.

Critical thinking and analysis

A librarian provides high quality services by carefully analyzing both information sources and services that can be used in the following manner:

- The use of electronic and printed media to connect users with the highly recommended and carefully selected sources of topics of interest to the primary users
- The librarian synthesizes a variety of information sources in order to provide the most relevant information to each patron.
- The librarian evaluates information use patterns based on data collected as a result of information service operations and uses the results to enhance services given to users.
- The librarian applies knowledge about the process of information seeking to structure information services for users.
- The librarian uses the 'Guidelines' on follow-up while providing reference service.

Responsiveness

The librarian provides services that are responsive to the user's needs in the following manner:

- The librarian determines the situational context of the individual's information needs, when interacting with each user in person or through another communication channel.
- The librarian analyses information sources recommended to users in the context of the attractiveness, interests, and content level.
- The librarian suggests specific works that relate to what the user said is important.

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- The librarian uses the 'Guidelines' statements on approachability, interest, and listening/inquiring, when providing reference service in a traditional in-person service setting.
- The librarian engages the users in discussions about experiences related to their information needs and also expresses interest in every user's experience.
- The librarian respects the right of users to determine the direction of their research by empowering them to pursue their own preferences.

Environmental scanning

The librarian should monitor the most relevant information sources to routinely update knowledge of current developments in reference and user services. This is done in the following manner:

- The librarian reads, views, and listens to media to keep themselves abreast in areas of knowledge relevant to the primary users.
- The librarian attends exhibits at local, regional, or national professional conferences at least once a year, for which the relevant institution provides support.
- The librarian scans the environment for emerging technologies that are relevant to the delivery of reference and user services.
- The librarian keeps themselves updated on information resources by consulting a wide variety of reviewing sources and publishers' catalogs, including those of small presses, by attending professional meetings and by reading, viewing, and listening.

Dissemination of knowledge

A librarian shares their experience with their colleagues and guides the new staff. The reference librarian must share information in the following ways:

- He/she should disseminate knowledge to the students in their area of expertise.
- He/she should prepare presentations.
- He/she should create Web pages.
- He/she should discuss issues with their colleagues.
- He/she should review draft manuscripts for their colleagues.
- He/she should participate in professional discussions via meetings, video conferences and other available communication methods and forums.

NOTES

Marketing, awareness, and informing

A planning process is essential to identify and promote services to users. A strategic plan of operation provides a framework for goals and objectives to be recognized. This road map for service functions provides means and methods by which services and information are delivered. A marketing plan, an aspect of strategic planning, is a promotional mechanism by which goals, objectives, and strategies can be measured in a quantitative manner. Who is providing reference services, what services are being provided, and the effectiveness of the services are the issues that need to be addressed—all these aspects can be measured in a quantitative manner.

Evaluation and assessment of resources and services

Consistent assessment of resources in the context of users' needs is essential to keep any information service vital and relevant. A parallel effort in assessing and evaluating the delivery of information services is equally important. A wide range of information services is provided to the users through a large and growing set of delivery channels. There are print collections visited on-site, print materials that are delivered to the user, electronic collections delivered over the Internet, information services provided in-person, or through telephone, fax ,e-mail, and Web-based virtual sessions. In all these services, the goal is to make the resources of a library available to the user in a way and in a format that meets the user's needs. Many aspects of the information service interaction are intangible and difficult to measure objectively. However, the goal of assessing and evaluating performance remains valid, if elusive. Reference and user services librarians are required to have competency in both formal and informal methods of evaluation and assessment. Assessment methods can range from effective use of close-ended questions in the reference interaction to a user feedback form on interlibrary loan documents. Other methods which can be used are structured surveys and studies using unobtrusive observation. Use of these and other assessment and evaluation measures will vary across time and across institutions to fit particular needs, but the competency required to conduct them will remain the same over time.

Check Your Progress

1. Who is a reference librarian?
2. Name any two essential skills required for a reference librarian.

13.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. A reference librarian helps to retrieve process and analyse information in a systematic manner according to the user's needs.

2. Two essential skills required for a reference librarian are the following:
   - Good communication skills
   - Ability to teach

NOTES

13.5 SUMMARY

- In this age of Information and Communication Technology (ICT), the role of the reference librarian has become all the more relevant and challenging.
- The terms Information Commons (IC) And Learning Commons (LC) may easily be confused.
- The frontline reference librarian's role in initiating, planning, implementing, and operating LCs is unclear. Scholarly articles about LCs often focus not on reference librarians but on the students at the centre of the LC or on the other stakeholders, such as the university administrators.
- Implementing the LC model involves restructuring the organization, learning new skills and creating new spaces.
- Competency refers to the knowledge and skills that enable an individual to perform efficiently in a workplace. An assessment of competencies is essential.
- The librarian suggests specific works that relate to what the user said is important.
- The librarian should monitor the most relevant information sources to routinely update knowledge of current developments in reference and user services.
- Consistent assessment of resources in the context of users' needs is essential to keep any information service vital and relevant. A parallel effort in assessing and evaluating the delivery of information services is equally important.

13.6 KEY WORDS

- **Emotional intelligence:** It refers to the ability to identify and manage one's own emotions, as well as the emotions of others.
- **Collaboration:** It refers to the working together of two or more individuals with the objective of achieving one common objective.
- **Competency:** It indicates sufficiency of knowledge and skills that enable someone to act in a wide variety of situations.

13.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

NOTES

Short-Answer Questions

1. Define the terms Information Commons (IC) And Learning Commons (LC).
2. What are core competencies?

Long-Answer Questions

1. Analyse the role of a reference librarian in the digital era.
2. How does the reference librarian assist in the dissemination of knowledge?

13.8 FURTHER READINGS

Lea, Peter W**.** 1990. *Printed Reference Materials*. Third Edition. London: Library Association.

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UNIT 14 REFERENCE INTERVIEW AND SEARCH TECHNIQUES

NOTES

Structure

14.0 INTRODUCTION

In the previous unit, you studied about the role, skills and competencies of a reference librarian. This unit will introduce you the concept of reference interview, its various stages and the literature search techniques and process.

Reference interview is a conversation between a user who is in need of information and a librarian who assists in finding the required information. Reference interview may be conducted in person, i.e., face-to-face, by telephone, or electronically through e-mail, live chat, Instant Messaging (IM) or other electronic means as requested by the user. Reference interview, in fact, is an intermediate step between the library users' query and ideal resources which provide answers to the query. Reference interview helps to know the query thoroughly, the purpose for which information is needed, background of the user, what information user has already collected and the type and amount of information required. Although librarians should learn the elements of good reference interview, yet they must recognize the fact that these steps may require to be modified to match each situation. According to author Cassell and Hiremath, "The reference interview is more an art than science. It is an ever changing practice that requires responsiveness to the context rather than the application of predetermined set of skills".

14.1 OBJECTIVES

After going through this unit, you will be able to:

- Define research interview
- Discuss the stages of research interview
- Explain the literature search process and techniques

14.2 DEFINITION: REFERENCE INTERVIEW

NOTES

Online Dictionary of Library and Information Science defines reference interview as "the interpersonal communication that occurs between a reference librarian and a library user to determine the person's specific information need(s), which may turn out to be different than the reference question initially posed. Because patrons are often reticent, especially in face-to-face interaction, patience and tact may be required on the part of the librarian. A reference interview may occur in person, by telephone, or electronically (usually via e-mail) at the request by the user."

Reference Interview Conducted face-to-face

Conducting a successful reference interview in person, i.e., face-to-face is a skill that requires understanding and practice. Reference interview helps to know the query thoroughly; the purpose for which information is needed, background of the user, what information user has already collected, and type and amount of information required.

14.2.1 Stages of Reference Interview

There are six stages of reference interview and each stage is equally important.

Stage 1: **Establishing rapport with the user:** To establish rapport with the user, the librarian should be approachable, show keen interest in the user's queries. He should have good communication skills to keep the user engaged during the reference interview, be efficient in search and must follow up to find out if the user's queries have been answered fully or not and suggest possible alternatives.

Stage 2: **Discussing and clarifying the question:** Once dialog is initiated, the librarian should clarify the question posed by the user, by enquiring the reasons for which information is sought, what information the user already has, time frame within which information is required, how much information is required and type of sources the individual is looking for. Here knowing the user's background is also important because that will determine the types of sources to be searched for providing answers.

Stage 3: **Developing strategy for successful search:** Once the subject requirements of the user are clear, the librarian constitutes the search terms and identifies most appropriate sources for the user. During the process of selecting search terms and identifying appropriate sources, the librarian should be in communication with the user to ensure that the search is in the right direction.

Stage 4: **Finding and evaluating information:** The next step is searching and locating the information. During the search process, the librarian should be in touch with the user to show him the search results to find out if these are meeting the desired information requirements. The process should continue till the user gets the required information or has resources to examine the same. The librarian should ensure that the sources selected should be of high quality and from reputed publishers.

Stage 5: **Follow-Up:** Follow-up in the reference interview is essential, as it helps to know, whether information requirements of the user have been met fully or not. If the user's query has not been answered to his satisfaction, then revise the search terms or try other sources. The overall purpose of the follow up is to ensure that good service is provided by the library and the user is motivated to come back again when in need.

Stage 6: **Closing the interview:** Close the interview on a positive note. In case additional information is required by the user and that is not available in the library, refer the user to other libraries, institutions or experts.

Reference Interview Conducted Remotely

Reference interview is conducted remotely when reference service is provided by telephone, email, live chat, instant messaging, SMS or other electronic means. In e-mail, the reference interview is in the form of a well-designed form which the user fills to state his information requirements. As all the essential details are with the librarian, it becomes easy to search and provide answers. Reference interview in Chat, IM, and SMS is conducted in real time. Here reference interview cannot be elaborate, as only short messages can be exchanged back and forth. The types of questions which can be handled by this mode are of ready reference type.

14.3 LITERATURE SEARCH TECHNIQUES

Based on the type of questions, the search strategy is worked out. Time required in searching and finding information also varies with the type of question. Query is first analyzed and clarified via reference interview. From this, one determines, the type of questions asked, the parameters to be established (related to the purpose, scope, time span, amount of material, level of material, etc.), and the source(s) or system(s) where the necessary information is likely to be found.

Types of Questions

Most of the reference questions received by the librarians can be broadly categorized into following five types:

(i) Directional type
(ii) Procedural type
(iii) Ready Reference type
(iv) Specific Search type
(v) Research type

Directional and procedural types of questions do not require searching the literature. In the case of the ready reference types of questions, standard reference books are consulted and answer is provided. Time required to answer such types of questions varies from two to ten minutes.

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Types of Answers

Answers provided to the users' queries may be in different forms. The answer may be in the form of complete data or information, as normally provided in case of ready reference types of questions; or in the form of sources like books, articles, journals and so forth containing the answer, as provided in case of specific search type of questions; or in the form of bibliographical references to the sources containing answer, as provided in response to research type of questions. According to authors, Cassel and Hiremath, answers provided to the user can be of different types and provide various levels of utility to the user. For example, an answer may be elementary, skilled or value-added. Though all answers are helpful to the user, value added answers provide highest level of utility for the user and save the time of the user. Value addition can be done by providing original sources, instead of providing only bibliographical references to these sources. When there are several relevant sources to the question, then the librarian can point out which ones are most suitable to begin with; as they contain the most relevant information and are from the reputed publishers. Similarly, the librarian can explain to the user about the suitability of a particular website or a database for search.

14.4 SEARCH PROCESS

The queries relating to specific search and research type including more difficult ready reference type require searching in secondary tools like bibliographies, indexes, catalogues and databases to find the requisite sources containing the answer. Here the actual search strategy, as well as possible sources, have to be worked out. Time taken to answer these questions also varies depending upon the type of questions asked. Information may have to be searched in diverse sources including informal sources to provide answer to the satisfaction of the user. In case of specific search type of queries, the answers are likely to be available in books and journals on the specific subject or topic. For this, library catalogue, bibliographies, indexes and other media are searched to find books or other material on the subject. This way the librarian must determine the likely subject headings and keywords which are most appropriate for the search. Depending upon the number of items retrieved, the librarian may have to broaden the search, narrow the search or carry out more specific searches to find the required material containing the answer. In the duration of the search process, it is advisable to show the search results to the user, so that only relevant material is selected and noted down. Once the search process is complete and the relevant references are noted down, the next step is to locate the material in the library and deliver it to the user for perusal. Research types of queries require searching for the micro documents like periodical articles, conference papers and so forth for finding the answer. For this normally bibliographic databases are searched.

NOTES

Queries relating to specific search and research types including more difficult ready reference types of questions require searching in secondary tools like;

- Bibliographies
- Indexes
- Catalogues and
- Databases

14.4.1 Searching Online Databases

Presently, most of the databases are in an electronic form and are available on the Web for searching online. Steps involved in searching electronic databases vary from database to database because each database system has its own custom–built interface that allows specific type of search with specific search operators and specific search commands. Most of the online search service providers offer free training modules, which provide step-by-step instructions to search the database and retrieve required information. In addition, there are some basic steps the librarian must know for conducting computer based search.

These steps are as follows:

Step 1: Registration with the Internet Service Provider

Step 2: Registration with Database Search Service Provider

Step 3: Access the Internet and Log on to the Database Search Service Provider

Step 4: Select the Appropriate Database

Step 5: Formulate the Search Expression

Step 6: Search and Examine the Search Results

Step 7: Reformulate Search Expression, if Required

Step 8: Select and Save or Print the Retrieved Relevant Records

In conclusion, it can be said that reference interview is a conversation between a user, who is in need of information and the librarian who assists in finding the required information. The user's satisfaction should always be kept in mind while conducting reference interview or searching the answer. For this, the librarian should be receptive and cordial, search information sources with or for the user, provide the requisite sources, enquire from the user if he or she is satisfied with the answer and encourage the user to come back again, if in need.

Check Your Progress

1. What is a reference interview?
2. State the various media through which reference interviews can be conducted?

14.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

NOTES

1. A reference interview is a conversation between a user, who is in need of information and the librarian who assists in finding the required information.
2. Reference interview may be conducted in person, i.e., face-to-face, by telephone, or electronically through e-mail, live chat, Instant Messaging (IM) or other electronic means as requested by the user.

14.6 SUMMARY

- Reference interview is a conversation between a user who is in need of information and a librarian who assists in finding the required information.
- Reference interview may be conducted in person, i.e., face-to-face, by telephone, or electronically through e-mail, live chat, Instant Messaging (IM) or other electronic means as requested by the user.
- Although librarians should learn the elements of good reference interview, yet they must recognize the fact that these steps may require to be modified to match each situation.
- Reference interview in Chat, IM, and SMS is conducted in real time. Here reference interview cannot be elaborate, as only short messages can be exchanged back and forth. The types of questions which can be handled by this mode are of ready reference type.
- Based on the type of questions, the search strategy is worked out. Time required in searching and finding information also varies with the type of question. Query is first analysed and clarified via reference interview.
- Most of the reference questions received by the librarians can be broadly categorized into following five types:
  - o Directional type
  - o Procedural type
  - o Ready Reference type
  - o Specific Search type
  - o Research type
- Answers provided to the users' queries may be in different forms.
- The queries relating to specific search and research type including more difficult ready reference type require searching in secondary tools like bibliographies, indexes, catalogues and databases to find the requisite sources containing the answer.
- Depending upon the number of items retrieved, the librarian may have to broaden the search, narrow the search or carry out more specific searches to find the required material containing the answer.

NOTES

- Queries relating to specific search and research types including more difficult ready reference types of questions require searching in secondary tools like;
  - o Bibliographies
  - o Catalogues and
  - o Indexes
  - o Databases.
- Presently, most of the databases are in an electronic form and are available on the Web for searching online. Steps involved in searching electronic databases vary from database to database because each database system has its own custom–built interface that allows specific type of search with specific search operators and specific search commands.

14.7 KEY WORDS

- **Instant Messaging (IM):** It is a type of online chat that offers real-time text transmission over the Internet.
- **Reticent:** It refers to a person who is unwilling to tell people about things.

14.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. How is reference interview conducted through e-mail?
2. List the types of reference questions received by librarians.
3. What is the significance of reference interview?

Long-Answer Questions

1. Discuss the stages of reference interview.
2. Explain the literature search process.
3. Give examples to illustrate the literature search in online databases.

14.9 FURTHER READINGS

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