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1 PREFACE In the curicular structure introduced by this University for students of Post-Gradu- ate degree programme, the opportunity to pursue Post-Graduate course in Subjects introduced by this University is equally available to all learners. Instead of being guided by any presumption about ability level, it would perhaps stand to reason if receptivity of a learner is judged in the course of the learning process. That would be entirely in keeping with the objectives of open education which does not believe in artificial differentiation. Keeping this in view, study materials of the Post-Graduate level in different sub- jects are being prepared on the basis of a well laid-out syllabus. The course structure combines the best elements in the approved syllabi of Central and State Universities in respective subjects. It has been so designed as to be upgradable with the addition of new information as well as results of fresh thinking and analysis. The accepted methodology of distance education has been followed in the prepa- ration of these study materials. Co-operation in every form of experienced scholars is indispensable for a work of this kind. We, therefore, owe an enormous debt of gratitude to everyone whose tireless efforts went into the writing, editing and devising of proper lay-out of the meterials. Practically speaking, their role amounts to an involvement in 'invisible teaching'. For, whoever makes use of these study materials would virtually derive the benefit of learning under their collective care without each being seen by the other. The more a learner would seriously pursue these study materials, the easier it will be for him or her to reach out to larger horizons of a subject. Care has also been taken to make the language lucid and presentation attractive so that it may be rated as quality self-learning materials. If anything remains still obscure or difficult to follow, arrangements are there to come to terms with them through the counselling sessions regularly available at the network of study centres set up by the University. Needless to add, a great part of these efforts is still experimental-in fact, pioneer- ing in certain areas. Naturally, there is every possibility of some lapse or deficiency here and there. However, these do admit of rectification and further improvement in due course. On the whole, therefore, these study materials are expected to evoke wider appreciation the more they receive serious attention of all concerned. Professor (Dr.) Subha Sankar Sarkar Vice-Chancellor

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3 Post-Graduate : Library and Information Science [MLIS] Paper -1 Information, Communication and Society Modules : 1-4 Course Writing : Editing : Dr. Swapna Banerjee Prof. Bhubaneswar Chakrabarti Paper - II Information, Sources, Systems and Services Modules : 1-4 Course Writing : Editing : Prof. Bhubaneswar Chakrabarti Prof. P. K. Mahapatra Notification All rights reserved. No Part of this Book may be reproduced in any form without permission in writing from Netaji Subhas Open University. Professor (Dr.) Debesh Roy Registrar

4

8

9 Unit 1 ‰‰‰‰‰ Data : definition and characteristics 1.0 Objectives 1.1 Introduction 1.2 Data—definition and scope 1.3 Data—types 1.4 Data—descriptive study 1.5 Exercise 1.6 References and Further Study 1.0 Objective This unit describes in detail data, their characteristics, definition, scope, characteristics of data in science and social science and the various types of data. Studying this unit will help you to get an idea of the various facets of data. 1.1 Introduction Data is taken as enquivalent to recorded symbols. The nature of data, types of data, its properties are all very importamt in the field of information science. Data can exist in a variety of forms—as numbers or text on pieces of paper, as, bits and bytes stored in electronic memory or as facts stored in a person's mind. The users need to test the usefulness of data based on its consistency, reliability, adequancy, transparency and timeliness. It data collected do not pass these tests, then the usefulness of data would be limited. 1.2 Data—definition and scope The term 'data' means a set of information relevant to the questions under study. Oxford English Dictionary defines data as known facts or things used as a basis for

10 inference reckoning." Various persons have defined data in various ways. M. Cooley states that data is the result of direct observation of events, that is, values of attributes of objects; K Leon Montogomery opines that data are signals detectable by the human senses, including facts, statistics or experimental results from a scientific experiment, where as Dinver's concept of data is that it is a sensory and perceptual phenomena. Schuman defines data as some quantitative facts derived from experimentation, calculation, or direct observation. A fermidable definition of data is given by UNESCO as facts, concepts, or instructions in a formalised manner suitable for communication, interpretation of processing by human or automatic means." In whatever way may we define data, it is very much clear from the above definitions that data is something which has no shape, arrangement, relevance, or coherence when it stands alone. When it is well fitted within a particular delimitnig arena, it must be properly arranged, sized or cohered to have a definite relationship and meaning. The scope of data is vast. There is not a single field of research where data is not needed, be it science or social science. All organizations, generate data about their activities. Organizations collect data on the state of their markets, the economic circumstances of the country or of its exports markets. All of these data are important. Some data have potential for competitive advantage and must be maintained securely and effectively if the organization is to benefit from their availability. Data are yery often associated with records of events, objects or persons. For example, a personnel record identifies an individual and includes many items of data that define the personage, training level, sex. marital status and many more. The importance of data in library service is noteworthy. There exists no field of knowledge, no human activity where data is not indispensible. Carefully gathered data analyzed in the context of an organization's, mission and the community needs, form the basis for evaluation and effective decision making. 1.3 Data—types Data have been broadly classified into two categories according to their source as primary data and secondary data. We shall discuss these briefly. Primary data—This type of data is collected by the investigator directly from the field of enquiry for some specific purpose, or to solve some specific problems. For example, data may be collected from individual households in a town to know their monthly income pattern, or, data collected from an experiment to ascertain the

11 effect of temperature on the rate of photosynthesis of plants. Collection of primary data is done by three ways— interview method, mailed questionnaire method, and direct observation of the units. In the first method, one obtains a representative sample of units and then notes down the answers that he obtains by interviewing the respondents. In the second method, the investigator sends the questionnaire to the address corresponding to the units which happen to be included in the sample. There are, however, various versions of the above two methods, depending on the nature and complexity of the problem. In the direct observation method, the investigator himself obtains the relevant data by actually visiting the field of enquiry and directly observing. For example, in estimating the total avareage under a particular crop, the investigator might go to the crop field and obtain information on the area of the plots for himself. Secondary data—Data collected by certain people or agency, but used by others for some specific purpose are called secondary data. These type of data are usually collected by government or non-government agencies in a routine manner and used by others according to their requirements. Sets of figures given in year books, census reports, official publications and records are examples of secondary data. There are two main drawbacks of secondary data. These are, firstly, the appropriate type of secondary data as needed by the investigator may not be available, and secondly: the authenticity of the data on which the secondary data is based must be verified properly. Even when relevant secondary data are available, their scope, coverage, and definitions may not tally with the investigator's view. Apart from this major classification, data may be characterised in other ways too. We shall discuss the division of data according to the CoDATA Task group on Accessibility and Dissenination of Data (CoDATA/ADD. 1975) i. Categories of sceintific data— a)Data with reference to time factor—On the basis of time factor, data is of two types : 1. Time-independent data—e.g. data in Astronomy 2. Time-dependent data—e.g. data of fossils. b)Data with reference to location factor—With reference to location, these are of two types : 1. Location-independent data—e.g. data in Chemistry.

12 2. Location-dependent data—e.g. data in Geology. c) Data with reference to mode of generation—under this category, there are three types of data. 1. Primary data 2. Derived data (secondary data) 3. Theoretical (predicted) data—e.g. data concerning solar eclipses. d) Data with reference to nature of quantitative values— 1. Determinable data—Data on a quantity which is assumed to take a definite value under a given condition. 2. Stochastic data—Data relating to a quantity which takes fluctuating values from one sample to another. e. Data with reference to terms of expression— 1.Quantitative data—Measures of quantities expressed in terms of well defined units, e.g. those in physics or chemistry. 2. Semi-quantitative data—These type of data do not exactly correlate to any quantitative values, but consist of affirmative or negative answers to posed questions concerning different characteristics of the objects. 3. Qualitative data—The data expressed in terms of definitve statements concerning scientific objects are qualitative in nature. f) Data with reference to mode of presentation— These are numerical, graphical or symbolic data. 1. Numerical data—Data presented in numerical values, e.g. quantitative data. 2. Graphic data—Data presented in graphic forms or as models, e.g. charts, or maps. 3. Symbolic data—Date presented in symbolic form, e.g.Weather. ii) Categories of data in social sciences : a) Data with reference to scale of measurement—Based on the scale of measurement, there are four types of data— 1. Nominal data—Used for assigning numbers as the identification of individual unit, e.g. the classification of books according to a particular discipline. 2. Ordinal data—Used for grading or ordering the relationship among the numbers assigned to the observation made.

13 3. Interval data—are ordered categories of data and the differences between various categories are of equal measurement, e.g. measuring IQ of a sample of population. 4. Ratio data—This is the quantitative measurement of a variable in terms of magnitude. b) Data with reference to continuity 1.Continuous data—These are an infinite set of possible value, e.g. weight of a person can be 42 kg., 42.2 kg., 42.9 kg., etc, and not limited to 42kg, 43kg, 44kg, etc. 2.Discrete data—These are finite set of values, e.g. numbers of children in a class can be 7, or 70, of 700, but not 7.5, or 70.5. c) Data with reference to number of characteristics—Based on the number of variables, data may be of three types— 1.Univariate data—data based on a single characteristic e.g. weight of an element. 2.Bivarite data—data based on two characteristics, e.g. height and weight of individuals. 3.Multivariate data—data based on more than two characteristics, e.g. height, weight and age of a sample of population. c) Data with reference to characteristic—Data organised on the basis of characteristics can be classified into 2 types— 1. Quantitative data—When the characteristic of observation is quantified, we get this type of data. 2. Qualitative data—When the characteristic of observation is a quality or attribute, we get this type of data. 1.4 Data—descriptive study Descriptive study of data allows the data to speak for themselves, in the sense that interference on the part of the investigator is kept to a minimum. After the collection of data, they must be represented in the form of tables, diagrams charts.-This representation has major advantage. The most important features of the characters under study is made clear through this process. Collecting data is easy, but analyzing it takes time and skill. Analysis begins with tabulating the data. Data analysis is a method in which the investigator examines information sources used and materials produced by the study group.

14 The various representation of data are discussed below : i) Tabulation of data—It is a systematic, representation of data in rows and columns. A table is headed by a title and the body of the table gives, the numerical information of the character under study. If the data under consideration are secondary data, then a source-note is put below the table to indicate the source of the data. Often a footnote is also necessary to explain some special features of some contents of the table. The following table shows data on the number of posts advertised for librarian and Assistant librarian in "The Statesman" from May-December 1973. Table 1. Months No. of posts Librarian Asst. Liban May 05 04 01 June 03 01 02 July 08 04 04 August 03 02 01 September 05 03 02 October 09 05 04 November 05 02 03 December 06 02 04 ii) Diagramatic representation of data—A popular way of representating data is by diagrams. Through this method even the laymen can be attracted. These diagrams give a very vivid description of the data set. covering various features like increase, decrease, variations etc. Data that are observed at different points of time are called 'time series' data, e.g.'annual production of steel In India during 1950-1960. It is possible to compare different series of data using, suitable diagrams. The various diagrams used to represent data are line diagram. bar diagram, pie diagram and pictorial diagram. These are discussed below ; a) Line diagram This is the most easiest way to represent a time series data. There are two perpendicular axes—the horizontal axis for time, and the vertical axis for the variable under discussion. Suitable scales ate adopted for the two axes. The values of the variable are marked as points corresponding to the given points or periods of time.

15 These points are then joined by line segments thereby giving the line diagram. The example taken from table 1 can be depicted through line diagram in table 2. [Line diagram showing the distribution of posts advertised for librarian and assistant librarian in the Statesman from May-December 1973] The above line diagram shows the number of posts advertised in the statesman for librarian and assisstant librarian during May-December 1973. Through this diagram, two things can be easily analysed-firstly, the distribution of these two ports monthwise and secondly, a comparative study between these two posts advertised rnonthwise. The line diagram is so called, as the figures are here joined throughsimple straight lines. b) Bar diagram In this type of diagram, a number of bars (i.e. rectangles) having equal width are placed along the horizontal (vertical) axis at suitable intervals. The lengths, i.e. the heights of the bars will be proportional to the values of the variable. A variant of the bar diagram is the multiple bar diagram where, instead of one bar, two or more bars corresponding to a single point are placed adjascent to one another, so that a comparison among figures is possible. Usually vertical bars are used to represent data that vary over time, and horizontal bars are used to represent data that very over space. The table below (Table 3) represents a simple bar diagram showing the number of different objects in the Vishwabharati museum.

16 The chart and the diagram above shows the age requirement for the posts of librarian and assistant libraian, as advertised in 'The Statesman' for the month of October-December, 1973. The above is a concrete example of multiple bar diagram.

17 c) Pie diagram Sometimes the values of a variable may be given for a number of categories and one has to study the relative importance of these categories. This is done by comparing the percentages of values falling in these categories. These percentages are represented by the pie diagram. To do this, at first a circle of suitable radius is chosen. Next the percentages are expressed as degrees by taking 100% to be equivalent to 360°. So if x be the percentage of any category, then the corresponding angle at the centre of the circle is 360 x 3.6x 100 = degrees. Finally, the pie diagram is constructed by dividing the circle into a number of sectors corresponding to the appropriate angles drawn at the centre of the circle. The table and figure below represent an ideal depiction of the pie chart. Table 5 Total runs M.S. Dhoni R. Dravid V.V.S. Laxman I. Pathan Others of India 603 89.96 102.99 147.97 89.96 172.09 = 90 = 103 = 148 = 90 = 172 (14.92%) (17.08%) (24.54%) (14.92%) (28.54%) The table and piechart depicting the individual runs scored by the Indian cricketers during their tour to Pakistan in Jan. 2006 in the second test. [r chart Piechart] d) Pictorial diagram This is the most vivid way of representing data. Suitable pictures are used to denote the total magnitude of the variable under study for each category. As a first step, a picture or a symbol of suitable size is taken to represent a certain number of units. Then to represent an observed magnitude, this symbol is repeated the required number of times— with fractions of the symbol, if necessary. To represent the

18 automobile production in India over a number of years, one may use a suitable picture of a car to represent a certain number of cars, and then to repeat, it also using a part of it to indicate the total production for each year. Exercise 1. Distinguish between primary and secondary data. 2. What are the differences between a bar and a line diagram? Elucidate your answer with suitable example. 3. Discuss the characteristics of data in science. 1.6 References and Further Study 1. Bavakutty, M. & Abdul Majeed. K. C—Methods for measuring quality of iibraries ESS ESS. 2005 2. Busha. Charles and Harter, Stephen P.—Research methods in librarianship : techniques and interpretation. Academic Press. 1980 3. Carpenter. Ray L—Statistical method for librarianship. 1978

19 Unit 2 ‰‰‰‰‰ Information : scope and characteristics 2.0 Objective 2.1 Introduction 2.2 Information—definition 2.3 Information—types 2.4 Information—characteristics 2.5 Information—-access 2.6 Information—scope 2.7 Exercise 2.8 References and Further Study 2.0 Objective This unit sums up in details about a vital resource in this age, information. The characteristics of information, its types, access and overall the scope and extent of information will be known to you. 2.1 Introduction The need and importance of information is manifold. It is an unique resource which has its special characterstics. It is essential to our existence and has a life of its own. The importance of information is manifested in research and development in business and industry, in planning and policy making and in management and decision making. Information is communicated from an "origin" to a "recipient". Access to information is an important factor, and specially so, in the light of Right to information Act. 2.2 Information—definition Information is a term which is widely used in our daily life. It has been viewed differently by different people. To some it is knowledge, and for others it is commodity, power and for some it is a document. Information is a term which carries many meanings.

20 Definitions of information often contradict one another and often fail to provide an adequate basis for its understanding. The term information is a very ambiguous term and used in different ways. There are three principal uses of the word information. (i) Information as a process—This term implies that what someone knows is changed when he or she is informed. So informaion is "the action of informing … communication of the knowledge of 'news' of some fact or occurence ; the action of telling or fact of being told something.'" (O.E.D., 1989, 7; 944) Signals, data or symbols may when perceived by somebody with proper knowledge and cognitive skills, change the person's state of knowledge. This is a two stage process. The first stage shows the physiological perception of the signals or the data : and the second stage is the process of being informed. A person's knowledge changes as a result of the combination of thought and evidence. Evidence may come in the form of event, communication, record etc. (ii) Information as thing—Here information means data or documents, which are regarded as being informative. Information as thing is meaningful in two senses—firstly at a specific situation and points in time, an object or event may actually be informative; and secondly, since the use of evidence is inperfectly predictable, the term information is commonly used to denote some population of objects, to which some significant probability of being usefully informative in the future, has been attributed. (iii) Information as knowledge—It is used as the knowledge which is communicated concerning some particular fact, subject, or event; which can be viewed as one, which reduces uncertainty. This concept means that information is an increment of knowledge and so it always shares the characteristics of knowledge. The information imparted in the process of information is a change of knowledge and thus a change of belief. Information in this sense is a fully intangible commodity. (iv) Information as a resource—Like air, water and space, information is available in abundance. Ii is also abused, wasted, neglected and degraded. It is an international resource. It is build internationally and used internationally. In the modern context information is considered as a resource, as fundamental as energy or matter which affects all human activity, and is an indispensable and irreplaceable like between intellectual and material activities. In other words, information must be at the service of the whole community. This view of information stems from the belief and evidence thereof that the possession, manupulation and use of information can increase the cost-effectiveness of many physical and cognitive processes. As an individual and societal resource, information has some interesting characteristics that separate it

21 from the traditional economic resources. It is expansive with limits appearently imposed by time and human cognitive capabilities. Societal concern with the husbanding of information resources has extended form the traditional domain of libraries and archives to encompass organizational, institutional and governmental information. Eminent scientists have referred to information in various ways. Belk in postulates three approaches to the determination of the requirement of an information concept.— 1. Methodological—having to do the with the utility of the concept. 2. Behavioural—having to do with the phenomena which the concept must account for, 3. Definitional—having to do with the context of the concept. Wersig and Neveling considers information through six approaches— 1. TheStructural approach. 2. The Knowledge approach. 3. The Message approach. 4. The Meaning approach. 5. The Effect approach. 6. The Process approach. Daniel Bell considers information to be data processing in the broad sense. 2.3 Information—types According to J.H. Shera, information is of six kinds— i) Conceptual information—The ideas, theores

hypotheses about the relationships which exist among the variables in the area of a problem. ii) Empirical information—Experience, the data of reseach may be drawn from one's self, or thourgh communication, from other. It may be laboratory generated, or it may be a product of the Literature search. iii) Procedural information—Procedural information relates to the means by which the data of the investigation are obtained, manipulated and tested ; it is essentially

22 methodological and from it has been derived the scientific attitude. The communication of procedural information from one discipline or field of investigation to another may illuminate sat shadows of human ignorance. iv) Stimulatory information—

Stimulatory information, that in enviormentally derived, is probably most effective when it

is transmitted by direct communication— the contagious, enthusiasm of another individual—but whether directly or indirectly communicated, it is

probably the most difficult of all forms of information to systematize. A part from this, there are other two types of information :

Policy information—This is the focus of the decision making process. Collective activity necessitates the definition and objective and purpose, the fixing of responsibility, the condification of rights and privileges and the delinenation of function. Directive information—Group activity cannot

proceed effectively without coordination and it is through to directive information that this coordination is achieved. Apart from this division, information can also be classified on the basis of sources, into primary, secondary and tertiary. The primary sources of information have the characteristics of new original or new interpretations of known facts and ideas and to this type belong the research reports; journal articles, theses, diaries, memoirs etc. The secondary sources of information are those which are derived from the primary sources and are organised and arranged according to a definite plan. e.g. Reports. Progress. Advances. Dictionaries. Current Awareness Bulletins etc. The tertiary sources are those which compile both primary and secondary sources, and these are again organised and arranged according to a definite plan e.g. Directories, Bibliography of bibliographies etc. 2.4 Information—characteristics The characteristics of information are related to four issues—information quality, information accessibility information presentation and information security. Up to a certain point, information that possesses these properties may be expected to be more valuable, than information lacking one or more of them. This concept of the value of information assumes that reduceing uncertainty about a particular decision is the purpose of acquiring information. Whether or not it can be measured easily, the usefulness of the information in a system is related to the extent to which, it influences decisions. i) Information quality—This is related to a number of characteristics like accuracy.

23 Precision completeness, age. timeliness, source, conciseness and relevancy. (a) Accuracy—The extent to which information represents what it is supposed to represent, is its accuracy. Accurate information makes it possible to provide a high level of customer satisfaction with lower costs for inventory. The level of accuracy to be acceptable depends upon the information being produced. b)Precision—Precision is the fineness of detail of the accurate information. It is possible to measure precision, although this measurement depends on the type of data and the situation. The typical measure of accuracy is error rate, the number of errors Empared to the number of items. c) Completeness—It is the extent to which the available information seems adequate for the task. In a practical sense, information is said to be complete, if the user feels' it is unnecessary to obtain more information, before finishing the task or.making a decision. d)Age—The age of the information is the amount of time, that has passed since the data were produced. The age of data produced daily, weekly, or monthly is easy to determine. e) Timeliness—It is the extent to which the age of the data is appropriate for the task and the user. Different tasks have different timeliness requirements. For long- range planning, data from months or even years ago may be satisfactory, but week old data is needed for marketing departments tracking an advertising compaign. f) Source—The source of the information is the person or the organization that produced the information. Source of information in an information system may be internal or external : formal or informal. g)Conciseness—Concise information is that which summarises the relevant data, and thus helps the user in saving their time. h) Relevancy—Relevant information is need-to know information, that leads to action or provides new knowledge and understanding. ii. Information accessbisity—This involves two criteria—availability of information and admissibility of information. (a) Availability of information—It is the extent to which the necessary information exists in an information system and can be accessed effectively by people who need it. It is an important determintant of how effecively business processes operate. (b)Admissibility of information—This means whether laws, regulations, or culture require or prohibit the use of information. It is an important factor when the use of age, gender, mantal status, ethnicity, or medical condition is viewed as relevant by

24 some people, and totally inapppropriate by others. This issue has become all the more important in the context of Right of information Act. iii) Information Presentation Information is difficult to absorb and understand if it is presented in wrong manner. Therefore the presentation of information is all the more important. Often graphs, bars, or charts are used to present information. From the user's viewpoint, format is the way information is organized and expressed. iv) Information security. Since information used by the wrong people or in the wrong way can be harmful, therefore the concept of information security prevails. It is the extent to which information is controlled and protected from inappropriate, unauthorized, or illegal access and use. Two concepts prevail in this area—access restriction & encryption. (a) Access restriction —It refers to the procedures and techniques controlling who can access what information under what circumstances. One of the ironies of the information age is that information technology cuts both ways in the area of access restriction. (b)Encryption—This means converting data to a coded form that unauthorized users cannot decode in an information system. Thus we see that for information to be valuable, these four factors play formidable role— information quality—referring to how good the information is; information accessibility—how easy it is to obtain and manipulate the information information presentation—the mode of representing the information, and information security— the extent to which information is controlled and protected from inappropriate, unauthorized or illegal access and use. 2.5 Information—access Access to information means enabling the user to accede either to a source of information, to knowledge, to understanding and to wisdom. If access to information is to ! be achieved, various hurdles or barriers have to be overcome. These are discussed below: i) Availability—The physical access, or document delivery is a very important

25 aspect. If the source can't be located and the user can't avail it physically, then an alternative source has to be recognized and made available. The user need to be able to inspect or locate every source of the data or document. ii) Identification—A source has to be identified also. This means that one has to decide where to look, which may be termed as channel selection, and also to identify a specific record of other source. (iii) Cost to the provider—Though monetary charges are not usally made, yet cost means what has to be fixed by the providers of the service. The detailed profile of any information service is largely defined by the allocation of resources, and this allocation is based on the resources and social values of those who allocate. (iv) Understanding—When the physical access of a suitable source has been achieved, then it must be made clear that the inquirer has capability to understand it. Otherwise his whole search for information will prove futile. If the inquirer can not understand the language, semantics or subject of the information source, then he may seek the help of experts in explaning to him the meaning. (v) Acceptability—Often the enquirer may not accept the particular source. This may be due to the fact that it is unwelcome and not significant to his requirement or his belief. The inquirer may understand something, but if he does not accept it's validity, he is not informed by it. There are some measures which provide the required impetus in ensuring a free and easy access to information among the citizens of the developing nations. Proper coordination and collaboration among the developing countries through exchange of information and experience, or through collaborative research and developmental activities, are very much necessary for the proper utilisation of information and reaching the information in every sector. Proper access to information will no doubt balance the information rich and information poor sectors of the world, and thus the proper growth and development of the society can be achieved. 2.6 Information—scope Information forms the life blood of the present society. Information pervades all sectors of industry, as well as it creates new industries based around them. It is an essential part of a nations resources and access to it is one of the basic human rights. It is not only a national resource vital for scientific and economic progress, but also the medium of social communication. The personal, vocational and social development

26 of the individual depends on the amount, quality and accesibility of information to such a user. Information was a vital resource, from time immemorial. In Manuscript Age. the writings on palm leaves, stones, brickes preserved the information. This information was treated as a valuable thing in the Documentation Age, documents increased in different forms, different subjects and different languages, and thus the information preserved in these documents also increased. In the Information age the society expected from the libraries to provide timely access to relevant information. In this current era, information explosion has occured due to technological advances in the field of communication, printing, reprography and thus the importance of information is manifold. The scope of information is discussed below under several heads— 1. Education—Information is the essential ingredient in new ideas, in course content and curriculum development, in creation of materials, and in the methods for teaching and learning. The new technologies feature prominently in the production and dissemination of the educational information, its management and control. The term 'information literacy' is well known to us, and it denotes an awareness of the importance of information in the educational field. 2. Research—The need for information is coherently reletaed to research. There are four types of requirements of information to the users in relation to research— a)Current requirement—Currency is an important issue to the researcher. He has to keep himself alert of the latest developments in his field of research. b)Everyday requirement—-In the course of his investigation the researcher might need information on a day to day basis. c) Exhaustive requirement—Documents consisting of relevant literature of the subject concerned is necessary for the researcher. d)Brushing—up requirement—The researcher occasionally needs to have a brief outline of the recent development of a related subjects. e) Entertainment—Throughout the entertainment industry—in the cinema, in the sports pages, or the magazine sections of the newspapers, there is a sizeable degree of information content. (3) Professionals—Various type of professionals like doctors,. lawyers, librarians, software specialists, teachers need information exhaustively daily. (4) Government sectors—Information is needed for decision making in all the

27 Government sectors. For international understanding and cooperation, information is much sought in for. (5) Organisations—Decision makers in various organisation too need information. The organisational level of the job, understanding the basic objective of the organisation, its goals, policies, activities all centre around the hub of information. So it is seen that users have the need for information. They may require professional practical, or intellectual knowledge and information. Therefore the need for the covergence of an information society is felt in which the capacity to utilize information becomes the source of power and the potential for material wealth. The advent of the information society is thus a direct product of information. 2.7 Exercise 1. Evaluate the importance of information. 2. Define information and state its characteristics. 2.8 References and Further Study 1. Chakrabarti, B.—Library and information society. World Press 1993 2. Chakrabarti, B & Banerjee, S. ed — An overview of perspectives in library and information science, WBCLA. 2003 3. Ramesh Babu. B. and Gopalkrishan, S. ed—Information, communication, library and community development. B. R. Publishing, 2004

28 Unit 3 ‰‰‰‰‰ Information science as a discipline 3.0 Objectives 3.1 Introduction 3.2 Birth of information science 3.3 Landmarks in information science 3.4 Information science and other subjects - their relationships 3.5 Information science : subfields 3.6 Exercise 3.7 References and Further study 3.0 Objectives This unit will make you aware in a nutshell the birth of information science, landmarks in information science, the relationship between information science and other subjects and the various subfields of information science. 3.1 Introduction Information science is the discipline that deals with the process of storing and transfering information. It attempts to bring together concepts and methods from various disciplines such as library science, computer science and engineering, in order to develop techniques and devices to aid in the handling and use of information. It is a distinct science recognised by its theoretical foundations, and the methods and approaches related to its study. 3.2 Birth of information science Foundation of information science was laid down on the available structure of library science. Information science has come to the present position through an evolutionary process, passing through 'documentation' in the sixties. The evolution

29 took place in the subject coverage and tools of operation..Information science can be said to be the extension of library science with focus on the added areas of information technology. Several factors have contributed consistently in the development of information science. These factors were supplemented by the technological developments suited for information handling. Let us discuss these factors one by one. (i) Social necessity : Social need was perhaps the most crucial factor in the development of information science. Nature of scientific research changed radically in the present century. Scientific and industrial research of present days is slanted to meet the social and economic necessities. Due to the social and economic compulsions, scientists have devised various means to meet the needs of the society from all possible sources which requires continuous and sustained research by the scientific community. Information support for carrying out research is provided by the information scientists, so that research may progress ate a fast rate. This is the social reason for the birth of information science. (ii) Volume and nature of research : The volume of research in this century has more than doubled compared to that of the past century. Prof. Mikhailov has shown that throughout the world, number of scientists are increasing 10 times for each 50 years. This increase in the number of scientists is an indication of the increased size of research output and more involvement of finance in research. This constant increase in number of scientists and consequent enlargement of research output requires information support through information scientists. Simultaneously the nature of research has also undergone tremendous changes. Previously only a few were engaged in scientific research, and in most cases it was an individual effort of few people. But in the present century, a cross-section of the society has been involved in scientific research. This scientific research is nowadays a team work. Scientific research has developed another characteristic feature in its interdisciplinary nature. Boundaries between disciplines are gradually disappearing and new disciplines have developed on the borderlines of these subjects. The nature of research has also been influenced by project and mission oriented programmes. Information scientists are to cater to these diverse information needs of various scientists. (iii) Information explosion : Proliferation of literature and information explosion are the basic and most important reasons for the development of information science. It is a big problem to locate the required information out of its vast mass. Information science has rescued this problem of information explosion through services and tools. (iv) Language Barrier : As scientific research grew, the various type of barriers

30 among the scientific communities seemed to be a problem; the most prominent among these being the language barrier. It became difficult for the scientists or the researchers to communicate among themselves due to this language problem. Any attempts for all the researchers to be conversant with different languages resulted in dissipation of their energy and hence retarded the growth of research. Information science laid a helpful hand to the researchers by way of translating individual papers, establishing translation banks and publishing cover-to-cover translated periodicals. (v) Technological Developments : Development in technologies, relevant to informa-tion communication, has had natural impact in the field of information. The major developments like electrostatic copying methods, efficient telecommunication systems, computers of increased capacity, robotics, wireless telephony are all being, utilised in information field, focussing the subject prominently. (vi) Role of Societies : Learned societies have played an important role in shaping the stream of information science. The societies contributed in diverse areas of information communication, be it formal or informal. Societies provided the meeting place for fellow scholare; where ideas could be exchanged through symposia, seminars etc. Societies also took park in solving the problems of methods of communication. Learned societies played a part in publication of secondary periodicals. They were also concerned in alerting functions. Establishment of libraries, sponsorship of fellowship; medals, prizes were all major contributions of the societies, all of which gave the subject of information science, a new dimension. 3.3 Landmarks in information science Landmarks in information science covers mainly three aspects - viz. information activities, texts published in this field, and stalwarts in information science. Information activities in the later part of the 19th century and early 20th century are noteworthy. Many catalogues and bibliographies were published during this period. In 1830, Pharmacentisches Central Blatt from Germany is probably the earliest documentation work. The Royal society of Great Britain took up a project to index available scientific literature which covered the period between 1800-1900, and which was published during 1867 to 1925 in 19 volumes. A unique documentation list in 50 volumes was compiled by John Shaw Blling, of USA in 1880 the first volume of this series being shown as Index Catalogue of Surgeon General's Office of the United States. In 1895, Henri La Fantane and Paul Ottet attempted to compile a universal bibliography. In the field of geology, Geological Society of London published

31 "Geological Literature added to the Geological Society Library." At Zurich, a huge work entitled Concilium Bibliographicum, was initiated in 1895 and continued to 1940. This work covered the field of zoology. Landmarks in information science would remain incomplete if significant texts in this field are not discussed. The first and the foremost in this area comes "As we may think" by Vannevar Bush (1945). He discussed his hypothetical Memex device for storing and searching of information, S.C. Bradfard's pioneer work "Documentation" (1948) is worth mentioning. In this, Bradford put his law of scattering, which opened up a new route to information science. In 1951 "Bibliographic Organisation" was brought out by J. Shera & M. Egan. Many henceforth unknown concepts like ' coordination' or need of speed in storage and research were perceived in it. P. Casey and J. Berry shouldered the responsibility of editing "Punched cards : their Applications to Science and Industry" in 1951. Use of Peek-'A-Boo, Uniterm & Zatocoding systems were all highlighted here. "Studies in coordinate indexing", edited by Mortimer Taube, and others were published in 5 volumes from 1953-1959. Here coordinate indexing methods, Uniterm system, were vividly described. J. Becker and T. Hayer published "Information storage and retrieval tools, elements, theories" in 1963 and here, attempt was made to treat information science as a discrete discipline. The Indian counterpart was projected in 1963, when Dr. S.R. Ranganathan contributed his ideas in "Documentation and its facets." Weinberg report (1963) suggested various means for improving communication, process, as the concept of information transfer chain was, focused here. Lancaster and Fayer published "Information retrieval on-line" in 1973. This book'dealt with printed index and card catalogue, edge-notched cards, early computers, batch processing computers etc. Lancaster's, book "Libraries and Librarian in an age of electronics" published in 1982, dealt with the modern scenarioso of information science. The third feature in landmarks of information science deals with the giants of information science. There are innumerable giants to be named in the area of information science, selected number of which will be discussed here. Calvin Mooers is one of the founders of information science, credited with, coining the terms information retrieval and 'descriptors', and was also one of the first to innovate the retrieval and system design processes. Hans Peter Luhn also contributed a lot to the cause of information science, the major concepts being KWIC indexing, SDI system, thesaurus, auto encoding etc. Mention may be made of S.C. Bradford, who shaped the idea of bibliometrics. Eugene Garfield's contribution in case of citation indexes in science and social science is remarkable. His studies paved the way for the future scenario of bibliometrics. Roger Summit, father of on-line systems, rriade remote searching of computer readable files accessible, and commercially viable

32 with the installation of DIALOG system at NASA MEDLARS, an important computer based medical literature analysis and retrieval system, was devised by F.B. Rogers of .the National Library of Medicine. Gerald Salton is credited for developing SMART for computer manipulation of natural language text. The idea of information analysis centre was conceived by G.S. Simpson. Cranfield Project, a milestone in the field of indexing system, was devised by Cyril Cleverdon. The names of B.J. Crane and Carlos Cuadra are worth mentioning in the field of Chemical Abstracts and ARIST respectively. Dr. Ranganathan, the Indian information scientist is remembered for his contribution in the various areas of information science, documentation, classification, indexing, information retrieval etc. Apart from these, other names worth mentioning are Shores. Yovits, Shannon, Weaver, Vickery, Bar-Hillel, Taube, Salton, Foskett. Loosjes. Schultz, Saracevic. 3.4 Information science and other subjects—their relationships It has been a long time since attempts have been made to trace the relationship of information science to other subjects. These subjects include natural sciences, physical sciences, humanities, social sciences, communication studies, psychology, linguistics, computer science, mathematics, statistics, physics and so on. Each of these subjects has influenced information science in one way or other. Natural sciences : According to Paisley (1990). some of the foremost research in this discipline results from natural sciences. Researchers apply the parent science's concepts, procedures, and methods when they arrive at a new field. Researchers transfer some features of the national science research paradigm when they undertake a research in information science. So in research practice, LIS is often constructed according to a natural Scientific model. Saracevic opines that information science is related to information technology in many aspects, because computers and data processing are essential in information retrieval. But the most important argument in showings the relationship of information science and natural sciences is shown by Harmon (1990), who defines information science in the following manner, "information science centres on the development of principles, laws, models, and theories, that predict or explain information phenomena associated with natural artificial systems. Such systems include e.g. cells, molecules, organs, organisms, computers, organizations, communities, and atmospheric systems." B.C. Brookes (1975) opined that a theory must possess a unique subject area, a set of basic concepts, a set of fundamental laws, and an explanatory base. This means that Brookes has opened it, basing on a natural scientific paradigm.

33 Computer science has directly influenced information science. The use of data processing has become more common, in information retrieval especially, and has brought concepts and methods from computer science to information studies. The results of IR research in information science have benefited computer science too. Ingwersen is of the opinion that there are so many common features that from a computer science point of view, it might have been logical to combine the information retrieval, representation and management elements from information science with the software and artificial intelligence of computer science. Expert systems, intelligent interfaces, human - computer interaction of computer science are all inherent areas in information science. Mathematics and statistics have had a great influence on information science. Bibliometry, scientometry and informetry have been added to information science due to the direct influence of the above mentioned subjects. Thus we have seen Bradford's law, Lotkas Law of Zipfs' law as an outcome of it. The influence of physics is felt when half life theory of literature, and obsolescence of any subject is being dealt with. Humanities : Humanities formed the foundation of library and information science. The history of the various areas of the subject was the main concern of research until the last two decades. In case of humanities, two subjects have specially contributed and played a pivotal role in shaping the structure of information science. Mention many be made of linguistics and philosophy. Philology has contributed a lot to add new areas for information science. It's impact is seen in indexing, thesaurus construction and claussurus building etc. Philosophy has an effect on the subject through its contribution to organization of knowledge and creating classification systems. Social Sciences : The most important remarks regarding the influence of social science on information science was made by Belkin (1978), who stated that it is especially concerned with information in the - context of human communication, and human communication and information is to be studied in terms of social objectives and group dynamics. Links between communication studies and information science have been observed by many researches on an often. These two disciplines share common research topics, Common researcher, and have formal organizational links. Both areas of study are concerned with the activities involved in the creation, organization, transmission, storage, management & use of information. Psychology, if we consider it as a subdivision of social sciences, have also influenced

34 information science. Users studies and user education are two fields which have been influenced. These fields are concerned with human mind and behaviour. 3.5 Information science : subfields If we consider information science from a broad perspective, we shall see that there are five areas of concerns. The first area deals mainly with formal and internal transfer of information, e.g., scientific communication or information flow within institutions. The second area is concerned with the generation and development of information needs within society, i.e. among specific groups of people or individual's. Next area focuses on the methods and technologies that help to improve performance and quality of information in information systems. Thus, in one way or the other, development of current theories is the main concern of this area. The fourth area deals with generated knowledge and forms of its analysis and representation in information systems. The problems of indexing and classification, as well as of measurements and distribution of research and development production belong to it. The last area focuses on the relevance, use, and value of information. 3.6 Exercise 1. What are the landmarks in information science? 2. What are the disciplines closely allied to information science? 3. Discuss the factors that led to the birth of information science. 3.7 References and further study 1. Chakraborty, A.R.—Fundamentals of Information science. Sanskrit Pustak Bhandar. 1990 2. Flynn, R.—An Introduction to information science. Dekker. 1987 3. Vishwanathan, C. G.—Elements of information science and technology. 1987

35 Unit 4 ‰‰‰‰‰ Communication Process 4.0 Objectives 4.1 Introduction 4.2 Human communication—History 4.3 Communication—Forms and functions 4.4 Communication—Models 4.5 Communication and Noise 4.6 Exercise 4.7 References and further study 4.0 Objectives This unit enables you to understand the history of human communication, the various forms and functions of communication, communication models, and the various barriers in the implementation of communication. 4.1 Introduction Communication is concerned with imparting a common idea or understanding and covers any type of behaviour resulting in an exchange of meaning. Communication system as a whole, consists of handling information and other matter. The history of communication is as old as the birth of civilization. Communication has many distinctive, salient features which make it unique in many respects. The various models of communication are highlighted in the following unit, which gives an overview of the approaches in the communication process. 4.2 Human Communication—History Communication as a whole consists of handling information in one form or another. From its early beginnings communication was seen as a process in which a speaker constructed messages to be transmitted to a receiver, to bring about the desired

36 responses to his receiver. So from the early times, communication process, consisted of source, messages and receiver. Scholars in the fifth or sixth century B.C. visioned communication as rhetoric. They viewed it as the practical art of persuasion. Aristotle and Plato saw rhetoric and public speaking not only as an art, but also as a legitimate area of study. During the early 20th century, interest in communication continued in rhetoric and speech, and the advent of the radio and later TV led to a wide application of journalistic concepts and the development of more theories of the overall process. In the late 1940s and 1950s scholars from various disciplines advocated various theories of communication that extended beyond the boundaries of their own fields. In 1960s, a good deal of work was done to synthesize the writings of rhetoric and speech. Specialization occured giving rise to research and writing in the 1970s. A remarkable event in the history of human communication was the establishment of the National Society for the Study of Communication (now International Communication Association) for bringing greater unity to the study of communication, by exploring the relationships among speech, language and media. We can trace the stages of human communication in the following way: (i) Age of symbols : It was about 20000 BC when early humans first carved symbols on the walls of caves, and used drums and smoke to-signal one another. With these primitive common devices, the foundations of the modern information processing technologies were firmly set. The age of signs and signals started vary early in the progression of pre-hominid and early pre-human life. (ii) Age of transition : The increasing ability to communicate fully and accurately led to the escalating development of communication processes and techniques. Time passed, and it slowly became possible to adopt one standardised, i.e. learned and shared gestures, sounds and other kinds of signals, that could be used by succeeding generations to engage in the basic exchanges needed for a social life, and that was speech. When humans moved into the age of speach and language, a radical change occurred. There is evidence that this occurred with the sudden appearance of the Cro Magnon, a new form of Homosapiens. By about 35000 years ago, language was in use. About 5000 years ago, human beings made the transition into the age of writing. According to Lewis and Fleur. 1983 "The skill was invented independently in several places in the world at various times." (iii) The Print Media : The process of manufacturing paper and the printing press were important technological milestones in the advent of the print media. The foundation of the print media traces beck to 1455, when a press with moveable type was set up. But books were confined to the literate elite class for a long time, until

37 19th century. In 1834 the first daily newspaper was brought out in New York. So slowly and steadily the age of Mass Communication set in. (iv) The Modern Age : The modern age encompasses the era of technological inventions, coupled with converging technologies of microelectronics computing and communications. In 1840, Sir Charles Whetstone and Samuel invented the telegraph. In 1876 Alexander Graham Bell sent the first telephone message by wire Morse. In 1895, when the waves could be successfully converted into coded signals, Marconi and Popoff succeeded in transmitting and receiving wireless messages across distances. The telephone then became the largest organised interpersonal communication network. The e-mail and voice mail of today are the extension of that old telephonic communication system only. As an audio visual mass medium, the television then took over the communication system. The cable TV. pay TV and satellite broadcasting are the extension of this television only. The radio was one of the communication media since 1906. The radio had one advantage - it was not dependent on the literacy, and so. it grew into one of the single largest communication system. The television as a medium, is basically an extension of the sense of touch, which involves maximum interplay of all the senses. Then the advent of the new technology, i.e. computers paved a new vistas in communication. Computer controlled aircraft, computer aided design, telemedicine are all pointers towards this communication. This theory of transitions is that of systematic accumulation rather than an account of serially arranged but distinct periods. Our primitive ancestors learned to use signs and symbols very early. Speech and language were then added. Writing followed, taking after, it printing and mass communications. Computer was the next to follow. Thus the history of human communication has been one of corresponding communication system, rather than simply a passing from one to another, as each of the major media of communication emerged in our society. 4.3 Communication—forms and functions Communication has been defined by various authors in various ways. Some important definitions regarding communication are cited below : (1)Newman and Summer : Communication is an exchange of facts, ideas, opinions or emotions by two or more persons. (2)Brown : Communication is the transmission and interchange of facts, ideas, feelings, or courses of action. (3) Theo Haimann : Communication is the process of passing information and understanding from one person to another.

38 (4) Katz and Kahn : Communication is the exchange of information and the transmission of meaning - is the very essence of a social system or an organisation. (5) Dance : It is the eliciting of a response through verbal symbols, in which "verbal symbols" act as the stimuli for the elicited response. (6) Robert S. Cathcart : Communication refers to a word that describes the process of transferring meaning from one individual to another. (7) Wallance C. Fotheringham : Communication is a process involving the selection, production and transmission of sings in such a way as to help a receiver perceive a meaning, similar to that in the mind of the communicator. (8) Charles Cooley : Communication is the mechanism by which all human relations exist and develop - all the symbols of the mind together, with the means of conveying them through space and preserving them in time. (9) Claude Shannon : The word communication will be used in a very board sense to include all the processes by which one mind may influence another. (10) Ordway Tead : Communication is a composite of information given and received, of a learning experience, in which certain attitudes, knowledge, and skills change. 4.3.1 Forms of communication Communication depends on the context, location and motivation, type of audience and its relationship with the communicator. Some major forms of communication are : (a) Centralised communication : In a communication network, a central person or a central unit mediates. (b) Decentralised communication : In this network, a central person or a central unit dies not mediate. (c) Formal communication : The official transmission of information. (d) Informal communication : The unofficial transmission of information. (e) Horizontal communication : Communication between positions on the same organizational level. (f) Kinesic communication : Communication through body movement or behaviour. g) Paralinguistic communication : Communication through gestures, tone of voice of signals. (h) Proxemic communication : Communication resulting from the way the communicator handles space.

39 (i) Symbolic communication : Communication by means of conventional signs. (j) Verbal communication : Communication by means of verbal symbols. (k) Vertical communication : Communication between different organisational levels. Whatever may be the forms of communication, it is no doubt a process involving the sorting, selecting and sending of symbols in such a way, as to help the listener perceive and recreate in his own mind, the meaning contained in the mind of the communicator. This process also includes exchange of ideas, facts, opinions and manner by which the source and receiver shares meaning and understanding with one another. The ultimate object of this process is that information transferred must be understandable to the receiver. The transmitter uses a set of media to convey ideas, opinions, facts of feelings. The media may be written media, or oral media visual, audio or audio - visual media. In the process of various media, the organisation's mission is accomplished and activised. The elements of the communication process is shown below : Source U Frans x Message « % mitter Receiver * Communication Process >»mmu Sym Comi C minication •* Cchannel nidation bols Message I i X i Ser ider Symbols Receiver -* % Speaks -º% Words *» Listens -*. Draws '-+ % Actions -º% Obsenfe^ -»• Acts -»• Numbers -º% Reads -* Writes -º% Pictures Communication Process

40 4.3.2 Functions of communication Communication is always purposeful. People engage in commucication to achieve something functional for the individual. Communication serves different purposes at different times and different settings. Let is now explain the functions of communication: (i) Instrumental function : Communication in the service of basic need satisfaction is the instrumental function. In our society, where there is highly specialized division of labour, communication for instrumental ends becomes necessary. (ii) Integration function : It is the function under which integration of activities takes place. It aims to bring inter-relationship among the various functions. (iii) Evaluation function : Communication is a tool to appraise the individual, his contribution to the organisation. (iv) Directive function : Communication is necessary to direct others. Directing others may be communicated either orally or in writing. (v) Interview function : In an organisation, interview as a medium of communication is an important process. (vi) Stimulation function : Communication helps in providing stimulus to a person or to an environment as a whole. Social contact with its variety and unpredictability offers rich potential for stimulation. (vii) Informing function : This is the most important function of communication. Information exchange takes place vertically, horizontally or diagonally across the society. (viii) Other functions : Effective decision making is possible when required, and adequate information is supplied to the decision - maker. Communication, either, verbal or written, helps the process of decision - making. 4.4.4 Communication models In order to try and understand the communication process, various devices are used to structure the thinking. These devices are called communication models. In order to understand communication models, we must define what a 'model' means. A model is a theoretical and simplified representation of the real world. A model, by itself, is not an explanatory device, but it plays an important and directly suggestive role in the formation of theory. Many authors have devised communication model in various forms. The significant among these are discussed briefly: (i) Aristotle's Model : The earliest model of communication was the symmetrial

41 and simple model developed by the Greek philosopher Aristotle some 2004 years ago. He includes five essential elements of communication - speaker, message, audience, occasion and effect. Aristotle advises the speaker on constructing a speech for different audiences on different occasions, for different effects. (ii) Lasswell's Model (1948) : According to Lasswell, communication is envisaged by the mode "who says what, in which channel, to whom, and, with what effect.'' It is a linear model and stresses on communication as mission of messages. Identification of transmitters, analysis of message content, study of transmission channels, audience identification and evaluation of effects are the five parameters of communication studies. (iii) Shannon & Weaver's model (1949) : This model is one of the important one in information and communication studies. This model is based on the statistical concept of signal transmission. In this model, the information source produces a message to be communicated out of a set of possible messages. The message may be words, pictures, music, etc. The transmitter converts the message to a signal, suitable for the channel to be used. The receiver performs the inverse operation of the transmitter by reconstructing the message from the signal. The destination is the person or thing for whom the message is intended. (iv) Osgood's model (1954) : Osgood's model is developed from his theory of meaning and from psycholinguistic processes in general. He provides for both sending and receiving functions within one individual, and takes into account the "meaning" of symbols. According to Osgood, the social nature of communication stands thus "Any adequate model must include at best two communicating units, a source unit (speaker) and a destination unit (hearer). Message is that pact of the total output (responses) of a source unit which simultaneously may be a part of the total input (stimuli) to a destination unit." (v) Wendell Johnson model (1951) : This model states that communication takes place in a context which is external to both speaker and listener, and to the communication process as well. The various stages'of communication are actually interrelated and interdependent. (vi) David Berlo's model (1960) : In Berlo's model, there are various components in the communication process. These are source, message, channel and receiver. Berlo emphasized the idea, that communication was a process, and the idea that "meanings are in people, not in words." He felt that human communication always had a purpose. Our basic purpose in communication is to become an affecting agent, to affect others, our physical environment, and ourselves."

42 (vii) Dance's model (1967) : Dance's model emphasizes that communication has no clear beginning and no clear end. The spiral continues indenfinitely. No communication transaction can be said to have fixed boundaries. Each transaction is in part a function of previous communication, and each transaction influences future communication. Dance's perspectives concerns the time factor, suggesting that each communicative act builds upon the previous communication experience. In addition to the models discussed here, a number of other models are used in communication research. No model is complete in all respects. So one should select the model that best fits one's purpose for the immediate problem athand. 4.5 Communication and noise Communication is a complex process involving a number of factors which are interrelated to a great extent. Therefore communication often has a low probability for success. Problems both internal and external to the individual and to the system impinge upon the chances for communication to occur. The obstacles to communication can be rightly termed as "Noise." In the library, four types of noise can be distinguished: Liternal noise, linginstic noise, internal noise and phychological noise. (a)Literal noise : When noise is transmitted over the same channel as the message, it is called literal noise. Due to this type of noise, the message sent is not the same as the message received; it is altered by the noise to the point that the noise becomes part of the message. So here the implified meaning of the sender is lost. In technical communication, such as telephone, radio etc. often due to interference of weather, or technical disorder, the message is lost. These are examples of literal noise. (b)Linguistic Noise : When two speak different languages, with neither having an understanding of the other's language, linguistic noise occurs. When the differences- in linguistic expressions of a representation inhibit the interference of meaning, the result is noise. Noise generated by one sentence or passage may create further noise, that affects acceptance of the totality of the message. This is a hazard to communication. (c) Internal noise : This noise emerges due to the irrational behaviour of human beings. Nonrational behaviour in communication can be a result of confusion or lack of understanding. In a communication system, the user must have a rational understanding of the system. This lack of understanding results in the internal noise. (d) Psychological Noise : Psychological noise occurs due to some psychological problems of the individual. This may be due to information overload, information

43 pollution or information misinterpretation. Noise in this case need not be random and senseless; perfectly good information, even an organized message can act like noise when it interfere with or disturbs reception of some signal. To avoid this noise. James Miller gives an outline of some processes— (i) omission temporary non processing of information. (ii) error processing incorrect information, which may enable the system to return to normal processing afterwards. (iii) queuing delaying the response. (iv) filtering-neglecting to process certain categories of information while processing others. (v) employing multiple channels processing information through two or more paralled channels at the same time. 4.6 Exercise 1. Define communication, and discuss its salient features. 2. How does noise manifest itself in a communication system? 3. Trace the history of communication. 4.7 References and Further Study 1. Andal, N.— Communication theories and models. Himalaya Publishing House, 1998. 2. Budd. John—The library and its users. Greenwood Press 1992. 3. Open University—Communication, U.K., 1976. 4. Rayudu, C.S.—Communication. Himalaya Publishing House, 1998.

44 Unit 5 ‰‰‰‰‰‰ Generation and dissemination of Information 5.0 Objectives 5.1 Introduction 5.2 Generation of Information 5.3 Transfer of Information 5.4 Information dissemination 5.5 Exercise 5.6 References 5.0 Objectives Information is generated and diffused in the modern, society for proper retrieval by users. This unit helps to understand the various modes and focus of generation of information, its storage, management, and various means of dissemination. 5.1 Introduction Information is an essential ingredient in decision making. The need for improved information systems in recent years has been made critical by the steady growth in size and complexity of organizations and data. Therefore the need for information generation from various spheres, and its proper dissemination is a critical study. Information is generated from a number of sources—personal, human sources, or organizational sources. From the point of generation of information to its effective dissemination, are the various processes, which make information consolidated, packaged, stored in the right manner and oriented properly towards the users. All these processes are termed in short, information management. In the information society, generation, management and dissemination of information are all very important aspects. 5.2 Generation of Information To live effectively is to live with information ran the definition by Norbert Wiener. Information is the name for the content of the outer world when we adjust to it and

45 make our adjustment felt upon it Calendars and clerks provide the formal information structures for ordering our experience in time; mental mats and physical maps provide the contexts for ordering space. The concepts of space, time, number, relationship are 'shaping activities' imposed upon reality by the thinking mind. Th»s type of reasoning is known technically as 'a priori', which is Latin for, 'existing prior to'. This means we have to presuppose these concept before we can perform mental operations on the world of our experience and derive information from it. The eye picks up useful information from the visual world when it is at rest, unless it is locked on to a moving object. Information is gained as a product of different human activities and events. Individuals or organizations begin activities in pursuance of certain objectives. All day and every day we are receiving information through our sense organs. All day and every day we reject information that we judge to be irrelevant to our needs and intentions. Events are things that happen or take, place. If there is no activity or event taking place, there would be no information. If there is no information, the entire population of the globe goes into a deep slumber. Information generation process can be discussed in the following areas : Research and Development : Research is a creative activity contributing to the growth of knowledge for the welfare of the society. All intellectual activities in the context of research in science, technology, social sciences and humanities generate information. The progress of a nation depend on these sorts of activities. The output of research constitutes a major part of information handled by library and information centres. These research activities are not restricted to research institutions alone. All academic instructions, also undertake research activities to generate varieties of useful information. Surveys and Censuses : We have organizations that gather statistical information through censuses and surveys. In India the office of the Register General conducts deceinual censuses to collect population data which become the basic information about the demographic characteristics of the country. Governmental and Non-Governmental Activities : Activities undertaken by governmental and non-governmental organisation generate information as a by-product For example, the police department is engaged for the maintenance of Law and order of the locality. The activities undertaken by this department, in town, generate information about such topics as terrorism, corruption, and the like. Activities of the Planning Commission, Election Commission and others generate an enormous amount of information on all dimensions of socio-economic issues. The Legislative and judicial bodies also contribute to the generation and growth of information.

46 Business and Industrial Organisations : They are also the source of by-product information regarding business and industry. The political power of some big nations is in fact, derived from information. Information has, thus, an economic value. 5.2 Transfer of Information The basic purpose of libraries and information centers is to assist in the transfer of information and the development of knowledge. There are a number of stages of transfer of information. The first stage is the identification stage, during which the organization segregates, appropriate from inappropriate information. There is a need to select the most appropriate or important information, which can be acquired. The information is then organized by the organization in some way or the other. After the completion of the organization, work, the information is prepared for storage, which means that the information must be readily retrievable. Users often need assistance to describe their needs in a manner that leads to locating and retrieving the desired information, which may be termed as interpretation. Finally, users draw upon the information to aid them in their activities or work, which is utilization of information, and dissurminate the outcome of the work to the internal or external enviornment, or both. There are planned procedures, policies and human rexource to carry out the necessary operational steps in this transfer process. 5.3 Information Dissemination The relevance of information becomes meaningful if the information is properly disseminated or distributed to the seekers of information. Information is disseminated through various ways, viz, various types of mass media like television, radio, newspapers, magazines etc. But the role of libraries in disseminating information is the scope of this unit. Libraries have long been engaged in disseminating information is one way or other. Be it private libraries of the kings, or the monastic libraries, or other great libraries, the main function of the libraries was to provide information. The form in which information was provided varied vastly from the modern days. As the society progressed towards an information society, the need for information was felt much more by the scientists, research & development workers, organizations and the common people. So gradually there was an inclination towards the individual

47 needs of the users. For this specialized requirement, a number of specialized information services came into being. Information is disseminated through various forms nowadays. Though the most common medium is still the book, yet periodicals, tape microforms, cartographic materials, three dimensional objects, are also forms of information dissemination. Communication, be it verbal or nonverbal, is the oldest method of information dissemination. Exhibitions in various forms such as charts, posters, models, diagrams can give information in a lively way. Information is disseminated through various channels, libraries being the prime one. Public libraries, academic libraries, or special libraries - whatever may be their form -libraries are disseminating information from the ancient days. Information in libraries is disseminated via the librarian, deputy librarian, assistant librarian, library assistants, special Service librarian, reference librarian, information managers, information specialists, information analysts and documentalists. Apart from libraries, information brokers provide information in lieu of a substantive charge. They are also called information vendors. Information intermediaries like Block Development Officers. .Sub Divisional Officers, Head of a Panchayat or Government Information officers provide information. In fact these people are appointed on the condition that they would provide the required information when asked for. The Clearing Houses which provide a single point of access to documents, which are priginated form a number of different place, are an important medium of information dissemination. The time of dissemination is another major factor. Often information is sought only occasionally, i.e. once in a week, fortnight, month or year. But regular help is provided when there is a regular demand of information, often there is also an emergency demand of information; so the information managers or specialists have to be ready with their tools to provide information at any nick of time. The most important part of information dissemination in the libraries are the various services through which information is disseminated. These are as follows : (i) Lending service : The most common form of service is through issuing a book/journal to the member. Special rules prevail in each library as regards to the terms of issue. Another form of loan is the interlibrary loan, through which a document not present in a library, but demanded by a member of the library, may be loaned form other libraries for a certain period. (ii) Reprographic service : Provision of photocopies to the users, instead of original documents is yet another form of dissemination of information. (iii) Newspaper clippings : Interesting articles and news items are often cut and

48 clipped in an order and information is provided through these. These are regularly updated. (iv) Translation service : Translation tools and translation pools are the two most important facts of translation service. In the era of globalization, translation mechanisms are becoming very important, as one needs to know the work in progress in other countries in their languages. Index Translationum. published by UNESCO and World Index of Scientific Translations are the two most important translation tools. (y) Reference service : This is the oldest method of service available in the library. It is a personalised service provided to the users. The specialist, called reference librarian, is provided for this work, He helps the user to define his query correctly, analyse his query and give definite answers to his query. (vi) Current awareness service : Through this service, current information on a special topic, or of a book, are provided to the users. This service is specially important in a special library, where the users are always in need for current information on a topic of their interest. These are often published as bulletins and circulated widely, or displayed in their notice board. (vii) Indexing and abstracting services : Indexing service has become important with the vast growth and development of knowledge in this society. Index is a tool to find the required information from a pool of information. Indexing is the method of information representation. Abstracting is the preparation of a shortened form of the item and giving it to the users. This helps the users to get the information in a short time and in a digestible form. (viii) Selective Dissemination of Information : This is the process of providing selective information to the users on their topics of interest. This process involves the following steps : (1) Construction of document profile : The document to be needed is prepared. This is the work of the database. (2) Construction of user's profile : The user's interests are seen and their profile is prepared. (3) Matching : The database tape and the users' profile tape are used as input to the match programme. (4) Issue of notifications : The addresses of the users are sorted on a magnetic tape; the address of user is printed with the corresponding answer; SDI print-outs are obtained from a print programmes: and the print-outs are separated and posted with a covering letter.

49 (5)Feedback from users : This feedback help in evaluating the profile performance and identification of modifications needed in the profile and updating the profile. (6)Modification of the user's profile, if needed : If needed, based on the feedback analysis and profile monitoring, an active phase of profile modification has to be initiated. 5.5 Exercise 1. Describe the importance of information dissemination in the society. 2. What are the sources of generation of information? 5.6 References 1. Guinchat, Claire and Menon, Michael - General introduction to the techniques of information documentation work, UNESCO, 1983. 2. Vickery, Brian and Vickery, Alina - Information science in theory and practice, London; Butterworths 1987.

50 Unit 6 ‰‰‰‰‰ Information theory and entropy 6.0 Objectives 6.1 Introduction 6.2 Information theory-origin 6.3 Information theory-communication aspect 6.4 Information theory-commodity aspect 6.5 Information theory-state of process aspect 6.6 Entropy 6.7 Redundancy 6.8 Exercise 6.9 References and further study 6.0 Objectives This unit gives an idea of one of the fundamental basis of information science, the information theory and the various interlinked aspects. Entropy and redundancy, the two major areas in information & communication process are discussed in detail. 6.1 Introduction Information theory is the representation of the conditions and parameters affecting the transmission and processing of information. The theories have developed rapidly, affecting not only the design of communication systems but also other related areas. Entropy and redundancy are two common linked aspects in the information communication process. 6.2 Information theory-origin Information theory is characterized by a few axioms from which many measuring functions, accounting equations, theorems, limits and above all its notion of information and communication can be deriveds. The information theorist treats quantities of information much like a physicist traces energy uses and losses within a mechanical

51 system, or an accountant measures cash flows and capital distributions within a company. Although quantities of information do not behave like energy and matter and have little to do with truth or value, once information flows are assessed, they can be related to, and shed light on other organizational features of the system in which such flows are observed. The idea of the information theory actually emerged in the later part of 1940s. Several researchers virtually independently worked on this idea. While working on statistical aspects of communication engineering, Norbert Weiner came to it. A.N. Kolmgoroff, a Soviet mathematician, came upon this idea from probability theory; Claude Shannon developed it while working on problems of coding and deciphering messages. Ludwig Moltzmann, an Austrian physicist had measured thermodynamic entropy by a function that resembles the one now used in information theory. But Claude Shannon of Bell Telephone Laboratories in the United States published the most elaborate account of the theory in 1948. Warren Weaver gave a popular account of Shannon's work and coauthored with him "The Mathematical Theory of Communication" (1949). Subsequently U.S. statistician Solomon Kullback linked information theory to statistics and W. Ross Ashby generalized it to many variables. The information theory was a major stimulus to the development of communication research. It legitimized research on communication and information processes in whatever mode they occurred. 6.3 Information theory—communication aspect From the communication aspect, information theory can be categorised into three types :— mathematical theory, semantic theory and decision making theory. The communication process according to this theory requites three items — source, message and destination. The source is the point at which a message originates. Source may be an organization, an individual, a machine; message may be in visible, audible, tactile form and destination may be again an individual an organisation or a machine. 6.3.1 Mathematical theory Shannon and Weaver were the proponents of this theory. They needed the measure of the amount of information that was being transmitted in any message.
The amount of information in a message is related to the probability ratio of the message and is
measured in bits. According to Shannon,
the significant aspect is, that the actual
message is one selected from a set of possible messages.
The system must be designed

52 to operate for each possible selection, not just the one which will actually be chosen. Shannon's theory recognizes that messages themselves do not physically flow from source to destination. Rather the source indicates, by whatever technical means are available, the specific message the destination should select from a set of messages. The .theory of communication set forth by Shannon necessitates a view of information that is quite peculiar. Weaver notes-,that, in this theory, the word information relates not so much to what you do say, as to what you could say. So information is
a measure of one's freedom of choice when one selects a message
and this degree of choice is expressed as bits of information. If one has a choice between two messages, then log,2=l, so the choice is, since 2=2'. characterized by 1 bit of information. If there is a choice among 256 messages, then there are 8 bits of information, since log 2 256 = 8, as 256 = 2 8 . So this whole thing can be generalised as log 2 X = N, where X is the number of messages to choose from, and N is the number of bits of information. Therefore, according to this theory, the amount of information in a message is related to the size of the vocabulary. 6.3.2

Semantic theory Fairthorne was the main proponent of this theory. Information, according to this theory, is not to be regarded as a flow of "stuff. Information will obviously be affected by the prior state of knowledge of the receipient. According to this theory, information is always selective among a set of preconceived alternatives, and the theory justifies this selectivity in terms of the number of questions one answers. This theory presumes two different sets of elements, languages, or symbol, connected by a code. One set contains messages, answers to questions, statements, the other set contains set of meanings, things people, ideas concepts etc. Information is manifested in what the elements in one set imply about those in the other set, The theory expresses the amount of information, 1, a message conveys is the difference between two states of uncertainty, U, before and after that message became known. I (Message / state of knowledge) = U (before receiving message) U (after receiving message) Information is positive when a message, answer, or report reduces the receiver's uncertainty about what he or she wishes to know. A message whose content is already known, and which does not alter the receiver's uncertainty is called redundant. A message which tells something unrelated to what (the receiver needs to know is irrelevant. A message which denies certain previously appeared sure facts, and thus increases the receiver's uncertainty conveys negative information. Some characteristic features of the semantic theory are that a) quantities of information are not tied to

53 physical entities, b) quantities of information are always expressed relative to someone's cognitive system of distinctions and c) quantities of information are always contextual measures. 6.3.3 Information for decision making B.C. Whittemore and M.C. Yovits have suggested that "information is data of value to decision making". Information involves reducing uncertainty. The amount of information supplied from a system to the decision maker to reduce uncertainty varies from time to time, and from situation to situation. Information, thus being a relative quantity, can be quantified in terms of its effects on the state of the decision maker at a particular moment in time. 6.4 Information theory —commodity aspect According to this theory, information is treated as a commodity. These theories deal with information as if it were an object, that is needed to do a job. Under these aspects there are three laws-Zipfs law, Breadford's law and Lotka's law. 6.4.1Zipfs law In 1935, George Kinsley Zipf formulated his famous law for word count. According to this law, a relationship exists between the frequency in the use of words and their distribution in books, reports, documents and other printed matter. If the number of different words occurring once in a given sample is taken as x, the number of different words occurring twice, three times, four times, n times in the same sample, is respectively 1 1 1 1 , , , of x 2 3 4 n upto few most frequently used words. The formula ab 2 = k, is valid for this law in which 'a' represents the number of words of a given occurrence and 'b' the number of occurrences and 'k' is constant. Zipf noticed that the ab 2 = k relationship is valid only for the less frequently occurring words. 6.4.2 Bradford's law Samuel Clement Bradford, in 1948, formulated a method to understand the distribution of scientific writing through mathematical formulations. The law of distribution of papers on a given subject in scientific periodicals may be stated, according to him, "if scientific journals are arranged in order .of decreasing productivity of articles on a given subject, they may be divided into a nucleus of periodicals more

54 particularly devoted to the subject and several groups of zones containing the same number of articles as the nucleus, when the number of periodicals in the nucleus and successive zones will be as l:n:n 2 , where n. = 5". That is the number of periodicals in each successive zone increased at geometric progression. The second zone will have five times the number of journals of the first zone, and the third zone has 5' or twenty five times the member of journals in the first zone. Afterwards this law was extended by Vickery. Leimkuhler and Brookes. 6.4.3 Lotka's law This law, propounded in 1926. states that there is an exponential relationship between the number of items contributed to the literature, and the total contribution by those who contributed two, three, or more papers. He gave the formula for this proposition as x // y = Constant, where x = no. of contribution y = no. persons. Finding the value of constant when n = 2. he observed that "the number of persons making n contributions is about 2 1 n of those making one, and the proportion, of all contribution that make a single contribution, is about 60 percent." 6.5 Information theory—state of process aspect Information assumes the nature of the result of an action on the commodity. A Debons has proposed that information is a part of continuum of process through which all intellectual capacities of all organisms can be represented. Information represents the state of an organism following the reception of energy from the environment in the form of a symbol or datum. Information reaches its highest known competence in the human being through the activities of the central nervous system. 6.6 Entropy The concept of 'entropy' goes hand in-hand with the communication process. Entropy was fully understood after the publication of Claude E. Shannon's paper. "A mathematical theory of communication". In thermodynamics, entropy is a measure of the irreversability of the process which is an irrevocable loss of ability to do work. Thus it is a measure of disorganisation. An increase of entropy implies a decrease in organisation, and increase of randomness. The mathematical representation of entropy in thermodynamics turns out to be the same as the representation of uncertainty in

55 information theory. So, Shanon also used the term 'entropy' to represent uncertainty. He refers to 'information', or the degree of choice, as entropy, because the mathematical representation of 'information' is almost identical to that of entropy, as used in thermodynamics. Entropy can be defined as measure of the amount of uncertainty that is cleared up for the receiver when a message from a source is communicated. Entropy can also be stated as a measure of freedom of choice, and it is highest when choice is unfettered, when one option has no better chance of being selected than another. Entropy is also a measure of statistical disorder, so the higher the level of entropy, the more disordered information may be seen to be. If a person is presented with several possible solutions to a problem, and has no reason to think that anyone is better than the others, then there will obviously be confusion. Entropy, or disorder, in such cases would be high. When the source can generate one of two possible messages, the receiver is uncertain regarding which of the two messages, he wants. If he can identify one. all the uncertainty is removed. Each of these messages can be identified by a very simple signal or symbol, i.e. a bit. Therefore one bit means one out of two possible messages; one bit of information removes the uncertainty with regard to which one of the two possible messages was generated or sent. As a measure of information content in the source, it is said that its entropy is one bit. Therefore it is seen that there exists a relationship between the number of possible messages and the number of bits, and this relationship is logarithmic. If one has a choice between two messages, the $log_2 2 = 1$, so the choice is, since $2 = 2^1$. Characterized by 1 bit of information. If there is a choice among 256 messages, then there are 8 bits of information, since $log_2 256 = 8$ ($\therefore 256 = 2^8$). This is expressed as $log_2 x = N$; where X is the number of messages to choose from and N is the number of bits of information. The formula for entropy is given as $H = -\sum (p_i \log_2 p_i)$ This formula is based on probability. So the highest value II can attain is 1 which signifies maximum entropy. If there are two possible choices then the probability of selecting the first alternative is p_1 and the second is p_2 which is $(1-p_1)$. Here H will be $- (p_1 \log_2 p_1 + p_2 \log_2 p_2)$. II is largest when the two probabilities are equal (i.e. when one is completely free and unbiased in the choice) and reduces to zero when one's freedom of choice is gone. 6.7 Redundancy Redundancy is a measure of information which is related to entropy, as well as which is important in case of information theory. Redundancy enables one person to be understood by another, it makes written and spoken communication possible.

56 Entropy represents disorder in that it signifies the degree of choice but redundancy lends order by narrowing choice. To understand redundancy, we must discuss about relative information content. Relative information content is the ratio of actual information content to maximum possible information content. rel 1actual I 1max If in a message, the actual average number of bits of information per symbol is 1.75 bits, and the maximum possible information per symbol is 2 bits, then relative information content is 1.75 2.0 = 0.875 . Redundancy is measured in this way - 1 - Relative information content. So in the above example, redundancy will be 1 - 0.875 = 0.125 (12.5%). It means that on average 12.5% of the symbols could be removed without destroying the essential information conveyed. Redundancy helps greatly in ensuring an error-free communication of information. If any communication channel was perfect and error-free, there would be an incentive to eliminate redundancy completely. But all channels are affected to some extent by noise and interference, and so redundancy can help to reduce communication errors. Without redundancy, there would be endless choice, and so, a kind of equilibrium or chaos in which choices have equal likelihood of selection at any given time. Human language is very much redundant and redundancy of English is 50% or even higher. It means that about one half of written English is there not to convey the essential meaning, but to ensure that sentences are correctly constructed. Therefore entropy and redundancy are two wings of information theory and very much vital ingredients in a communication process. 6.8 Exercise 1. Discuss the semantic theory of information. 2. How is entropy related to information theory? 3. Which of the theories of information you feel the most justified in the information age, and why? 6.9 References and further study 1. Budd J.—The library & its users. Greenwood Press, 1993. 2. Kent, Allen ed.—-Encyclopaedia of library & information science, Mercel Dekker. vol. 8 1983. 3. Young, J. F—Information theory, Butterworth & Co. 1971.

57 Unit 7 ‰‰‰‰‰‰ Structure of knowledge 7.0 Objectives 7.1 Introduction 7.2 Knowledge—definition 7.3 Knowledge—characteristics 7.4 Theories of knowledge 7.5 Sociology of knowledge 7.6 Knowledge—classification 7.7 Exercise 7.8 References and further study 7.0 Objectives This unit gives an idea of 1. Various definitions of knowledge 2. Features of knowledge 3. Various theories of knowledge 4. Scope of sociology of knowledge 5. Classification of knowledge. 7.1 Introduction Knowledge has become the most important factor in economic life. It is the chief ingredient of what we buy and sell, the raw material with which we work. Capital consists in a great part of knowledge and organization. Knowledge and innovation have played an important role in the development of society throughout history. Knowledge is a component of intellectual capital. There are many theories and many classification systems of knowledge.

58 7.2 Knowledge—definition Knowledge has been defined by various people in a number of ways. Most of the definitions of knowledge are slanted towards a philosophical biasness. In the arena of library and information science knowledge can be defined as information in context of an individual's role, learning behaviour and experiences. It only has value in the context of the situations where it is being applied. The key success factors of it include the congruity between the information and the individual's perspective. The major steps that occur in the transforming of information into knowledge are learning, knowing, filtering. evaluating and balancing. It can also be said that knowledge is the result of linking together a number of pieces of information into meaningful patterns. The traditional definition of knowledge is "justified true belief. In traditional Western epistemology (the theory of knowledge) 'truthfulness' is the essential attribute of knowledge. It is the absolute, static and non-human view of knowledge. Humans inherently possess knowledge as the understanding, awareness, or familiarity acquired through study, investigation, observation, or experience over the course of time. It is an individual's interpretation of information based on personal experiences, skills, and competencies. 7.3 Knowledge—characteristics Knowledge requires some personal values level and awareness that comes with personal authority, such as decision making. Knowledge is about beliefs, action and meaning. It is the way in which we human beings adapt to the world around us, how we modify it and make it a part of ourselves. Mc. Dermote describes six characteristics of knowledge which is very much relevant and which distinguish it from information. 1. Knowledge is a human act. 2. Knowledge is the residue of thinking. 3. Knowledge is created in the present moment. 4. Knowledge belongs to communities. 5. Knowledge is circulated through communities in many ways. 6. New knowledge is created at the boundaries of old. Knowledge creates knowledge when it is shared, therefore underpinning the new emphasis on knowledge is relationship. It is in the present society, a relationship

59 between people who feel empowered in a manner that has not been previously evident in human history. Knowledge is dynamic, since it is created in social interactions among individuals and organizations. Knowledge is context-specific, as it depends on a particular time and space. Without being put into a context, it is just information, not knowledge. For e.g. '48, Bhupen Bose Avenue' is just information. Without context, it does not mean anything. When we say "Mr. X lives at 48, Bhupen Bose Avenue", it becomes knowledge. Knowledge is humanistic as it is essentially related to human action. Knowledge has the active and subjective nature represented by "commitment" and "belief, that is deeply rooted in individual's value system. Knowledge is relational : such things as 'truth', 'good' etc. are in the eyes of the beholder. Knowledge is a dynamic human process of justifying personal belief towards the 'truth'. There are two types of knowledge : explicit knowledge and tacit knowledge. The former can be expressed in formal and systematic language and shared in the form of data, scientific formulae, specifications, manuals etc. It can be processed, transmitted and stored relatively easily. Tacit knowledge is highly personal and hard to formalize. Subjective insights, intuitions and hunches fall into this category of knowledge. Tacit knowledge is deeply rooted in action, procedures, routines, commitment, ideals, value and emotions.

It dwells in a comprehensive cognizance of the human mind and body.

It is difficult to communicate tacit knowledge to others, since it is an analogue process that requires a kind of 'simultaneous proccesing'. In Western epistemology, knowledge has been traditionally viewed as explicit. But it is a fact that tacit and explicit knowledge are complementary, and both types of knowledge are essential to knowledge creation. Explicit knowledge without tacit insight quickly loses its meaning. Knowledge is created through interactions between tacit and explicit knowledge, rather than from tacit or explicit knowledge alone. 7.4 Theories of knowledge Whenever we speak of knowledge, two eminent personalities click our mind. One of these is Descartes, born in Touraine, France, in 1956, and the founder of analytical geometry. His ideas are of great importance, as they contributed to the principles of modern philosophy - he is known as the "Father of Philosophy". He loved the precision of mathematics, and based on his mathematical tendencies, he proposed four rules for thinking which he labelled his "Method of Cartesian Doubt." These can be interpreted as : first, never accept anything except clear and distinct ideas: second, divide each problem into as many parts as are needed to solve it: third, order thoughts

60 from the simple to the complex and finally, always check thoroughly for oversights. After considerable thought using these rules, he deduced that all knowledge of external things is in the mind, He concluded that "I think, therefore I exist." He saw this as his foundation on which to base the rest of his philosophy. He aimed to "lay the foundation of all philosophical and scientific knowledge entirely by a prior reasoning ~ i.e. by reasoning that does not appeal to senses, experience or observation. (Horner and Westacott. 2000). In this way Descartes can be said to hold a rationalist view of knowledge. The second philosopher who propounded his view of knowledge was Locke. He was born in London in 1632. He carefully considered how people think and understand. He concluded that the mind is like a "white paper" which is blank when we are born, and that all understanding and knowledge comes from our experiences (empiricism). He looked at the origins and limits of human knowledge and concluded that all the information we have arises through our five senses - he believed that if ideas originate from experience, then the content of thought must stem from sensation. He proposed that all complex ideas originate from each one of the five senses. Locke then took this argument further -he classified senses into primary and secondary qualities. He defined primary qualities as those ideas which may differ under certain circumstances, while secondary qualities are those which have the power to produce ideas, which do not necessarily look like their objects. For example, colour would be classified as a secondary quality, whereas shape would be classified as a primary quality, because colour can look different under various light patterns, but the shape of an object is defined and always the same. •Though these two are the major theories of knowledge, there are other viewpoints too. Plato considered that we are born with a certain amount of knowledge, but Berkley insisted that Locke's claims that objects have primary and secondary qualities were unsupportable. Berokley maintained that as we can only know what is in our own mind, it is difficult to prove the existence of anything outside our own minds. Locke and Descartes, are the founding fathers of two opposing schools of philosophy - empiricism and rationalism, one considering knowledge as the experience of the senses, and one trusting to the speculations of reason. There are other two theories of knowledge mainly epistemological theories of pragmatism and historicism. Pragmatism can be defined as a questioning, logical method for solving or considering problems, whereas historicism can be offered as an alternative (or additional) view that all can only be understood in terms of historical context. The table below summarizes the simplified relevance criteria in four epistemological schools (J. Doc, Vol, 59, no.2).

61 Empiricism Rationalism Historicism Pragmatism Relevant : Obser- Relevant Pure Relevant Back- Relevant : Informa- vations, sense thinking, logic, ground knowledge tion about goals and data. Induction mathematical about values and from collections models, computer preunderstanding. consequneces both of observational modelling, sys- theories, concep- involving the .re- data. tems of axioms tions, context. searcher and the Non relevant : definitions and historical develop- object of reasearch Speculations theorems. ments and evolu- (subject & objecf). knowledge trans- Low priority is tionary perspec- Low priority (or mitted from given to empirical tives. outright suspicion) is authorities. Data data becasue Low priority is given to claimed about the observ- such data must be given to value free or neutral ers' assumptions organized in decontextualized information. and accordance with data of which the preunderstanding. principles which meanings cannot cannot come from be interpreted. experience. 7.5 Sociology of knowledge Sociology of knowledge studies the social sources and social consequences of knowledge. It has been argued that the concept of knowledge is to sociology as the notion of attitude is to psychology. As the combination of soil and environment determine the crops a farmer plants as well as their yield, so different types of knowledge (e.g. religious, political, scientific, everyday) are understood to differently flourish within varying social millieus. In developing precisely how knowledge becomes socially modified, sociologists have focused on many processes. i. Knowledge production : how various combinations of relative institutional power (i.e. political vs. religious, print vs. electronic communications) lead to difference in the social value attributed to, hence differential expenditures invested into the development of different knowledge types. ii. Knowledge encoding : how coding of knowledge is possible through graphs, or when presented as a newspaper article.

62 iii. Knowledge transmission : how different forms of human communication affect our cognitive habits, social relations, political ideologies etc. iv. Knowledge decoding : how beliefs determine what we see; how expert status entails ability todecipher legal and government documents. v. Knowledge / information storage : how the form in which information is stored (i.e. in a folder of written notes vs. in a computerized file; in qualitative vs. quantitative formats) affects the way in which connections are seen and knowledge derived. vi. Knowledge retrieval : the social construction of knowledge. vii. Decision making : decisions based on social interactions, where knowledge plays a pivotol role. The connection between knowledge and society goes in both ways - not only does a society shape its knowledge, but the reverse holds true too. When the socially constructed frameworks, by which human experiences are commonly parsed and given order, evolve to the point that they survive through time, we have the seeds of civilization. Sociology of knowledge also involves the social psychology of consciousness and belief. This cognitive branch alerts us to the facts that we live in a second-hand world, that most of what we "know" is generally received uncritically from others, and that models of decision - making must take into account the roles of pluralistic ignorance* emotion, and the bearing of knowledge type (e.g. scientific, religious) and form (e.g. mystical vs. rational) being reflected upon. Here the sociology of knowledge examines the relationships between mental phenomena and social organization. 7.6 Knowledge- classification Knowledge has been classified by philosophers, linguists, sociologists, information scientists in their own respective ways. But the most relevant classification, in case of library and information science, is that of Machlup. He has formulated a scheme consisting of 17 subject groups encompassing knowledge and various types of knowledge producing activities. The scherne is outlined below : 1. The economics of knowledge and information : general. 2. Production and distribution of knowledge : knowledge industries, information services, information machines. 3. Ignorance, chance, risk and uncertainty as factors in the explanation of individual choices and particular economic institutions and phenomena.

63 4. Uncertainty, risk-aversion, venture spirit, innovativeness and alertness as factors in the explanation of entrepreneurship and profit. 5. New knowledge (invention, discovery) and its application (innovation, imitation) as factors in economic growth. 6. The transfer of technology and know-how. 7. Economic forecasting. 8. Cost and value, private or social of information and alternative information systems. 9. Decision theory and game theory. 10. Decision-making by consumers with incomplete and uncertain knowledge. 11. Decision-making by worker and job seekers with incomplete and uncertain knowledge. 12. Decision-making by Private firms in various market positions with incomplete and uncertain knowledge. 13. Policy-making by Governments and Public Agencies with incomplete and uncertain knowledge. 14. The formation and revision of expectations and their role in economic dynamics. 15. The role of information, knowledge, expectations, risks and uncertainty in the functioning of markets, and the formation of prices. 16. Prices as information system for resource allocation and product distribution in market economies and planned economies, national programming and planning. 17. Human Capital : The accumulation of knowledge and skills. These seventeen groups are further classified into various subgroups. Let us now discuss in short the concepts embedded in this classification. 1. The first group accommodates publications that are regarded fundamental to the economics of knowledge and information. A piece of writing is fundamental, if it outlines or treats the conceptual framework designed for the whole area of inquiry. Here discussions of such fundamental distinctions, like knowledge as a stock and information as a, flow; knowledge, as a state of knowing and information as a process designed to produce such a state; knowledge as things known of enduring validity and relevance and information as messages transmitted or received about some things of only temporary or even ephemeral relevance; or between learning to 'know what' and learning to 'know how' are carried out.

64 2. The second group contains publications on the economic aspects of activities designed to generate or disseminate knowledge, or to produce machines or other facilities for processing information. In this group, the facet of education is given prominence, since it is the largest of the knowledge industries. 3. A fundamental association exilts between the theory of money and the economics of knowledge and information. This is the main node of this subgroup, 4. The core of this group is novel knowledge and uncertain knowledge, according to some people like Knight and Schumpeter. Alertness and speedy response to emerging knowledge are the characteristics of entrepreneurship and the source of profit, and these form the main ideas of this group. 5.'The elements comprising this subgroup consists of search activities, invention and discovery. Publications on the economic aspects of inventive activities are assigned to this group. 6. Transfer of technology, a vital activity, is the prime focus of this subgroup. Technical know how means interaction between those who know how to do something and those who want to learn it. 7. The group lists the concepts related with forecasting trends and fluctuations, forecasting prices, profits and interest rates, forecasting technological change, forecasting national aggregates etc. 8. The eighth group contains information on cost and value, private or social of information and alternative information systems. 9. The ninth, tenth, eleventh and twelfth group are all related with decision theories and game theories, be it decision making by consumers with incomplete and uncertain knowledge, or by workers and job seekers with incomplete and uncertain knowledge, or by private firms, in various market positions, with incomplete and uncertain knowledge. 10. The thirteenth group includes information, regarding policy-making by Governments and public agencies with incomplete and uncertain knowledge. 11. The 14th group includes the various types of expectations like expectations of changes in income of changes in investment and consumption, of changes in interest rates and so on. 12. Group 15 is the place for studies of the market mechanism as it is affected by incomplete and uncertain knowledge and inefficient information processes. 13. Publications qualify for group 16 only if they take consideration of the fact

65 that knowledge of economic relevance, including people's preferences, ambitions, skills, and their perceptions of relevant circumstances of time and place is widely dispersed. 14. The last group includes the accumulation of knowledge and skills for human capital which means writings on public policies for education, training and manpower, if they are treated within the conceptual framework of the theories of human capital and comparative returns to investment. 7.7 Exercise 1. What are the characteristic features of knowledge? 2. Discuss Machlup's classification of knowledge. 3. Give an idea of Sociology of knowledge. 7.8 References and further study 1. Allee. Verna-The 'Knowledge Evolution : expanding organization intelligence Butterw Orth Heinneman. 1997. 2. Little, Stephen ed.-Managing Knowledge : an essential reader. The Open University & Sage 2002. 3. Machlup, Fritz-Knowledge : its creation, distribution and economic significance, 1984. 4. Yojana-Feb. 2006.

66 Unit 8 ‰‰‰‰‰ Intellectual Property Rights 8.0 Objectives 8.1 Introduction 8.2 Intellectual property rights-introduction 8.3 Copyright 8.4 Patents 8.5 Transborder Data Flow 8.6 India's National knowledge Commission 8.7 Exercise 8.8 References and further study 8.0 Objectives By reading this unit you will be able to understand the various facets of intellectual property,'viz., copyright, patents, transborder data flow etc. You will have an idea of some recent incidents on Governments part in developing a strong knowledge base, i.e. formation of National Knowledge Commission and its activities. 8.1 Introduction A country which ignores or neglects the opportunities and challenges offered by the "knowledge society" ultimately faces a dull future. The widespread introduction of information in the society touching all the aspects of daily life, requires that there should be proper provisions with regard to the legal aspects of the use of information, be it in any form or other. 8.2 Intellectual Property Rights : Introduction Intellectual Property Rights is the expression of ideas defined by federal and international laws as property. Though ideas themselves cannot be owned, the manner in which a particular author, film director, or other creator expresses ideas, belongs 67 to him or her, and is protected by copyright law from unauthorized reproduction. It is divided in two categories - Industrial property which includes inventions (patents), trademarks, industrial designs and geographic indications of source, and copyright which includes literary and artistic works, such as novels, poems & plays, films musical works, drawings, paintings, photographs, sculptures and architectural designs. These are mainly statutory rights which allow the creator or owner of the product / work to prevent others from exploiting the same for a certain period of time. These rights make the creator / inventor as the owner of the product or work. IPR's roots can be traced back in the 15th century when invention of the printing press enabled copying of literary works. This illegitimate copying led to the emergence of certain statutes to protect individual creation and inventions. That was the beginning of the journey of IPRS which has now taken a global shape in the form of World Intellectual Property Organisation (WIPO) and TRIPS (Trade Related Intellectual Property Rights) Agreement. There are several ways to safeguard the intangible properties, i.e. a book, a poem, a scientific or technological invention, a broadcast, a film or anything that is created originally by human resources. The following are the tools of protecting originality and creativity." Trademark : It can be a logo, symbol, word, phrase, jingle, picture, sound, or even smell or a combination of all these which is used to distinguish one work from another. Trademark provides a distinct identity to a particular good or service, and "thus protects it from being copied. Trade secrets : Trade secret protection is a safeguard to protect the secrets of a product or work. Patent : It is the right of an individual or group of individuals in the form of a company to gain profit from a particular invention or unique manufacturing process. A patent is an intellectual property relating to scientific and technological inventions. A patent is granted by the government of the country to the applicant and gives the inventor the right for a limited period to prevent others from using invention in any form without permission. When a patent is granted, the inventor becomes the owner of the patent. Like any other form of property, a patent can be transacted, purchased, sold or even mortgaged. Design : A design is the presentation of the whole or part of a product resulting from the features of colour, size, shape, texture or materials of a product or its packaging. Intellectual property is becoming increasingly important not only for wealth creation, but also for providing employment and living standards; the emphasis is also shifting

68 away from a "brick and mortar" to the "'click" economy. This is evident from the fact that while in 1982 some 62% of the corporate assets in the U.S.A! were physical assets. the figure shrunk to mere 30% in 2000. While the intellectual property system in India dates Back to a century and a half its role is now undergoing a paradigm shift from being an utility office to. a service oriented, efficient body with corporate outlook. Intellectual property has a moral value. The act of creativity which produces a work of intellectual property makes a special link between the creator and his or her work, especially in literary or artistic creations. France has always emphasised protection for the authors moral rights: particularly the rights to Be recognised as the author and to object to derogatory treatment of the work. Britain saw copyright simply as economic property until moral rights were introduced in the Copyright, Designs and Patents Act 1988. In other areas of intellectual property the economic aspect is usually paramount, but pecuniary loss is not always a prerequisite for legal redress. The two most important forms of intellectual property are copyright and patents. 8.3 Copyright Copyright is basically the individual right of an author to dispose of his or her work in return for remuneration. According to Christopher Scarles, "Subject to certain exception, it is ownership of and right of control over all ways of reproducing a work. "Copyright is designed mainly to protect an author, an artist, publisher or other owners against any unauthorised copying his or her works - as by reproducing the work in any material form, publishing it. performing it in the public, filming it, broadcasting it, causing it to be distributed to subscribers or making any adaptation of the work, Hverywhere a copyright provides a copyright holder with a kind of monopoly over the created material. The laws of most countries also recognise the owners 'moral right' to protect his or her material from being pivoted. There are many issues that challenge the copyright system 1. Reproduction of copyright material : Reproduction of intellectual property is the main element in the copyright system. Photocopying falls under the authors right of reproduction, which are recognised in the legislation of many countries and in international connections. 2. Fair Use : The issue of fair use is the most problematic one in the whole copyright system. It has always been a controversial issue. The 'fair use' doctrine has created many uncertainties in the modern environment.

69 3. Non print material : The use of audio-visual works and other non print materials is another important factor. 4. Computer : The copyright issues that have been recently raised usually fall into three broad categories - the protection of computer software, the computer uses of intellectual property, or the role of computers in creation of works. All these issues are being argued at national and international levels. 5. Database : There are many situations in which the supplier not the creator of the database, claims a copyright. Unless there is an explicit agreement to permit it, down loading is seen by some as violation. The Indian Copyright of 1847 is the earliest statutory law in India concerning copyright. In 1911 the law of copyright was codified in England. The Governor General of India enacted the Indian Copyright Act of 1914 to make some modifications to the provisions of the 1911 Act. This statute remained in effect until an independent India enacted the copyright Act. of 1957, which came into force in 1958. This act states that copyright may be secured in original literary, dramatic, musical and artistic works, films and records without regard to formalities. The duration of copyright for original literary dramatic, musical and artistic works is the lifetime of the author plus fifty years. Phonograms and broadcasts are also protected under this act. This Act also establishes India's policy regarding the 'fair use' of copyright works. There is a copyright office, overseeing whose activities is the copyright Board whose members are appointed by the government. The most fundamental right conferred by copyright is the right to exclude unauthorized reproduction of the copyrighted work. It is a legal device designed to protect the livelihood of creators and producers of literary, musical and artistic works. In the context of technological developments the 1994 amendment of the Indian Copyright Act extended protection to owners of copyright and related rights by bringing it within the scope of digiial technology. Works which are "published" in electronic format such as material on CD ROMs, floppy disks, online database are protected in the same way as their printed equivalents. Electro copying is the term which means the storage, display, dissemination, manipulation or reproduction of print -based copyright works into machine-readable form. This means a) using an optieal scanner or document image processor to convert copyright protected works into electronic format. b) downloading from commercial database into a, paper format.

70 c) downloading copyright protected material from database directly on to a computer to store for further use. d) sending copyright electronic material around a local area network. e) broadcasting copyright protected works on e-mail & f) sending copyright works by fax. 8.4 Patents A patent is an exclusive right for a limited period of time (term of patent) granted by the Government to the Patentee, in lieu of full disclosure (complete specification) of the invention. Anything to be patented needs that the invention should be new, non-obvious and capable of industrial application. It includes manufacturing methods, process, machines, products or their improvement and also inventions. A patent is not granted if the invention is already available with the public in the form of published literature or, prior / common knowledge. It must not be from the categories specifically declared non-patentable. The patentee has the exclusive rights for the use of the patent. He can take legal action against any infringement. He can commercially exploit its potential with the confidence that it cannot be copied or imitated without his permission during the period of patent. It can be licensed, assigned or sold for commercial consideration. After the expiry of the patent term, the invention will be fully and freely available to the public, thereby facilitating easier and faster technology transfer. An inventor or his assignee, alone or along with others can file an application for a patent with the appropriate patent office in the stipulated form accompanied by the provisional or cornplete specification. A patent lasts for twenty years from the date of filing the application. A patent expires if it has lived its full term, or is hot renewed, or is revoked. The Government has put in place a new patent regime from 1st January 2005 keeping in line with the WTO commitments, India is among the few .developing economies to have brought in amendments to the existing patent law. This law allows patenting of products in areas of food, drugs and chemicals which were not covered earlier. Apart from meeting the WTO obligations, India has brought in the new regime as there is an economic rationale. It enables pioneering firms lead time to recoup sunk cost on research and development.

71 8.5 Transborder data flow It deals with the promotion of the electronic transfer of data among libraries across national borders, thus ensuring that the vital interest of the library community in resource sharing is preserved. It is restricted to data which is publicly available with or without charge, and encompasses both reference and source databases. It includes formulation of policies and guidelines raising awareness of the subject, improvement of access to computerized databases etc. Online databases are the most common application of this data flow to the information professionals. Multinational corporations with world-wide operations are one of the major users of this data flow. Not only this, but international financial transactions are also conducted by TDF. The growth of transborder data flow has been facilitated by the convergence of telecommunication, broadcasting and computing technologies. The issue of transborder data flow encompasses technology transfer, international data and intellectual property protection, maintenance of cultural diversity and sovereignty etc. In the transborder data flow, many national frontiers have to be crossed. An online database may collect information in three countries key it by low-cost labour in another country, into a computer in another country, and transmitted eventually to a user in another country. There are many legal issues raised by TDF. National sovereignty, security; economic interests or suppression of crimes often requires control of transborder data flow. Public policy also needs controls on TDF due to personal privacy. 8.6 India's National Knowledge Commission India has taken up a pioneering step in setting up the National knowledge Commission on 13th June, 2005 by a notification of the planning commission, Govt, of India. Through this, India is leaping into the 21st century as it has already created the requisite knowledge base, a talented pool of knowledge workers, and an explicit recognition of importance of knowledge in this globalised world. This commission is created to strengthen the roots of India's knowledge base. The Indian Prime Minister, on this issue remarked, "I want business leaders as well as our political and intellectual leaders to work with the Knowledge Commission so that we can build a more open society and a more open economy." The Commission advises the Prime Minister on matters relating to institutions of knowledge production, knowledge use and knowledge dissemination. The terms of reference of the Commission, referred to is the "Knowledge Pentagon" are-A) building excellence in the educational system to meet the knowledge

72 challenges of the 21st century and increase India's competitive advantage in fields of knowledge, 2) Promote creation of knowledge in science & technology laboratories, 3) improve the management of institutions engaged in intellectual property rights 4) Promote knowledge applications in agriculture & industry, 5) Promote the use of knowledge capabilities in making government an effective, transparent and accountable service provider to the citizen, and promote wide spread sharing of knowledge to maximize public benefit. The Commission would develop a set of clear deliverables after catalyzing arid interacting with working groups. The Commission would wind itself up on October 2, 2008 with a report on task done. A National Steering group (NSG) would be created under the chairmanship of the Prime Minister with the following composition to guide the work of the National knowledge Commission (NKC). 1. Prime Minister (chair) 2. Minister of Human Resource 3. Minister of Agriculture 4. Minister of Commerce & Industry 5. Minister of Communication & Information Technology 6. Deputy Chairman, planning Commission & 7. Minister of state, sciende & Technology. The, Planning Commission is the nodal agency for NKC for administrative, logistic, planning and budgetary purposes as well as handling parliament related responses. India's National Knowledge Commission is looking forward to cooperate with multilateral agencies, think tanks and universities in India and abroad, as the Commission works to harness knowledge for India's development; and realize its potential to become a major knowledge power. A recent World Bank study by Dahhnan & Utz (2005) - (Indian & the Knowledge Economy : Leveraging Strengths and Opportunities) has recognized that India has made tremendous strides in its economic and social development in the past two decades and has come to realize even faster growth in the coming years. This study notes that it is high time for India to make its transition to the knowledge economy. There are a large number of tasks before the National knowledge Commission. The foremost task is to address the problem of educated unemployed. Unemployment was recorded to be 186 million in 2003 without work with the world youth unemployment rate (14.4%) being over twice as high as the world unemployment rate (6.2%) according to International Labour Organization (ILO). Unless the problem of educated unemployed is successfully tackled, India may face serious setbacks on its journey to become a knowledge superpower. So reorienting the education system to make it market oriented is a primary task of the Government and the process of it is equipping the youth knowledge and skills required by the market in which both the private and public sectors have important roles to play, India's National Knowledge Commission therefore addresses the problem of educated unemployed on priority basis.

73 8.7 Exercise 1. What do you understand by Intellectual Property Rights? Discuss in detail. 2. Discuss the activities of India's National Knowledge Commission. 8.8 References and Further study 1. Chakrabarti. B & Banerjee, S. ed.—An overview to perspective on library & information science. WBCLA 2004. 2. Employment News—June. 2005; October, 2005; March, 2006.

74 Unit 9 ‰‰‰‰‰ Knowledge Management 9.0 Objectives 9.1 Introduction 9.2 Knowledge management—concept 9.3 Knowledge—forms 9.4 Knowledge conversion 9.5 Knowledge Manager's Role 9.6 Exercise 9.7 References 9.0 Objectives This unit provides in a nutshell z the scope and variety of knowledge and knowledge management. z the various forms of knowledge. z the idea of the approaches of the conversion methods of knowledge. z the role of the catalyst in die process, i.e. the knowledge manager. 9.1 Introduction Knowledge management describes the way in which organisations attempt to capture, enhance and utilise the knowledge necessary for their survival. In this pro- cess, knowledge is converted in four ways,. Knowledge managers role in this process is noteworthy; it is he who mediates the knowledge transfer, conversion and manage- ment through the help of technology. In this society, the proper utilisation of this greatest wealth is no doubt an important and paradoxical issue. 9.2 Knowledge management—concept Due to the breadth of the concept and the cornplex nature of knowledge, there is probably no accepted definition of knowledge management. Knowledge professionals

75 have defined the concept in different ways. Karl Wiig. defined it as the system atic,
explicit, and deliberate building, renewal and application of knowledge to maximise an enterprises knowledge—related effectiveness, and returns from its knowledge as- sets. Karl Sveiby defined it as the art of creating value from an organization's

intan- gible assets. World Bank (2001) defines it as the management of knowledge through systematic sharing. In a nutshell, knowledge management can be viewed as the pro- cess of identifying, organizing and managing knowledge resources. These include explicit knowledge (information), know-how (learning capacity), know-who (cus- tomer capacity) and tacit knowledge in the form of skills and competencies. We shall now discuss some concepts related with knowledge management. While discussing about, knowledge management, we must first refer to explicit knowledge and tacit knowledge. Explicit knowledge is the knowledge that can be expressed, captured and documented in forms of publication such as trade secrets, patents, online databases etc. Tacit knowledge is the hidden knowledge residing in the cognitive system of human beings, and that is gained through socialization and interaction with the environment. Explicit knowledge is reusable in a consistent and repetitive manner. It exists as a physical or virtual entity that can be measured, identified and distributed. It is explicit. On the other hand human beings are the storage medium of tacit knowledge. When the storage medium is an individual then it is vulnerable to loss; where it is stored in a community, the vulnerability is re- duced, the ability to reuse is enhanced. Tacit knowledge centers around "mental models", which are concepts, images, beliefs, viewpoints and guiding principles. Most of the people view knowledge management in an organization as that of making tacit knowledge more explicit. Nonaka and Takeuchi (1995) view that there are four types of interaction within and beyond an organization that are based on the differences between explicit and tacit knowledge. These four modes of knowledge conversion are dealt later. 9.3 Knowledge—forms The forms of knowledge usher complexity, which does not lead to any unanimous solution-whether knowledge can be understood as a social process, or is it a thing, or is it an object, is still a big question. Let us examine these concepts one by one. 1. Knowledge as an object : Some people view knowledge as the sum of every- thing they have learned. Things are owned by somebody, so they are property. Things need to be kept or stored in some places. They need to be maintained properly too.

76 Thinking of knowledge as an object, leads people to focus on databases and other storage devices. 2. Knowledge as a process : Another way of thinking of knowledge is as a process. Those who believe in this theory, focus on sharing, creating, adapting, learn- ing, applying and communicating knowledge. Polamji describes knowledge "as an activity which would be better described as a process of knowing". Knowledge has properties of process in its continual movement through creation, adaptation, en- hancement and application. 3. Knowledge as a complex system : In this perspective, knowledge is viewed as a creative phenomenon that requires the right environment. It is a complex, self-organizing system. This view draws on concepts from systems theory. 4. Knowledge as public good : This theory visualizes knowledge as social good that can be used by additional persons without causing any additional cost. This is an important focus of viewing knowledge from the economic arena. This thought presupposes that the 'same amount of knowledge that is used to make m units of output will serve to make m +1 units, and the same knowledge that is used by n persons (producers) can enable n +1 persons to make the same product. 9.4 Knowledge conversion Nonaka and Takeuchi (1995) viewed organizational knowledge, in four forms - socializiation, externalization, combination and internalization. The four interaction methods envisage a dynamic process in which tacit and explicit knowledge are ex- changed, transformed and converted. a) Socialization : This mode,of conversion is from tacit knowledge to tacit knowledge i.e. sharing tacit knowledge between people. This exchange can take place in a one to one. or one to many interactions. It deals mainly with communication and collaboration between people and it can be gained through observation, on the job training and joint activities. b) Externalization : This is probably the most important part of documentation of knowledge i.e. conversion of tacit knowledge to explicit knowledge. This includes discussion among team members responding to questions, documented standard op- erating procedures and periodic reports. c) Combination : It refers to the process of converting explicit knowledge into more complex sets of explicit knowledge. This knowledge can be shared and trans-

77 ferred via various documents. It deals with the processing of information i.e. docu- mented explicit knowledge. d) Internalization : It refers to the process of conversion of explicit knowledge to tacit knowledge, i.e. the process of utilizing explicit knowledge. This means the processing, of external knowledge or information, understanding it and then internal- izing it. Internalization takes place when an individual learns or gains knowledge by doing or via experience. In conclusion, we can say that knowledge management seeks to manage knowl- edge, though knowledge itself is a very slippery concept with many different defini- tions. It is perplexing to note that much of the highest-value knowledge within an organization remains uncodified. Lots of knowledge are unutilised, never finding its way into databases, process diagrams or else. So much of what the institution "knows" remains unknown or inaccessible to those who need it. 9.5 Knowledge manager's role The main role of the knowledge manager is to provide continuity and integration across the management and content changes. There are four main activities of a knowledge manager-a) Catalogue the knowledge capital, b) Capture the knowledge capital, c) Retrieve, and d) Utilise the knowledge capital. a) Catalogue the knowledge capital : This means defining the organisation's knowledge assets. The manager must be able to determine what knowledge is impor- tant. It is the oest knowledge that one wants to collect, store and disseminate, and this knowledge is called knowledge capital. Making an audit of knowledge resources is equally important. This audit of internal knowledge resources, includes recategorisation of knowledge and cataloging of knowledge capital too. b) Capture of knowledge capital : Capturing means designing processes in which the users themselves become proactive creators of knowledge capitals apart from being information consumers. Knowledge managers develop a controlled knowledge vocabulary, consisting of well-defined keywords. This structured knowl- edge is equipped in such a way that it is easy for the users to serve himself, with minimal guidance by the knowledge manager. So, capturing knowledge capital. means contributing to the creation of a managed vocabulary, collecting knowledge capital and acting as experts in the structuring of stored knowledge and creating new applications to capture and access knowledge.

78 c) Retrieve knowledge capital : Retrieval support implies assisting users in the proper use of information technology to access the available knowledge. The appli- cation of proper technology is an important item in this part. Content and content- rich interfaces, which are attractive to the users ought to be added. Here the knowl- edge manager's mission is the proper and creative use of knowledge, that already exists. d) Utilise knowledge capital : It means assisting managers in using the available knowledge creatively. The knowledge manager needs to act as a catalyst for the necessary change, train people to manage their own knowledge better, and facilitate knowledge champion networking. The knowledge manager acts as a catalyst in the process of knowledge management, at the end of which an user of the information service has a responsibility for his / her own knowledge management. It can be said that the benefits of good knowledge management are shared between the individual and the organisation. To get people in the organisation to manage their knowledge better is a prime responsibility of every organisation, and the knowledge manager can contribute a lot to this mission. 9.6 Exercise 1. Discuss the importance of knowledge management in an organisation. 2. What are the types of knowledge conversion? 9.7 References and further study 1. Alice, Verna—The knowledge evolution! : expanding organizational intelli- gence, 1997. 2. Ashworth, W. ed.—Handbook of special librarianship and information work. ASLIB, 1967. 3. Hawamdeh, Suiiman Al—Knowledge management : cultivating knowledge professional. Chardos, 2003. 4. Nonaka, Ikujiro & Takeuchi, Hirotaka—The knowledge creating company, OUP 1995.

79 Unit 10 ‰‰‰‰‰ Information Society 10.0 Objectives 10.1 Introduction 10.2 Information Society—definition 10.3 Information Society—impact of IT 10.4 Information Society—Role of libraries and 10.5 Information age and information society 10.6 Knowledge society 10.7 Exercise 10.8 References 10.0 Objectives By reading this Unit you will understand the dimensions of the information soci- ety, its characteristics, images and concepts of the society its future implications and its criticism. The features of the information age and its relation to the information society are also highlighted. 10.1 Introduction Information society is the modem society, in which the quality of life, as well as prospects for social change and economic development depend increasingly on infor- mation and its exploitation. The society is shifting its preposition and abilities related to information formats, to be in a position to exploit information. Libraries are also being forced to change in the control of the change in the society, because they are not only dealing with great social changes, but also with some fundamental & eco- nomic changes that affect them directly. 10.2 Information Society-Definition Information is becoming an important resource, and more central day by day, and therefore obviously the need of a new type of society is issuing. This has led to the

80 development of the information society. Scholars have on and often discussed about this opinion on the information society. From their discussions, five main definitions of the information society have emerged. These definitions each lay emphasis on some particular criteria. i) Technological : This is the most common criteria for the development of the society. The technological reason has come to the forefront mainly due to the easy access of information through various technologies, namely computers, telecommu- nication networks, and the other applications of information technologies to all cor- ners of the society. Computers and computing have led to an unimaginable fast access to information, information and information resource management, informa- tion consolidation and repackaging, economically viable information, better informa- tion storage facilities and extensive distribution of information. To sum up these it means that information is produced and distributed extensively in the modern society. Though Alvin Toffer. Christopher-Evans. and James Martin are against this techno- logical criteria, but John Naisbitt makes it clear in his writings, that if mechanization was the core of the industrials society, then computer technology is the heart of the information age. Many critics are against the role of technology in an information society. According to them', if it is so. then the society would be suitably called a "high-tech, society!' There are others who stresses on the appropriate measurement of IT in the society i.e. an usable measure of the information technology. Again some are of dilemma whether technologies are first invented, and then subsequently have their impact on the society. To counter all these views, and to establish the role of technology in the new society, it can be safely said that there is a constant interplay between 'technology' and 'society' and these are acutely interrelated. The new tech- nologies are bringing profound and continuous changes in the society. According to social change is related to technological innovation. But the even' lal outcomes are the result not of were technological impacts, but of a settle and complex interplay between technology and society." ii) Economic : Fritz Machlup (1902-1983), gave the idea of the role of economic factors of information as crucial to the information society. He distinguished five broad industry groups in the information industry— a) Education —namely schools, colleges, libraries. b) Media of communication—viz., radio, television, adventuring. c) Information machines—e.g. computer equipment. d) Information services—law, insurance, medicine. e) Other information activities— e.g. Research & Development.

81 He then gave an economic value to each and traced its contribution to the gross national product (GNP). If GNP increases due to the above five factors, then there is the possibility of the emergence of an information economy. Marc Porat also echoed in the same tune as Machlup, but divided the economy between 'primary', "'secondary" and "non information" sector. According to him. the primary sector includes industries that produce, process disseminate or transmit knowledge or mes- sage. 'The goods making up this sector are valued for their information producing, processing or distributing characteristics. The secondary information sector includes the important information activities, such as research and development inside a com- pany, information produced by government departments etc. He showed by these, that over 46% of U.S. GNP accounts by the information sector. Michael Rogers Rubin and Mary Huber extended Porats study and concluded that between 1958 and 1980, in the U.S.A., the contribution of knowledge industries to GNP increased from 28.6% to, 34.3%, so it can be concluded that information society is the area where the economric activitry is undertaken by the information goods and service produc- ers, and the public and private bureaucracies. iii) Occupational : The third criteria of the information society is based on the workforce constituting this society. In this society the main type of workforce con- sists of people whose prime function is creating, processing, and handling informa- tion. Daniel Bell has rightly remarked that "white collar society" is slowly emerging. By "this term, he meant the information workforce. He envisaged the decline of the industrial labour force as well, This information work force consists mainly of sci- entists, teaches, librarians, inventors, journalists, authors, lawyers, managers, typists, computer operators, telephone installers and so on. All these people together consti- tute three major types of workforce - producing--and selling knowledge, gathering and disseminating information searching, planning and processing information. This new class of people thus constitutes of intellectuals and technical people. In this society they dominate over those who base their work on physical strength and manual labour. iv) Social and Political : In information society, information is the enhancer of the quality of life. So a widespread information consciousness has come into being and users ultimately gain high quality information. Politically information has be- come the supreme source of Power. The world is now divided on the basis of infor- mation into information iich and information poor. Freedom of information leads to a political process characterised by increased participation and consensus. v) Cultural : The role of information in enhancing the cultural value is notewor- thy. The standard of living and much more, the quality of living has gained an impetus due to the increased role of information in our daily lives. Our television sets

82 and programs have undergone a massive change, our movies now "wear a new look, our newspapers reflect a new way of thinking. The informational features of our world are very much penetrative. The increase of information in social circulation is felt every now and then and this is an important criteria in the 'development of the information society. 10.3 Impact of I.T on information society Information technology is the means for better management and exchange of information, for more efficient communication and ultimately for the benefit of the people using information technology. Through information technology, fast, accurate efficient ways of doing things can be accomplished. Cronin has given a comprehension description of the social impacts of information technology in the information through society the following concepts. a) Amplification : Through technology, more information can be stored, more information can be accessed and more information can be send much more faster than was done previously. b) Globalisation : Information has now become a global activity, strengthening Mc. Luhan's vision of a global electronic village. c) Acceleration : The opportunity to increase access far beyond that which has been achieved so far is due to information technology. Technology also increases the ability and means to control access to information. d) Massification : A large amount of information now reaches a large number of user through the information technology. e) Decentralisation : Electronic access, distributed processing, teleshopping and flexi-working are encouraging a trend to decentralisation, local control and individualised work patterns. f) Mystification : The pace of developments in resource-rich organisation are vastly different from the rate of absorption of new technologies at the grass root level and that too is due to the impact of technological developments. g) Transformation : The role of technology in transforming all sectors of the society is overwhelming. A new set of workers called information workers have emerged. Changes are taking place in the occupational structure of the advanced societies.

83 h) Intensification : The role of information technology in creating an intensive information awareness through out the society has been recognised by one and all. It is an established fact that information is an important resource, which can be Capitalised and which has a market value. The modern market now treats information as commodity, a peculiar commodity which does not get exhausted on consumption, which has multiple life cycles, which can be produced in large quantities, and which is a social good. i) Commercialisation : As information becomes more and more important, and information technology plays an important part, commercialisation of information is inevitable. There are costs related with generating, storing, retrieving, distribution and exchange of information. The role of information technology in shaping these aspects of information is prominent, and in the information age, these cornerstones of information society can never be underestimated. 10.4 Information Society—Role of libraries and librarians Librarians collect the record of human knowledge, preserve it, order it for use, and provide access for those who need it. In the wired society, a similar group of cata- loguers, classifiers and technical experts organize the information and provide an appropriate array of access points. Nowadays, libraries are concentrating on buying shared electronic information, creating electronic links among local catalogues and providing swift delivery systems, increasingly directed towards patrons. In the infor- mation society, every user hovers through electronic indexes and electronic union catalogues and discovers items he wants to read. The role of the libraries and the librarians have been modified concomitantly to keep up with this change of attitude of the users. The library has shifted as a place towards the information to which it can provide access. In the information society, information is brought to the user by the libraries rather than users searching for information in the libraries. The other facilities which the libraries provide to the users in this information society are discussed below : a) Improved searching and manipulation of information : In the information so- ciety. the information centres facilitate improved access to information by providing various sophisticated search and retrieval facilities. b) Improved facilities for information sharing : As access becomes easier, facilities

84 for sharing of information improves. Many institutions, users of research groups use the resources of the internet and digital libraries to share information through file sharing, or cooperative document preparation and use. c) Speedy and timely access to information : Up to date information is provided by the libraries in this society. The time lag is reduced by the modern libraries with the help of web and digital publishing and quick inclusion of digital information in their collection and services. d) Improved use of information : In the networked world when the world has become a global village, any type of information is accessible to the users. Informa- tion generated in any part of the world, in any language, in any form can reach the users, thanks to the improved technological use in the modern libraries, where the barriers of time, space, language and culture are broken down, thus improving the use of information. e) Reduction of digital divide : The modern libraries in the information society help to develop the communication among people in the world, enhance their oppor- tunities to access information and communication technologies, and thus reduce the digital divide. 10.5 Information age and information society Information age represents a time when each and every person can harness infor- mation in a practical way and transform information into knowledge. Information in this age makes one more powerful and much wealthier. Information society is the modern society in-this information age. In this age the Change from a goods produc- ing sector to a service economy based on information is the most important factor. According to Bell, the axial principle in this age is the centrality of theoretical knowledge and the future orientation is the control of technology and technological assessment. In this age, therefore, information is a central resource and within orga- nizations, a source of power. In this age, the role of information has attained new proportions with the acceleration of research, mounting social and population pres- sure, changing technological environment and increasing needs of professionals. The important characteristic feature of this age is information overload. Too much information has created information pollution in this age. This overload costs busi- nesses and individuals valuable time, effort and additional resources. It has resulted

85 in the decrease of accuracy and precision of the information which is retrieved. A very important requirement in thus information age is information literacy on the part of the users. This means the ability to effectively access and evaluate information for a given need. Each innovation in information handling from the invention of paper to the modern computer, has placed new demands on achieving literacy. In an infor- mation society a citizen must posses at least three things to be literate - one must have the intellectual skills to deal with information; one must have access to the information technologies which store, convey and process information, and one must have the access to the information itself. The effects of the revolution in the information and communication technologies in the information age "have been felt by the traditional libraries and librarians. The nature of library collection in the digital environment is changing in fundamental ways. Access process is also changing in its own ways. For librarians and informa- tion professionals, this digital age brings a need for a constant update of their pro- fessional knowledge and competencies. 10.6 Knowledge Society During the last century, there is a major transformation from agriculture to infor- mation society. The information society evolved in the last decade. In the 21st cen- tury, a new paradigm is born, where knowledge is the primary production resource. This knowledge society is powered by innovative capacity. The quality of life in this society can be improved by focusing on better heath, education infrastructure and other social indicators. Not, only this, but effectively utilising knowledge can create comprehensive wealth of the nation too. The main criteria of knowledge society is to be able to create and maintain the knowledge infrastructure develop knowledge workers and enhance their productivity through creation, growth and exploitation of new knowledge. A knowledge society is based on knowledge economy. In this knowl- edge based economy, it is important to understand the way knowledge is spread out, and also to know about the type of knowledge required to accelerate the country's overall growth rates and for this reason, the need-of properly trained knowledge professionals is utmost.

86 10.7 Exercise 1. Discuss the characteristic features of the information society; 2. What is the role of the information professionals in the information society? 10.8 References 1. Chakrabarti, Bhubaneswar—Library and Information Society, World Press. 1993 2. Kent, Allen—Encyclopaedia of Library & Information Science. Mercel Dekker, 1983. 3. Lyon. David—Information Society. 1988 4. Khan, Chakrabarti, Banerjee—Reforming Reference. Mittal. 2004 5. Yojana—Feb. 2006

87 Unit 11 ‰‰‰‰‰ Information : Economic Aspects 11.0 Objectives 11.1 Introduction 11.2 Information : Economics Characteristics 11.3 Costing of information products & services 11.4 Pricing of Information Products & services 11.5 Marketing of Information products & services 11.6 Exercise 11.7 References 11.0 Objectives By reading the unit you will be able to know the quality of information as an economic resource, and also asses its value as a marketable commodity. The qualities of information to be considered as a commodity depends on the costing and pricing techniques of information. The marketing of information, like other consumable commodities consists of various marketing techniques and systems. 11.1 Introduction Libraries produce a set of products that are hard to identify, define and measure. One of the products of the libraries is information, verbal or recorded, which can produce knowledge. Society is becoming dominated by knowledge - dependent occupations, and an emergent need for improving techniques in the field of informa- tion processing is on the rising. In case of information, the degree of its price & Cost depends upon the nature of information, the purpose for which it is obtained, the circumstances under which the need occurs, who is using it, the level of competition or demand for the information, the level or amount of processing required to make it useful, its importance to decision making and decision makers, and the amount of similar information available to users from other competing sources. Marketing of information products and services are all based on these criteria.

88 11.2 Information : economic characteristics Information is termed as "good" in the modern society. The value of information is different for different customers. Some information has entertainment value, some business Value, but regardless of the particular source of value, people are willing to pay for information. Consumers differ greatly in how they value particular informa- tion goods. Information is costly to create and assemble. Information is costly to produce, but cheap to reproduce. Economists say that information is an "experience good" where consumers experience it to value it. Information is an experience good every time its consumed. The distinguishable features of information as an economic resource are : 1) It is shareable not exchangeable, and can be given away and retained at the same time; 2) It is expandable and increases with use; 3) It is compressible, able to be summarised & integrated; 4) It is acquired at a definite measurable cost. 5) It possesses a definite value, depending upon its user. 6) It may vary in value over time in an entirely unpredictable way. 7) It has a consumption rate which may be quantified, 8) It is amenable to the use of cost accounting techniques. Machlup depicted information activities as education, research and development, media of communication, information machinery and information services. His study showed that the national economy consists of the following components-information work force, information goods and services, emergence of information industry and new markets, and information infrastructure. 11.3 Costing of Information Production and Services The study of costs is an important factor in today's commercial world. Be it materialistic good or be/it information, the whole concept of economics is based on this cost analysis. Organizations including libraries determine how much it can pro- duce in response to different demands, and the lowest price at which it can sell its products. Cost in economics means opportunity cost - this is equally applicable in

89 case of libraries. This means the value placed on resources in their best alternative use. Prior to making pricing decisions, one must know costs, and this knowledge can be applied to various library purposes. The value of a service to the customer is realised basing on the costs; whether customers are using a new product or services is known from the cost, whether customers are using a similar type of library in the face of competition - are all known through these costing techniques. Cost data analysis is used to improve the quality of management decision making, to make a proper budget, to compare the different ways to achieve a particular objective & to evaluate employee performance. There are two main types of costs - fixed cost and variable cost. Fixed costs are those costs which do not vary in the short run. They are the costs of the fixed factors. These represent the total expenses that go on when even no output is produced. These are often called sunk or overhead costs and usually include rental, depreciation. maintenance overhead salaries etc. Fixed costs are shown graphically below : Fixed costs Output Variable costs vary with the level of output. They are the costs of those inputs which can be verified even in the short run. As output rises, these costs increase. This cost is represented diagrammatically below : Total cost is the sum of fixed cost and variable cost. TC = FC + VC Total cost is represented diagrammatically to the next page :

90 Average cost is the total cost divided by the number of units produced Average cost = Marginal cost is the addition, or increment, to total cost involved in expanding output by one unit. Direct costs are the costs that can be specifically identified with a project or activity. Indirect costs are those costs that are not readily assignable to a specific project or activity. Cost accounting is a management tool for the library and information profession- als in the day to day control of library and information system. It means the trans- formation of financial accounting data for the process of determining the cost of either manufacturing an article rendering & service or performing & function towards cost reduction & cost effectiveness. Costs can be analysed in a library by the use of heading under which it is allocated for the payment of particular expenses—salaries, books, lighting etc. Costs can be analysed by function too. The main functions are selection and acquisition, organising it for use, making it available and supplying information. Cost effectiveness is the method of fact finding either by the cheapest means of accomplishing the defined objective, or the minimum value from a given expendi- ture. The cost of producing information, display the following features : - (a) Information products have high fixed cost, but low marginal costs. (b) The chief component of the fixed costs for information products are sunk cost, i.e. costs which cannot be recovered if production is stopped. (c) Information products are costly to produce, but cheap to reproduce. (d) Most of the information products bear high cost for the first copy, but the additional copies come cheap. Total cost Output

91 Cost accounting is the process of allocating resources to activities to show the cost of each individual activity. The techniques and results of a cost accounting exercise assists the LIS manager in a variety of activities : a) Specify the cost structure illustrating how the budget is made up, b) Assist in supervision of the efficiency of operations, c) Provide pricing aids allowing for decisions, d) Allow comparison of cost between different information systems. e) Allow new or changed services to be coasted, f) Help review financial performance. g) Assist in preparation of budgets; and h) Assist in re- planning and rebudgeting exercise. 11.4 Pricing of Information Products & Services Price is the exchange value of a product. It is usually expressed at two levels - utility and value. Utility is the genetic property of a product to satisfy the need of a user. Value is the quantitative worth to attain to the library products. To a user, the price of a product is for money paid towards utilities and benefits. The developed information products and services should reach the user of the library through a proper distribution system to value for information product or services. In exchange economy, the value of the product is expresses in terms of price. The product price is that what the user pays in order to get the product or service. There are some objectives of pricing library and information service products and services. These are : a) Surplus maximization or making profits : Profit is one of the main objectives of pricing. The library and information centers may use the principle of profit or surplus maximization, to reach large users with their products ad services with a price that gets an acceptance from users. In case of LIS products, profit is not always the main issue in fixing the price, but products have to be charged at least to meet the minimum cost price. b) Cost Recovery : the libraries should seek a price that would help them to recover a reasonable part of the costs. It should meet the user community interests through its price policy; so before deciding to price a library product or service, a considerable thought should be given to whom it is intended, particularly the user nature, acceptance to price, interest to product etc.

92 c) Market size maximization : The resource available in libraries is made avail- able maximum numbers of users: thereby the market size can be amplified. Pricing policy depends on the policy of the library. So price variations for same products can not be avoided. In public libraries most of the services are offered at free of cost. But the same service may be priced in academic and special libraries. d) Entering new markets : To design and develop LIS products besides the existing roducts, a systematic pricing policy directs, the library whether to go for a new product por not. e) Competition among other library agencies : The price of a product, which is being produced by many libraries should be the same or should not have much variations. The user should not feel adversely to the price variations. There are two categories of factor identified that influence the price of products. Factors within the organization are the internal factors which includes utilities of library and information centers, the features of library and information centres, the features of library products, the stages of product or product life cycle, user status and their interaction with price, and expenses included in developing the library products and services. The external factors are those outside the organization and these are : characteristics of library and information centers, bargaining power of suppliers, bargaining power of library users, library pricing policy, influence of parent organi- zation to which the library is attached, library users attitude and behaviour towards a given product and related legal aspects. Pricing of products is always based on costs involved in the generation of a product or service. The main factos involved in arriving at a pricing decision are : a) the costs involved in the generation of information services and products; b) factors or criteria needed to be considered in arriving at the costs; c) which factors among these are important, and which can be ignored; d) decision regarding whether these information products be given free or charged; e) the category, of clientele who could be rendered free service, or who could be given a charged service. An organization also must proceed through three types of pricing strategies - it should determine the pricing objectives, whether there should be maximum profit; it should determine the pricing strategy–i.e. cost based, demand based or competition based, or else, and also it should determine when and whether implementement a change of price, and if, how to implement it. Cost oriented pricing, is setting prices

93 largely on the basis of costs. This is very important in case of libraries, as here one has to always take into account the client number and variety Often in the past and also sometimes in the present, the libraries charge much less to the patrons than the actual costs incurred. This is mainly due to the non profit nature of the libraries. Cost oriented pricing is popular for a number of reasons - there is less uncertainly of costs than about demand. By basing the price on the cost, the seller simplifies the pricing task, and so there is no need to make frequent adjustments as demand con- ditions change. When all the similar types of libraries use this pricing technique, their prices and so price competition is minimized. Demand oriented pricing looks at the condition of demand rather than the level of costs to set the price. Price discrimination is a particular type of demand oriented pricing, where a particular product is sold at different prices. This discrimination may be on customer basis or product basis or place basis. In case of libraries, customer based discrimination applies when a service is changed negligible or free in case of students, and moderate to all other customers. Product based discrimination is very much applicable in libraries. An important academic journal subscribed on line will be charged highly, where as a common commercial journal will be made available free of cost. Placed based discrimination is also valid. If one renews his/her books from home, instead of personally visiting the library, it may cost him much more than renewing by visiting the library in person. Also mobile circulation system, i.e. bring- ing books at the doorstep of the users will cost much more membership free than personally visiting the library and becoming a member. Competition oriented pricing is described when an organization sets its prices on the basis of what its competitors are charging. According to what it competitors are charging, it may charge the same, at a higher price, or at a lower price. In this case, pricing always depends on that of the other coordinate organizations. In case of public libraries, this may be seem important. But it cannot hold true in case of academic libraries. A common term in case of price analysis is price elasticity of demand. This means the ratio of the percentage change in demand (quantity sold per period) caused by a percentage change in price. So price elasticity of -1 means that sales rises by the same rate as price falls. Again price elasticity of + 1 means sales rise more than price falls. And price elasticity lower than - 1 means sales rise by less than price falls. All of these are expended in terms of percentages.

94 Olaisen (1988) has described five types of pricing models in a non profit organi- zation. These are— i) optimal pricing —where substantial profit is made. ii) pricing according to value—where both profit and loss are allowed. iii) Full cost recovery—where all costs are recovered. iv) marginal cost pricing—where subsidies are needed and, v) Free distribution of information services—where full subsidies and needed. It is for the individual libraries to determine which of these ideal pricing models to be adopted in their organization. Since the library and information centers are being run not to make profits alone, one or more pricing models can be adopted, keeping inirview of their environmental factors at least for their existence, if not for profits. 11.5 Marketing of information products and Services Marketing is a comprehensive term that describes all the processes and interac- tions that result in satisfaction for users and revenue for the organization. The American Marketing Association defines marketing as those activities which direct the flow of goods and service from production to consumption. The term market stands for exchange of goods, demand for products/services, a specific geographic area and an activity. In case of library, it can be safely said that it is in a specific area where an activity of exchange of documents or services between readers and staff takes place for which demand exists. Marketing in library consists of studying the target market's needs, designing and procuring appropriate products and services which may be offered by the library, using effective pricing, communicating and distributing to inform, motivate and serve the users. This marketing concept in libraries like other non profit organizations is a recent one. Library as a facilitating agency takes docu- ments from their producers to the users and renders product service. As a producer of various types of service like translation, CAS, SDI, reprographics, library takes the service products to its users. Information explosion, the technology revolution and escalating library costs are responsible for the libraries to develop a marketing ap- proach. With an increase competition in the world of information, marketing is a factor for survival. Modern library services are based on the following marketing principles :

95 z The libraries must have an active attitude towards the market. It cannot expect users to buy a product simply because it is produced. The management must actively study the market, persuade customers, promote the product and organize distribution. z Marketing is to be given at least as much importance as other basic functions such as administration, production and finance. z The marketing function must be integrated, which means that the various marketing considerations must be taken into account in the decisions of all the managers and officials. A very important part of marketing consists of the various marketing activities. These include market planning, product planning, pricing, promotion and distribution of information products and services. Market planning surveys the environment, chalks out the marketing opportunities and decides the ways to be followed in following those opportunities. Library mar- keters need to identify users and determine their information needs. Demands analy- sis is a very important part of market planning. This is done mainly by obtaining quantitative data on library resource potential and use potential. Market profiling is done to obtain marketing of information. It is necessary to identify the market scope to formulate appropriate policies for a library. It takes into consideration many factors like user affordability, extent of use, repeat customers, user preferences and the staffing pattern of a library. Product planning is another activity which is concerned with developing a prod- uct which can satisfy the customers. In case of library, the librarians have little control over the production of documents But this is applicable in case of library services. A part from the usual services, some other services products like Additions list. Local Documentation list. SDI, tailored services for user satisfaction are the various areas which can be stressed upon. In case of planning a product, the main agenda are who should be the user groups, to whom the information services or products should be targeted what should be the services or products that can be produced and marketed to the different target groups etc. Promotion is the activity that covers all-aids to sales. It stimulates demand and increases sales. Promotion moves the product towards the customers. It involves various mechanisms that inform the target groups about the resources available, services and products offered by the libraries and information centres. For promotion, tools like book fair, user education, sales promotion are very common. But it has to be made certain that the content of communication in each tool should be according to the educational level or information needs of the users. Other important tools are a) advertisement—the purpose of which is to stimulate primary demand and then

96 selective demand of a product. A leaflet describing newspapers and periodicals received in a library can be distributed. Talks in radio and television are important promotional tools. b) displays—Displays of new arrivals, book exhibitions of best, rare, important and local historical collections can be an effective tool. c) Shows—It may consist of documentary film shows on the library and in the library itself. Organizing special events for children on some remarkable occasions, on some special events in important. d) Exhibitions—Long term book exhibitions, exhibits of artists, topical exhibi- tions or centenary exhibitions are promotional tools. e) Book fairs—May be of national; district, state, town level, through which contact between publishers and users can be established through libraries. f) User education—through lectures, with audio visual aids and demonstrations is a primary promotional tool. g) Mobile book exhibitions—through this system, not only does the library reach each and every user at their doorstep, but membership is increased at a large rate. Distribution is the marketing activity which is concerned with distributing the product the publisher to the user, making the product available to the user. The major channels-of distribution concern inter personal delivery, strategic placement, in-house dissemination, local depositories, mass media, mail, telephone and computer net- work. Lastly the major task of creating a market falls under the purview of the libraries. The three ways to create a market comprise of increasing the present volume of sales, walking up a dormant market and also creating a demand that did not exist at all. In conclusion, it can be clearly said that the present concept of marketing of the library has stemmed up from the concept that information is an economic commodity like other commodities, information has a cost and price value and it can be bought and sold. Its importance as an economic resource an as a public good has given it the much needed value in the financial market. 11.6 Exercise 1. Discuss the impedance of information as a commodity. 2. Write a note on the pricing of information products and services.

97 11.7 References and Further Reading 1. Cronin, Blaise ed—The marketing of information library and information services ASL1B 1992. 2. Feather & Sturges—International Encyclopedia of Information & Library Science. Routledge. 1997. 3. Stevenson Smith. G.—Accounting for librarians and other not for profit managers. American Library Association 1983. 98 Unit12 ‰‰‰‰‰ Right to Information 12.0 Objectives 12.1 Introduction 12.2 Right to Information—Issues 12.3 Government and Non Government Information 12.4 Right to Information—Need 12.5 International Efforts 12.6 Libraries and Right to Introduction 12.7 Right to Information Bill, 2005 12.8 Exercise 12.9 References and Further Study 12.0 Objectives Right to Information is an essential human right in the modern society. By reading this unit you will have a sketch of the various issues involved in this Right—the Governmental and non Governmental information, the requirements for the right to information, the ongoing International efforts countrywise & organisation wise to implement this Right, the role of libraries in implementing this Right and lastly the excerpts from the Right to Information Bill, 2005, of India. 12.1 Introduction Information is power in this society. So the right to information is very important, especially in a democratic country. This Right has been visualized as an effective tool against corruption and a major step towards the establishment of transparency in governance. The Right to Information Bill, 2005 is a major step towards achievement of this transparency and the proper running of the Government.

99 12.2 Right to Information—Issues "A popular Government without popular information or the means of acquiring it, is but a prologue to a Farce or a Tragedy or perhaps both. Knowledge will forever govern ignorance, and people who mean to be their own governors, must arm them- selves with the power knowledge gives", remarked the fourth president of the United States, James Madison in "Notes on Virginia." Therefore Right to information is one of the main human rights that protect and develop the human life. The use of this right helps to contribute to solve the many social and cultural problems of the indi- vidual at the national level. More than fifty countries around the world have adopted freedom of information acts, facilitating access to government records. Many other countries like Brazil, the Philippines, Switzerland, Taiwan etc. are moving in that direction. Information of sensitive documents in this process, has been classified into three levels—top secret, secret, or confidential. These are to be kept secret to protect public security. defence, or military matters. In the European Union, the effect of the "sensitive document" classification means that only certain people can process the application for access to those documents and that reference to them can only be recorded in the register or released, with the consent of the originator. In the Euro- pean Union, 38% of applications for access to document are said to be refused because of various exceptions and unspecified exception. Direct access to the con- tents of documents is only given to 45% of them, Including those released after appeals. The number of documents in the register at the end of 2002 was 375. 154 of which 168, 647 was directly accessible-(45%). Users have the right to be free of unreasonable limitations or conditions set by libraries, librarians, system administrators, vendors, network service providers, or others. Users also have a right to information, training and assistance necessary to operate the hardware and software provided by the library. Users have both the right of confidentiality and the fight of privacy. The library upholds these rights by policy, procedure and practice. The Right to Information, like other right is not absolute, and has its limitations. These limited areas are as follows : T) International relations and national security; 2) Law enforcement and prevention of crime; 3) Information, if disclosed, would violate the privacy of an individual; 4) Information, of an economic nature, when disclosed would cover an unfair advantage on someperson, or subject, or government;
100 5) Information which is covered by legal/professional privilege, like communi- cation between a legal advisor and his client, and 6) Information about scientific discoveries and inventions specially in the field of weapons. The Government should identify and specify in clear terms the agencies and areas where secrecy is to be maintained. Specific provisions are needed to be made with regard to : 1. Deciding what is or is not classified; 2. Assuring that people with access to sensitive material are to be trusted; 3. Proper security is to be ensured through instituting rules and procedures; 4. Providing appropriate measures against those who violate the rules. 12.3 Government and Non government Information The Government is the largest producer of information. Any public issue which demands introspection from the citizens should not be kept concealed. The govern- ments' policies with regard to the information it itself generates or collects are very important for all citizens. Important issues in this regard are the adequacy of the Government's own information collection programme, openness of government data, and practices regarding government's publication. Non governmental information concerns both private and organisational information. The various NGOs are produc- ers and publishers of masses of information. Information regarding revenues, statis- tics, commissions reports, records are all very important. There must be statutorycontrol of all these data. 12.4 Right to Information—Need Right to information seeks to combat corraption and improves administrative fuctioning. This Act seeks to end excessive secrecy in governance and strives for an open system with reasonable safeguards and empowers the people in curbing corrup- tion. By opening up the society and giving people access to information, the law seeks to elimiulate delays, redress people's grievances and meet their aspirations and right to prompt service by official agencies and public servants. According to Soli Sorabjee, "lack of transparency was one of the main causes for all pervading corruption and Right to Information leads to openness, accountability and integrity." This right has been recognised as a fundamental human right, inti- mately linked to respect for the inherent dignity of all human beings. This right is

101 important for democracy, accountability and effective participation. The use of this right helps to solve many social and cultural problems of the individual at the na- tional level. The success of democracy depends upon equality of access to a free flow of information, and therefore the need of this Right to Information is much more felt in a democratic country. 12.5 International Efforts The United Nations, the Common Wealth, the Organization of American States and Council of Europe--all these have recognised the fundamental nature of the right to information. In 1946. the UN general Assembly adopted Resolution 59(1) which dealt with the Freedom of information. In 1948, the UN general Assembly adapted the Universal Declaration of Human Rights. Article 19 of this Right states that everyone has the right to freedom of opinion and expression, which includes the freedom to hold opinion's without interference and to seek, receive and impart infor- mation and ideas through any media regardless of frontiers. In 1993. the UN Com- mission on Human Rights established the office of the UN special Reporter on Freedom of opinion and Expression, and Abid Hussain was appointed to the post. In his Annual Report (2000) the UN Special reporter elaborated in detail on the specific content of the right to information. The commonwealth, in 1991, adopted the Harare Commonwealth Declaration, which included fundamental human rights and the individual's right to participate by means of free and democratic processes. In 1999. a commonwealth expert group in London adopted some principles and guidelines on the right to know and freedom of information as a human right, whereby every individual must be permitted to obtain records and information held by the executive, the legislative and the judicial arms of the state. In 1948, the organization of Ameri- can states adopted a seminal human rights declaration. In 1985, the Inter-American Court of Human Rights recognised freedom of information as a fundamental human right. The Council of Europe, an intergovernmental organisation guarantees freedom of expression and information as a fundamental human right in Article 10. Pakistan has promulgated the ordinance on Right to Information in 1997. According to this ordinance, the time for providing information is 21 days. In Nepal, the Press and Publication Right ensures that no news item, article or other reading material is to be censored; no press shall be closed or seized for printing any news item, article or other reading material; the registration of a newspaper or periodical shall not be cancelled merely for publishing a news item, article or other reading material; and every citizen shall have the right to demand and receive information on any matter

102 of public importance, provided that nothing shall compel any person to provide information on any matter about which secrecy is to be maintained by law. Thailand passed the official Information Act in 1997. According to this Act. a person has the right to inspect, obtain copy of information made available for inspection. With regard to request for information, the Act simply provided for a mechanism for request for information, grant for information thereof. The official Information Board is the monitoring and implementing authority. 12.6 Libraries and Right to Information Library services and the right to information are part of the national information policy. Right to information can be implemented through the various libraries, which also act as social and cultural kiosks. They have important responsibilities in safeguarding the public's right to information. Libraries show the path to access information in proper manner. The human right to freedom of expression and free access to Information is the important issue, which librarians must also defend vigorously. IFLA and International publishers Association (IPA) at their 8th meeting held in Glasgow on 22 August 2002, adopted some principles which are: a) Freedom of expression is a fundamental right of the human being, in accor- dance with article 19 of the Universal Declaration of Human Rights and International Convenant on Civil and Political Rights. This is the right of every individual to hold and express opinions, and to seek, impart and receive information. b) The diversity of sources of knowledge and information is an essential prereq- uisite for cultural diversity, creativity, prosperity and the development of societies worldwide. c) Librarians, by providing the access to information play a central role in the development and maintenance of intellectual freedom. d) Global information networks facilitate the exchange of information through- out the world to the benefit of all. IPA and IFLA encourage governments to oppose any attempts to censor or inhibit the publication of, and access to, on-line information. e) The UNESCO agreement on the Importation of Educational, Scientific and Cultural Materials fosters free circulation of educational, scientific and cultural materials and thus facilitates free flow of ideas and plays a central role in the widest possible dissemination of the diverse focus of self-expression in societies. IFLA and IPA encourage the ratification and implementation of both instruments.

103 12.7 Right to Information Bill, 2005 In India, the Right to Information Act was passed in 2005, which came into force on October 12th. The Act seeks to end excessive secrecy in governance and strive for an open system with reasonable safeguards and empower the people in curbing cor- ruption. Public Information Officers have been appointed in all Central Government Ministries and departments simultaneously with the enforcement of the law and a number of State governments, local bodies and organizations substantially funded by the Government have also appointed Public Information Officers to receive applica- tions for information with a fee Of Rs. 10, but for the poor there is no such fee. They can have the information photocopied at the rate of Rs. 2 per page and even electroni- cally in compact discs, video cassettes, audio cassettes, certified samples and dis- kettes, tapes and floppies; or the people can inspect official works, documents and records which are open to public and not secret information. The applicants can take notes of their own. Such information would be provided within 30 days of the application, and if information concerns the life and liberty of a person, such infor- mation will be provided in 48 hours. Failure to give information will be deemed as refused, but if there is genuine reason for refusal of information, reasons for such refusal will be given. Those seeking information could then to the appellate authority. There are quite a few exceptions to this right. These include information, disclo- sure of which would prejudicially affect the sovereignty and integrity of India; the security. Strategic scientific or economic interest of the state; relations with foreign states; or lead to incitement of an offence. Besides, information which has been expressly forbidden to be published by any court of law or tribunal or the disclosure of which may constitute contempt of court. The act jurisdiction extends to the whole of India except the state of Jammu and Kashmir. In this context, it may be mentioned that various India laws have provided for the right to access information in specific contexts. Section 76 of the Indian evidence act (1872), the Factories Act (1948), Section 25(6) of the Water (Prevention and Control of Pollution) Act-1974 the Air (Prevention and Control Pollution) Act-1981, The Envionment (Protection) Act, 1986, The environment (Protection) Rules, 1986 and the environmental Impact Assessment Regulations are some examples. The 'Press Council' Draft (1995), the ''CERC" Draft, the "Shourie Committee" Draft-1997. the Freedom of Information Bill -2000 and State level laws and Orders on, the Right to Information (Goa Right to Information Act-1997, Rajasthan Right to Information Act-2000 Delhi-2001) are created for awareness about freedom to information and expression.

104 The Right to Information Bill is discussed below : The Right to Information Bill, 2005 Arrangement of clauses Chapter I Preliminary Clauses 1. Short title, extent and commencement. 2. Definitions. Chapter II Right to Information and obligations of public authorities 3. Right to information 4. Obligations of Public authorities. 5. Designations of Public Information Officers. 6. Request for obtaining information. 7. Disposal for request. 8. Exemption from disclosure of information. 9. Grounds for rejection to access in certain cases. 10. Severability 11. Third party information. Chapter III The Central Information Commission 12. Constitution of Central Information 13. Terms of office and Conditions of Service 14. Removal of Information Commission or Deputy Information Commissioner. Chapter IV 15. Constitution of State Information Commission. 16. Terms of office and conditions of service. 17. Removal of State Chief Information Commissioner. Or State Information Commissioner. Chapter V Powers and functions of the Information Commissions, Appeals and Penalties. 18. Powers and Functions of Commission.

105 19. Appeal. 20. Penalties. Chapter V Powers and functions of the Information Commissions, Appeals and Penalties. 18. Powers and Functions of Commission. 19. Appeal. 20. Penalties. Chapter VI Miscellanceous 21. Protection of action taken in good faith. 22. Act to have overriding effect. 23. Bar of jurisdiction of costs. 24. Act not to apply to certain organisations. 25. Monitoring and reporting. 26. Central Government to prepare programmes 27. Power to make rules by Central Government. 28. Power to make rules by competent authority. 29. Laying of rules. 30. Power to remove difficulties. 31. Repeal. Some excerpts from this Bill arc as follows : Chapter I This Act may be called the Right to Information Act, 2005. In this Act, "appro- priate Government" means in relation to a public authority which is established, constituted, owned, controlled or substantially financed by funds provided directly or indirectly by the central Government. State Government etc. "Competent authority" means the speaker in House of the People,, or the Legislative Assembly of a State, the chief Justice of India, the Chief Justice of High Court, the President or the Governor . "Information" means any material in an form, including records, docu- ments, memos, emails/opinions, advices, circulars, orders. logbooks, reports, papers, models, data material held in any electronic form and information relating to any private body which can be accessed by a public authority under any other law.

106 Record includes any document, manuscript and file, any microfilm, microfiche and facesimile copy of a document; any reproduction of image or images embodied in such microfilm and any other material produced by a computer or any other device. "Right to information" means the right to information accessible under this Act which is held by the control of any public authority and includes the right to inspection of work, documents, records; taking notes, extracts, or certified copies of documents or record, taking certified samples of material, obtaining information in the form of diskettes, floppies, tapes, video cassettes etc. Chapter II Subject to the provisions of this Act, all citizens shall have the right to informa- tion. Every public authority shall publish within one hundred and twenty days from the enactment of this Act, the particulars of its organisation, functions and duties, details in respect of the information, available to or held by it, reduced in an elec- tronic form, the names, designations and other particulars of the Public Information Officers. Every information shall be disseminated widely and in such form and man- ner which is easily accessible to the public. All materials shall be disseuimated taking into consideration the Cost effectiveness, local language and the most effective method of communication in that local area and the information should be easily accessible. A person, who desires to obtain any information under this Act, shall make a request in writing or through electronic means in English or Hindi in the Official language of the area in which ihe application is being made. An applicant making request for information shall not be required to give any reason for requesting the information. An information shall ordinarily be provided in the form in which it is sought, unless it would disproportionately divert the resources of the public authority, or would be detrimental to the safety of preservation of the record in question. Chapter III The Central Government shall constitute a body to be known as the Central In- formation Commission, which will consist of the chief Information officer, and such number of Central Information, Commissioners not Exceeding ten as may be deemed necessary. These persons shall be persons of eminence in public life with wide knowledge and experience in law, science & 'technology, management, journalism etc. The Chief Information Commission & an Information Commissioner shall not be a Member of Parliament or Member of the Legislature of any state or Union Terri- tory. The Commissioner shall hold office for a term of five years from the date on

107 which he enters upon his office, or till he attains the age of sixty five years, which- ever is earlier, and shall not be eligible for reappointment as such Information Com- missioner. Chapter IV Every State Government shall constitute a body to be known as the ... (nature of the State) Information Commission to exercise the powers conferred on. and to per- form the functions assigned to. it under this Act. The State Information Commis- sioner and the State Information Commissioners shall be appointed by the Governor. All other qualifications and conditions of service under this chapter shall be equiva- lent to that of the Central Information Commissioner, as discussed in Chapter III. Chapter V Under this Chapter are discussed the powers and functions of the Commission and the penalties. It shall be the duty of the Central or State Information Commission to receive and inquire into a complaint from any person who has been refused access to any information requested, who has not been given a response to a request for information or assess to information within the time limits specified under this Act. who has been required to pay an amount of fee which he/she considers unreasonable, who believes that he or she has been given incomplete, misleading or false informa- tion under this Act. Chapter VI Nothing contained in this Act shall apply to the intelligence and security organisations. The Central Information Commission or state Information Commis- sion shall prepare a report under this section and comply with the requirements concerning the furnishing of that information and keeping of records for the purposes of this section. The appropriate Government shall, within eighteen months from the commencement of this Act. compile in its official language, a guide containing such information, in an easily comprehensible form and manner. In a nutshell, this chapter covers rules regarding protection of action taken in good faith, act to have over riding effect, act not to apply to certain organisations, power to make rules by Central Government, power to make rules by competent authority and power to remove difficulties. 12.8 Exercise 1. What is Right to Information? Discuss its relevance in a democratic country. 2. Give a brief outline of the Right to Information Act, 2005.

108 12.9 References and Further Study 1. Byrne Alex — ''Towards a world of free access to information and freedom of expression''—IFLA Journal. 26(4) 2000. 2. Ramesh Babu, B. & Gopalakrishan., S. ed.—information, communication. library & community development. B. R. Publishing 2004.

109 Post-Graducte : Library and Information Science [MLIS] Paper - II Information Source, Systems and Services Modules : 1 - 4

110

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9 UNIT 1 ❏ INFORMATION INSTITUTIONS : GROWTH AND DEVELOPMENT Structure 1.0 Objectives 1.1 Introduction 1.2 Knowledge and Information 1.3 Activities Information Institutions 1.4 Pattern of growth and development 1.5 Types of Information Institutions 1.5.1 Libraries 1.5.2 Documentation Centres 1.5.3 Information Analysis Centres 1.5.4 Data Centres 1.5.5 Referral Centres

and Clearing Houses 1.5.6 Non-traditional Information Organisations 1.6 Indian Scenario 1.7 Institution Building 1.8 Future Scenario 1.9 Summary 1.10 Exercise 1.11 References and Further Reading 1.0 OBJECTIVES Modern libraries are information centres above all. Since the industrial revolution the nature and scope of library services have been profusely changed and extended the growth of information centres and libraries in special subject fields. Whether one calls this change revolutionary or evolutionary hardly matters; what counts is the degree to which such change will affect the library's role as an institution in society. This unit presents you the nature of information institutions and depict their growth pattern. This unit will enable you to identify the different types of information institutions and their specific role in the dissemination of information to individuals, groups as well as institutions who might require information in different forms and formats. You will also have a scenario of the future in the changing context of information. 1.1 INTRODUCTION It is an accepted biological fact that a growing organism alone will survive. Ranganathan's

Fifth Law of Library Science—Library is a growing 'organism'

implies

10 a system concept, 'growing' connotes a living system ever capable of forming new components with an automatic and self-adapting mechanism in a continuously changing environment and the 'Library' can be interpreted as part of the whole, or whole for the part. Indeed the statement envisions a dynamic institutional structure capable of meeting the challenges of modern information demands, caused by a self- propelling, multidimensional growth of information and knowledge. Interestingly, Ranganathan stresses on institutional infrastructure for information as later writers emphasise and confirm. Peter Drucker, for instance, acclaims "during the last fifty years, society in every developed country has become a society of

institutions. Every major task, whether economic performance or health care, education or protection of environment, pursuit of new knowledge or defence, is today being entrusted to

big organisations, designed for purpetuity and managed by their own managements. On the performance of these institutions, the performance of modern society—if not survival of each individual—increasingly depends". These two views imply the role of institutions in modern society. The role is of great significance as the modern society has entered the information age. here the majority of people are engaged in creating, gathering, storage, processing or distribution of information. Thus the modern society has become a society of institutions, entering into the information age. Institutions building assumes special importance and building has, in fact been receiving attention as a subject of study and research in its own right. With this major promise this unit attempts to : (a) describe minutely the growth pattern of institutions for knowledge and information; (b) sketch in some detail the present situation; (c) draw attention on the planned institution building with special reference to third world countries; (d) present a scenario of the future in the changing context of information. 1.2 KNOWLEDGE AND INFORMATION There is difficulty in defining information. Information theory gives us some useful insights into the effects of information; one of the most useful of these is the concept of uncertainty. Uncertainty is almost a source of stress and every little reduction of this uncertainty is always preferable. If you have ever been at a social function of any kind you will note how the occasion starts with maximum uncertainty; the attends are unsure of what to say to each other then as they exchange information the uncertainty and tension gradually relax. At times it is difficult to differentiate knowledge from information. In general usage there would seem to be an ascending staircase from the elementary percept to an observed fact to its expression in a proposition giving information on the observed state of affairs. The observed fact

11 of the cat sitting on the mat becomes information when it becomes communicable to others. Yet, facts on their own do not constitute knowledge. To pursue our trivial example for the moment, a hypothesis about the biological necessity of the sedentary behaviour of cats on mats would brug the observed fact into a set of relationships with other like instances. This would make our singular observation more significant and perhaps contribute to the available sum of knowledge on cat like behaviour. In this way we think of knowledge as theoretical and more generalised and information as potential knowledge. Daniel

Bell observes, "Information is news, facts statistics, reports, legislation, tax- codes, judicial decisions, resolutions and the like

and it is quite obvious that we have had 'explosion' of these not only with the multiplication of organisation but because all countries and the diverse world politics and

the

world-wide economy now come under our daily scrutiny in newspapers and television and in the pages of specialised magazines.

Knowledge is interpretation in context, exegesis, relatedness and conceptualization, the forms of argument. The results of knowledge are theories; the effort to establish relevant relationship or connections between facts, data, and other information in some coherent form and to explain the reasons for these generalisations". Institutions have been established to cope with both knowledge and information. A variety of institutions have sprung up. The development process needs the use and application of them. 1.3 ACTIVITIES OF INFORMATION INSTITUTIONS The process of transfer of information/knowledge is usually seen as a chain of activities, the links being generator, editor, publisher of primary publications, indexing and abstracting, journal producers, libraries, documentation and information centres, on-line services, information companies and the end user. Institutions performing these activities may be broadly grouped into three categories as follows: (a) Knowledge creating institutions, for example, research laboratories, R & D institutions, institutions of higher education and research attached to universities, etc; (b) Knowledge/Information processing and disseminating institutions for example, journal and book publishers, statistical data organisations, S & T data centres and the like; and (c) Institutions that collect, store, process, disseminate and service knowledge/ information recorded in various forms. It may be noted that over the years, there has been an increasing interaction and cooperation between all these institutions. With the application of fast developing

12 technology to information generation, processing, dissemination, distribution and use, many of these functions are getting blended, blurring the link elements of the information chain. At present, however, the different types of institutions mentioned above operate with their distinct identity. Here we are concerned with the second and third groups of institutions. 1.4 PATTERN OF GROWTH Studies on Information institutions growth are scanty. A thorough and useful study has been done by Vincent Giuliano for the consulting firm Arthur D. Little. Giving an historical perspective of the information transfer pattern and the institutional framework, the study discusses three basic modes of information transfer, each corresponding to a different value system. The three modes are as follows : (i) Disciplinary Information Transfer corresponding to the value of pure science, academic and basic research—called Era I (ii) Mission Information Transfer corresponding to the value system of government sponsored missions (like AEC, NASA in the 1960s)—called Era II, and (iii) Problem-Oriented Information Transfer corresponding to the value system of solving societal problem—called Era III The principal characteristics and features of the three Eras are given below : Era I : Disciplinary Information Transfer The basic ethic associated with this Era-I is knowledge for knowledge. The institutions came into being primarily to support education, research and development. Information is generally disseminated through journals, monographs, seminars and meetings usually associated with academic and research institutions, learned societies, professional bodies and the like. Access to primary information is through indexing, abstracting and bibliographical publications. Institutions that facilitate access to documents are largely the academic and other institutional libraries. The user communities are the students, scholars, academicians research workers and others. Financial support to the system is through internal budgetary provisions, grants and government subsidies. These services are free. This traditional system has been continuing for a long time, notwithstanding the strains and stresses now being encountered by the different components of the system such as libraries and journal publishing. Era II : Mission-Oriented Information Transfer The basic ethic behind the development of Era II is to 'organise to do a job. The mission-oriented information systems were developed during the 1950s and through

13 mid 1960s to provide support to agencies like NASA. Here the information transfer process is characterised by a need for coordinating and using knowledge simultaneously from variety of disciplines, as in the case of NASA mission where inputs of information from electronics, biology, medicine, aeronautics, chemistry, physics, etc. are required. Information is disseminated through primary publications like technical reports, besides journals and other traditional publications. Secondary services that provide access to primary information function are through varying degree of interpretative and abstracting tools. The technical information centres that offer these services, being part of the mission agencies, mostly governmental establishments, get their budgetary appropriations. The user communities consist of scientists, engineers and technologies and managers. The feed-back mechanism for controlling the system and using it to determine the needs for information or research are more or less similar to those of Era I, but the flow of information between the two systems has been unequal. While the mission-oriented system drawn heavily from discipline-oriented information system only limited reverse flow is provided through primary journals and some technical reports. During this period, newsletters and trade journals, increasing in importance, have been reflecting that some of STI systems have a major economic value and that market- oriented information transfer mechanism has gained significance. Era-III: Problem-Oriented Information Transfer The basic ethic

that paved the way for establishment of information organisations in Era III is solving 'societal problems'. Problem-oriented information systems

have begun to emerge from the late sixties with growing thrust in the seventies.

Systems that have emerged during this period represent a context in which information is utilised for societal problem-solving such as economic

well-being, environmental protection, agricultural productivity, energy availability use, public health care/safety, and disaster prevention/control. The type and structure of systems that can handle Era III information, providing new products and services, have not yet been properly established, institutionalised or legitimised, but some possibilities are in the offing. Users of the problem-oriented systems involve a variety of groups-elected officials and their staffs, bureaucrats and civil servants, businessman and industrialists, legal professionals and judiciary, scientists, engineers, technologists, consultants, media people and the general public. Information brokers, consultants and intermediaries are the new types of institutions emerging to offer the specialised quality of service. Repackaged information, collected from a variety of sources with validated and authentic data, is the type of specific information service expected. STI infrastructure is historically de-signed for meeting

14 the information needs of scientists and technologists. Expanding the context of information usage to societal problem-solving brings in new problems of interpreting technical results to enable non-technical users to take responsible decisions. Obviously, this type of information is available only at a price. Information industry, a private enterprise and highly market-oriented and taking risks to attend to the needs of consumers, has emerged. Individual-Oriented or Customised Information Service Toni Carbo Bearman, Executive Director of US National Commission on Libraries and Information Science is of the opinion that an Era IV Information Transfer is emerging, in which repackaging of products and services is being designed to meet the needs of individuals whether at home or in business and industry. Delivery of information to home-bound citizens and the packaging of information for the scientists in industry are just two examples of these services. Fee-based information services began to emerge. The most striking and significant development of information institutions in the 1970s and 1980s has been the growth of information industries. They are also known as Fee-based Information Services, Information On-demand Companies, Information Consultants Information Brokers, Intermediaries and the like. They sprang up in countries like the United States of America, U.K., France, Germany, the Netherlands, Austria, Spain, Belgium, Switzerland and Yugoslavia. While the major organisations such as PREDICASTS, Arthur Little Co. Inc., Lockheed Information Services, Bibliographic Retrieval Service, New York Times Information Banks, etc. have been operating for a long time, many of the smaller set-up having flourished from the late seventies and grown in the eighties. The large firms are founded by people with background in journalism, law, business administration, etc. and are generally staffed by subject specialists. The medium sized firms are run by information specialists with background in library automation, information retrieval, system design and analysis, etc. The small commercial services are staffed by information specialists with or without advanced degrees in subject fields. 1.5 TYPES OF INFORMATION INSTITUTIONS Amongst the different categories of information institutions the most popular ones are : Libraries, Documentation Centres, Information Analysis Centres, Data Centres,
and others. Barring these traditional institutions many non-traditional (
deinstitutionalised) information services have ensured lately. Some of the important types of information institutions are described below :
15 1.5.1 Libraries Since the invention of printing from movable type in the middle of the fifteenth century, and more especially since the development of scientific periodical some 200 years later, formal channels of professional communication have been heavily based on printed documents. We tend to take this medium completely for granted. But can we necessarily assume that print on paper will always be the major vehicle for formal communication in science and other professional fields ? Will paper be as important in the information systems of the twenty first century ? Almost certainly not. The experts who are predicting the demise of books and libraries have prominent credentials. Prominent among those who are predicting an end of books and libraries are : F. W. Lancaster and Vincent E. Giuliano. Landau described a "library in a desk". Moreover, the system of Bush, Licklider and Landau assume that the user will have, literally at his fingertips, access to a large personal library and/or to a wide range of external bibliographic resources. Libraries have undergone a major change in modern times. The history of progress in librarianship has been a story of successful integration of new technologies and new means of communication into existing programmes and services. Librarians have welcomed innovation and have, if anything, been sometimes overeager in the embrace of the new. Online catalogues are demonstrably superior to card and microform catalogues. Networked indexing and abstracting services are superior to their print forerunners. It goes without saying that modern libraries should have electronic circulation systems, acquisitions and serial control systems and should provide access to the world of digitized data and facts of all kinds—numeric, bibliographic, image- based and textual. Looked at objectively, the relative roles of electronic communication and non- electronic communication become dear. Electronic methods are best for "house keeping" and for giving access to data and small, discrete packets of textual, numeric and visual information. People of the future will know only that which we preserve. This is a weighty responsibility and one that should be in the minds of all librarians. We do not advocate clinging to old therego because they are old, nor do we advocate clinging to old things because they are old nor do we advocate discarding old things because they are old. The library of tomorrow must be one that retains not only the best of the past but also a sense of the history of libraries and of human communication. Without that, the library will be purely reactive, a thing of the moment, sometimes useful and sometimes not but never central to human society. In summing up we describe thus—from oral narrative to the invention of writing : from myths, legends, stories and histories literally etched in stone, through medieval manuscripts to the printing press; from private communications between

16 individuals, through mass media broadcasting, to electronic telecommunications and information dissemination across networks of networks interconnected globally if not yet galactically : technological advancements have progressively enabled the spread of the word and words—the communication of human thought—ever more effectively from private to public through libraries. We live in an ahistorical age. The little that is known about the past is not used to inform the actions of the present. The library of tomorrow must be one that retains not only the best of the past but also a sense of the history of libraries and of human communication. With a sense of history and the knowledge of enduring values and the continuity of our mission, the library can never be destroyed. Along with this sense of time future being contained in time present, there must be the acceptance of the challenge of innovation. It is neither the easiest of prescriptions nor the most fashionable, but libraries have to combine the past and the future in a rational and unsentimetal manner. 1.5.2 Documentation Centres

Documentation activities of a country are very much interlinked with the research and developmental efforts of the country. Documentation centres are concerned with the dissemination of documentary information.

Thus

among the varied forms of organisation for collection and dissemination of information, documentation centres are quite important. Traditionally, libraries have been pursuing the basic function of collecting every kind of publications and holding them in readiness for use. After World War II, the impetus for provision of documentation

and information services to specialist users has arisen, mainly due to

exponential growth and complexities of information sources. Need began to be felt for analysing the contents of the holdings of libraries in finer

details; whereas libraries of traditional type have not been undertaking such a task. The traditional library tools have become progressively less effective as the volume of materials grows and the requirements of individuals become more specialised. In a library, where the service is in terms of documents, those documents can be organised on the shelves in a linear manner along some logical sequence by means of appropriate notation, because each document is by itself a physical entity. But when the items of information contained in the documents are to be handled and served, no such straight-forward arrangement is possible, because the bits of information are by themselves no physical entities and are scattered in various sources. A different approach is called for in handling and serving the scattered items

of information. Specialist libraries began to build up facilities for meeting the changing needs of scholarly clientele for intensive services. Later in time, documentation centres began to emerge towards the same

prupose.

17

Nowadays, the term 'information centre' is commonly used, even though in a broad sense documentation centre and information centre may mean one and the samething.

In general, a documentation centre brings to the attention of the

specialist users current

and recent

literature of value to them,

sieves through information sources and indicates pinpointedly or with high precision the right kind of information, makes an exhaustive search of literature resources so as not to miss worthwhile information, and provides documentation and information services on demand and in anticipation.

However, the functions that are assigned would vary from one documentation centre to

the other.

A local documentation centre has the sole function of providing information services for supporting the programmes and activities of its

own institution.

The documentation centres at local levels and which

are attached to individual R & D institutions business houses, industrial enterprises, etc. are established and administerd by their parent institution. At the national level, it might be the responsibility of the appropriate government agency to establish and administer the national documentation/information

centres.

There are varying patterns of organisation of documentation and information systems in different countries. In the past, examples of USA for decentralised structure,

of USSR for centralised structure and of UK for a mixture of both the above,

used to be mentioned. At present, the network concept is gaining currency. The trend is now

to pool the resources, facilities and expertise of various information centres, for achieving maximum economy and productivity. 1.5.3 Information Analysis Centres With the enormous growth of the primary scientific literature, the individual scientist or engineer is faced with the problem of its retrieval and evaluation, as most of the information remains hidden in published documents. Much information published in primary journals never catches the eye of the information seeker similar is the case with a abstract journal. Their number and size have increased. Moreover, scientific research is fragmenting into narrowing specializationand is becoming more and more interdisciplinary in nature. The time lag between the primary publications and abstracts aggravates the problem further. In a day-to-day working situation, the need for the reliable numerical values for physical properties continually arises. A potentially useful tool for the transfer of scientific and technical information exists in the information analysis centre. Such centres, as discussed in Weinberg Report, usually serving specific fields in which large amount of data exist and require critical evaluation, consist of one or more active specialists who (a) systematically collect, index and store information in a field, (b) analyse and evaluate this information and (c) make it available in a form and language keyed to the needs of specific groups of users. The potential benefits of MLIS (P 4 & 5, Eng)—2

18 an information analysis centre can be put as—'the specialised centre acts as the retailer of information'.

An information analysis centre (IAC) has been defined as 'an organization which indexes, abstracts, translates, reviews, synthesizes, and evaluates

information and/ or data in

a clearly defined specialized field or pertaining to a specific mission,

to provide definite users' groups with digested, repackaged or otherwise, organized pertinent information available in a useful convenient form, "relieving the user from the ardous task of mining the sand of literaure for the new grains of gold". The functions, products and services of IAC vary with needs of its user population.

The key activities are analysis, interpretation, synthesis, evaluation and repackaging of information

carried out by subject specialists, resulting in the production of

new evaluated information—in the form of critical reviews,

critical compilation of data, correlation of data, etc. 1.5.4 Data Centres

The modern society needs data for planning and development activity in every sphere, namely, policy making as well as in formulating plan of action.

Data are collected from studies involving observation and surveys. In such form, the data are called 'raw data'. Raw data are not usable for decision making. These become usable after certain manipulations involving organisation and synthesis.

There are different types of data such as Scientific data, Technical data, Techno-economic data,

Socio-demo- graphic data.

Data collected from different sources by different methods need to be stored and made available to those who need it. For this purpose, proper institutional mechanisms have been developed. These are known as

Data Centres.

Unesco defines data centre as

an organisation handling quantitative numerical data. Such centres take

the

primary function of collecting, organising and disseminating data (mainly numerical) and also provide a measurement service and be in a position to advance relevant measurement techniques.

The term data centre is used interchangeably to define a range of Information

Centres, not all which are critically evaluating data. Data centres vary both in size and

in scope. The scheme which will meet the initial aim of every Data Centre is to make available to the users a potential data obtained from various sources.

The Data Centre includes three main components : 1. An organized data collection : the data base; 2. A connection with the

data sources which feed the database; and 3. A contact with users who are expected to interact with the

database with questions.

Many data centres
have been established in India under the NISS AT programme. It may be noted in passing data centre and data banks are dissimilar only regarding
19 the subjects they deal and type of data they handle. Data Centres handle only numerical data and mostly for the science and technology dealing with physical and chemical properties. Data banks are multidisciplinary and handle all types of data particularly administrative, statistical, techno-economic, census and survey, and management that are produced by various institutions. Data Centre handles data themselves or literature about data whereas data bank handles only data. 1.5.5 Referral Centres and Clearing Houses Referral Centres may be described as the "information desk" of the scientific and technical community. It does not provide technical details in answer to queries or furnish bibliographic assistance. It does not supply data or documents. It
directs enquirers to an appropriate source for the information or data required.
Referral may be to libraries and documentation centres, or to appropriate agencies and individuals.
To achieve this a referral centre has certain basic tasks to perform. These are: (i) to inventory all significant information resources in different disciplines; (
ii) to
compile and publish directories of information resources; (iii) to analyse the operating relationships that exist in the information complex
of various disciplines. Clearing Houses The dictionary definition of
a clearing house is
a central agency for collection, classification, and distribution, specially of information.
The definition would encompass all information centres and most special and conventional libraries.
In the parlance of information scientists a clearing house is a relatively new word. For our purpose it is a depository of or documents with the additional mission of serving as a central agency for collection, classification, and
distribution of information. It also includes such functions as collecting and maintaining records of research and development
in the planning stage, in progress
and completion.
Sometimes, substantive questions about items in these records are referred to the source, and thus a clearing house may act as a referral centre also. The Smithsonian Institute's Science Information Exchange serves as a clearing house of research in progress; the National Technical Information Service combines the functions of a document centre with those of a clearing house; and a referral centre;
the National Referral Centre of the Library of Congress provides referral to experts within the field of
an inquiry, it does not supply data or documents.
For a number of years British Library Lending Division (BLLD) functioned as a Referral centre. Most of the clearing houses have
specialists and
well developed collections. They have information gathering network to acquire documents in their subject
area.

20 1.5.6 Non-traditional Information Organisations We have given you some ideas about the range of information institutions which have been set up for meeting the information needs of the society. The 'library' as a formed concept remains a constant; in its actuality it is protean; everchanging, versatile, regularly taking on new forms in response to everchanging needs. However, no matter how flexible and adaptive it may be, the 'library' only exists as a library in the fullest sense when it is being used in accordance with its primary purpose and the capability that society designs into it. This traditional storehouse of knowledge has been caught in the successful integration of new technologies and new means of communication. While accepting that change will come continuously, it is imperative to preserve the basis of institutionalised service by accommodating the key aspects of the overall service. However, information service is no longer limited to traditiional libraries and information centres. During the last few decades several phenomena have been developed—Information Broker, Invisible College, Information Filters and so on. 1.5.6.1 Information Broker Information broker is in business for profit. It may be an individual or a firm. It uses a variety of sources including libraries and information centres to get answers for the client's requests. In developed countries including USA there are a number of brokerage firms in operation. 1.5.6.2 Invisible College It is now well established that there exists, in any scientific community, a personal network of professionals, related through similar research interests, institutional ties, or former associations, who maintain a close association by informing each other of on going and planned research, asking for criticism of draft papers or reports, discussing current work in correspondence or at conferences, and possibly collaborating on various joint projects. The "invisible college", as described, for example, by D. Crane (Invisible Colleges : Diffusion of knowledge in scientific communities. Chicago, University of Chicago Press, 1972), is a personal network that tends to comprise an elite, influential, and cohesive group of workers engaged in research at the forefront of their field. The invisible colleges are extremely effective information networks, but participation is largely restricted to those who are leaders in a field. According to D. J. de Solla Price, "There now exist dozens of what we call invisible colleges, each consisting of the few hundred persons who make up the international body of real leaders in their subjects. They are power groups, albeit often unwittingly,

21 and the more power they have the more they gain." Then aim, to spread the good word with the minimum of delay, is entirely laudable, and of course as the most prominent workers in their various fields they do generate much of the significant new information. 1.5.6.3 Information Filters The concept is concerned with personalised information delivery. Filters are third parties to the communication between users and sources. They should possess both the knowledge and the functionality to critically examine the information in the sources and forward the information they 'judge' as relevant to users. They are addressed only for a specific and relatively narrow class of users and sources. This is a new type of information service for which manual as well as automatic techniques can be used. 1.6 INDIAN SCENARIO After independence for developing infra-structural facilities the government has been taking initiative in the organisation of effective information system and services. This led to the development of Libraries and Information institutions throughout the country. We have discussed in unit 1.3 the three eras in the pattern of growth of information institutions. That framework is reflected in Indian context. Institutions such as Libraries, Documentation and Information centres academic and professional levels, R & D institutions and laboratories, government agencies and quite a few public and private sector undertaking have been set up. Initially, all these institutions functioned in isolation. Later the situaiton has changed and there have been established linkages within some categories of institutions. In Era II during 1950s and 1960s missio-oriented organisations like Atomic Energy Commission, Indian Space Research Organisation, Electronic Commission, and some came into being.

Council of Scientific and Industrial Research, Indian Council of Agricultural Research, Indian Council of Medical Research, Defence Research & Development Organisation

may also come under this group. In Era III that is, from the 1970s Institutions like Small Enterprises National Documentation Centre, Documentation attached to National Health and Family Welfare that is, National Institute of Health & Family Welfare (NIH & FW) and a few others are problem solving type of institutions. Most of CSIR organisations on Food, Leather, Drugs, etc. began as problem oriented research. They required specialised information to support their research activities which led to specialised information centres. In Public sector Central Machine Tool Institute, Steel Authority of India Ltd. (SAIL), BHEL and in private sector Tata Energy Research Institute, Bharat Electronic and others developed their information units to meet their technical information needs.

22 In 1980s the government started encouraging the modernisation of the information systems using modern technologies. As a result, National Information System for Science and Technology, Environmental Information System, Bio-Technology Information System, etc. were taken into consideration. Networking and resources sharing activities are pursued in the development of information services. Projects such as Library and Information Network, Delhi Library Network, Bombay Library Network, Calcutta Library Network, have been taken up to develop in phases. 1.7 INSTITUTION BUILDING "The strategies and approaches for institution building vary from country to country in accordance with their respective environments, requirements, priorities and the level of existing institutions. An institution should have set goals, objectives and criteria for priorities. It should have challenges and opportunities, carefully conceived roles, well defined tasks and clear sense of purpose. Its programmes should be symbolic of what stands for and its role in society, infused with societal values. It has a purpose, function and ability to service and serve clientele relevant to needs, and environment. (Y. Nayudamma). The effectiveness of these institutions may be judged by their contacts with users and their information needs in different contexts and contributing in full measure to the decision-making processes for economic, industrial and social development. All types of institutions irrespective of subjects affiliation and activities contribute to the development process. But the development itself is a complex process; a continuous and transdisciplinary one, requiring multi-pronged tesk forces, cutting across vertical and horizontal structure, to achieve desired results. A concerted and coordinated exdeavour is needed to build proper structures by government, industry, STSI institutions. This calls for a network of institutions allowing organised information flow from top to bottom and between coordinated and collateral levels. Western models available to the third World countries must be examined in the context of the requirements of countries concerned and adopted or adapted only if they could ensure results. Information institution building is a complex process involving men, materials, machinery and money and will have to be managed effectively for obtaining optimum results. Clear perspective and farsightedness, determining appropriate goals and objectives, fixing targets for outputs, careful planning with guidelines of policies, criteria for priorities and dfficient execution, organisation and management—all these are essential elements in institution building.

23 1.8 FUTURE SCENARIO The shape of things to come in the twentyfirst century has been predicted by a number of writers of the industrially advanced countries. Alvin Toffler, for example, observes that the info-society of the future will commence a new civilization which will restructure education, redefine scientific research and completely reorganise the media of communication. The Third Wave civilization will rest on intensive, de-massified media, feeding extremely diverse and often highly personalised imagery into and out of mid-stream of the society. (Toffler) He sees deinstitutionalisation, in this third wave civilization which will be characteristic of individualistic services. He predicts total change from the present industrial society, institution building getting a back seat. Daniel Bell does not envisage deinstitutionalisation in his post-industrial society. Communication and knowledge being the strategic resource and transforming agents of the post-industrial society, will pose economic-political problems, one structural and the other intellectual the structral problem will raise the issue of centralisation versus decentralisation what kind of techno-organisation is best designed to be efficient, meet consumer use-industrial, commercial, financial, scientific, library and information-and remain flexible enough to allow for continuing technological development. This has always been a controversial issue and may continue to be so. In fact, political organisational pattern may set the tune for the type of other organisations. The second policy problem is intellectual which is concerned with information policy, particularly the dissemination of scientific and technical information. Lancaster predicts disembodiment of the library in paperless society. The new institution for information will be consultancy organisation, equipped with machines of various kinds, connected to remote data bases and banks on-line and offer consumer-oriented services based on needs. The Variation in the institution will be in the nature of services they offer and their scale of operations. More networks, consortia and systems may be conceived. In India the impact of information technology is felt in the field of mass communication. How our institutions disseminating information will shape will largely depend on professional initiatives. It is not just moving into the machine age, but putting knowledge and information to work. 1.9 SUMMARY This unit presents an overview of importance of institutions in modern society. It stresses the significance of Information Institutions to the present society, a

24 historical bespectacled of the growth and development of Information Institutions with special reference to India. It has highlighted the inportance of non-traditional Information Institutions. This unit has discussed the Indian Scenario stressing growth pattern of Information Institutions. Institution building is a highly complex process. The Institution should set goals, objectives and criteria for fixing priorities. It glimpses the shape of things to come in the twenty first century. Developed countries have set their own models. India has felt the impact of information technology in different fields specially in communication. It is the duty of the information professionals in India to set the country in the pursuit of innovations to remodel our Information Institutions. 1.10 EXERCISE 1. Discuss the type of Information Institutions. 2. State the functions of Referral Centre. 3. How would you organise a Data Centre? 4. Describe the growth and development of Information Institutions in India. 5. 'Information Institution building is a complex process'—Discuss. 1.11 REFERENCES AND FURTHER READING 1. Bell, Daniel: "Social framework of the Information Society". In The computer Age : A Twenty Year View, ed. by Dertouzos, M. L. and Moses, J. M I T Press, 1979 pp 163-211. 2. Guilliano, V. E. and others. Into the Information Age : a perspective for federal action on information. ALA, 1978. 3. Lawcaster F. W. : Science, scholarship and Communication of knowledge. Library Trends 1979, 27(3), 367-388. 4. McGarry K. J : Changing context of information : An introductory analysis. Clive Bingley, 1981. 5. Nayudamma, Y : Science and technology patterns of institution building. Society and science 1980, 3(4), 137-138, 141. 6. Rajagopalan, T. S. and Rajan, T. N.: Information Institutions pattern of growth and development with a perspective of future. In Rajagopalan, T. S. ed., Rauganathan's philosophy : assessment, impact and relevance. Vikas, pp 64-75. 7. Toffler, A : The Third Wave. Newyork, Morrow, 1980. p 462.

25 UNIT 2 ❏ INFORMATION CENTRES Structure 2.0 Objectives 2.1 Introduction 2.2 Definition 2.3 Need for Information Centres 2.3.1 Objectives of Parent Institution 2.3.2 Expressed or Established User Need 2.3.3 Problem Areas 2.3.4 Proliferation of Literature on the Subject 2.4 Types of Information Centres 2.5 Organisation of Information Centres 2.6 Services of Information Centres 2.7 Planning an Information Centre 2.8 Examples of Information Centres 2.8.1 International 2.8.2 National 2.9 Summary 2.10 Exercise 2.11 References and Further Reading 2.0 OBJECTIVES An information centre is an agency that provides right information to the right person in a usable form and on time. This unit will give you an understanding of (a) the role of information centre (b) the need for information centre (c) the types of information centre (d) planning of information centre (e) services of information centre (f) national and international information centres 2.1 INTRODUCTION The operation of a special library or information centre takes place in a highly campetitive environment. It is one of the characteristics of organisational dynamics that resources rarely if ever approach the level of demand for them. If librarians are to retain their share, or perhaps do a little better than that, they must understand the dynamics of the organisation in which their competition for funds takes place.

26 There are no cut and dried rules as to the best placement of the information centre. Factors such as perceptions, personality and the interest can have more influence than the rank and status of the individual to whom you report. The information centre should try to clearly define its role and how it fits into the parent organisation. Special libraries or information centres within a business or company are very different than other types of libraries. Special libraries share some common traits. In his book H. White identifies the sigificat characteristics of special libraries and information centres : emphasis on providing information nontraditional setting a limited body of users limited subject scope small collections the need to establish usefulness relationship to organizational mission management that is not library oriented the impact of organizational policies working under time pressure libraries that take on user's burden specialised and internal materials restricted access entrepreneurial activities The information exists to support and enhance the mission of the organization in which it is housed. In information centre the emphasis is on the provision of information contained in the documents, rather than the documents themselves.

In 1946 John Crerar Library of Chicago laid the foundation of information centre. This library used to offer the industry various kinds of information services from newly formed department Research Information Service. It is worth to note that specialist libraries began to build up facilities for meeting the changing needs of scholarly clientele for intensive services. Later in time, documentation centres,

either in supra or juxta or infra position to their companion libraries, began to emerge towards the same purpose. Nowadays, the term 'information centre' is more commonly used, ever though in a broad sense documentation centre and information centre may mean the one and the same thing. The distinction is somewhat artificial. Strictly speaking, information centres ought to undertake information and supply evaluated data and information, whereas documentation centres may be satisfied with the function of contents analysis of documentary sources towards pointing out to the existence of raw information.

27 2.2 DEFINITION Information services

units

in organizations have been usually referred to as Information Centres or

Information

Departments. The emphasis in the case of these centres is towards provision of information contained in the documents, rather than the documents themselves

which is the main consideration of the traditional libraries. Some, however, have referred to the information centres as 'Specialist Libraries' since the emphasis was on a collection of nascent micro-documents with service to specialist readers. The functions, products, and services of information centres vary in detail, depending on the informational requirements of the user population, but are, on the whole, similar. The general sequence of operations and possible products/services is given below: ? Activities Services/Products Selection and Collection of documents Bibliographies, Current Awareness Services Indexing & Abstracting Indexed bibliographies, Abstracting Bul- letins, Custom Searches Extraction Digests, Extracts; Descriptive Reviews/ state-of-the-art report, Trend Report, compilations (unevaluated) Evaluation Critical Review of Area, critical compi- lation of Data, criteria for Experimentation, Recommendations, Solutions to (immediate) problems, Correlation of Data, Prediction of properties In the above diagramatic representation of

activities and products, the amount of intellectual activity involved in the preparation of products

increases as one proceeds from bibliography to data correlation. It may also

be noted that each activity and product forms the input for subsequent activities and products. While the activities of selection, collection

constitute the domain of traditional libraries which are document oriented, activities of indexing, abstracting, and extraction in addition to selection and collection, are common to information centres in general. But, the evaluative acitivity is the exclusive domain of of 'Information Analysis Centres—now redesignated as 'Information Consolidation Units.'

28 2.3 NEED FOR INFORMATION CENTRES Generally, Information Centres began as 'Unplanned' libraries through accumulation of books, periodicals and other records. Over a period of time they grew and became unmanageable and unproductive. It was at this time that the people concerned tended to look seriously for the establishment of a formal mechanism which would take care of the growing collection so that it could generate the needed information services to the clientele. Some of causes indicative of the need for the establishment of an Information Centre are as follows : Perception that funds were being wasted in the purchase of multiple copies of books and periodicals because of lack of centralization and control. Large and extensive collection of materials scattered in offices or store rooms. When they took up considerable and still did not yield the desired item when it is demanded. A flood of mail announcing new publications, information services and databases that nobody had time or inclination to screen to determine those of interest. An awareness by organizational professionals, from contact with others by professional gatherings, that they were not keeping with their development in their fields. This was particularly unsettling for researchers, but it was also disturbing for business executives if they suspected that there were things others knew and they did not. Professionals (or organisations) were spending a great deal of time in the attempt to track down needed information, including trips to other libraries and information centres. An important decision had to be delayed because needed information was not found out. Evidence of duplicated effort, with a resulting waste of time and money, because the results of earlier work were not known properly. Another fact is that the present day Information Centres have largely been due to the interest and effort of numerous sponsoring agencies belonging to both the private and public sectors. Thus a need has arisen for justifying the establishment of new Information Centres to the satisfaction of sponsoring agencies. In other cases, the parent organisations needed to be convinced for the establishment of Information Centres as units of their organisations. Justification for establishment of Information Centres can also be discussed in relation to : (a) Objectives of the parent institution; (b) Expressed or established user need; (c) problem area; (d) Elaboration of the subject to be covered; and (e) Proliferation of literature

29 2.3.1 Objectives of Parent Institution Study of the existing operating Information Centres reveals that almost all of them— whether they be discipline-oriented, mission-oriented or census bureau type—are, generally located in one parent institution they may be sponsored by and supported by other organisations. Further the activities of the Information Centres seem to be in conformity with the objectives of the respective parent institutions. So it would be quite in the fitness of things to assume that the institutions and their users having realised the importance and value of information for their activities have established the respective Information Centres. 2.3.2 Expressed or Established User Need The need for an Information Centre in a particular field would become obvious if we examine the features of the World of Information. Features are : (a) accelerated growth of information, increasing rate of obsolescence, (b) wide variation in quality and reliability, (c) Interdisciplinary nature of information; scatter/seepage of information (d) wide range of standards and modes of presentation of idea, (e) pertinent information published in documents with restricted circulation, (f) multiplicity of languages, (g) too many documents. Information Centres have limited funds and space. The overabundance of information has made many a research scientist to create new information rather than search through existing documents. Recognising the need for information, many information systems systematically identify, collect, store and disseminate information to the users and their needs. This is largely because information presented is not oriented or structured according their specific needs. 2.3.3 Problem Areas In some of the problem areas like Biodeterioration, Pollution, Nuclear. Safety, and the like where existing knowledge and experience are scattered over several disciplines and where the literature/information is spread over a variety of sources, it becomes problematic for researches, policy-makers and managers to have access to information. In other words, the inter-disciplinary nature of information in such problem areas poses difficulties requiring the establishment of Information Centres. 2.3.4 Proliferation of Literature on the Subject Some of the factors which have influenced the character and increased the current pace of scientific and technological activities are as follows : (i) Exponential growth of publications, (ii) Rapid fragmentation of knowledge; (iii) Interdisciplinary nature of scientific research (iv) Increasingly effective technological capabilities;

30 The information explosion coupled with information "pollution" has created problems to users needing information. This applies especially to new, peripheral and interdisciplinary fields. One of the solutions of overcoming these hardly is to set up an Information Centre whose task will be to organise, coordinate and institutionalise the information compression and evaluation activities in the subject field concerned. 2.4 TYPES OF INFORMATION CENTRES (IC) Information Centres can be classified in many types. Let us have a brief discription of various types : By Level of Service (a) Local IC serving a well-defined, comparatively small clientele (b) State or Regional IC serving a less well-defined or less homogeneous, but comparatively a larger clientele e.g. SAARC Documentation Centre, (c) National Information Centre serving an even more heterogeneous, but comparatively much larger clientele, e.g. NISCAIR (National Institute of Science Communication and Information Resources) By Range of Subject-Coverage (a) Information service covering fairly well-defined homogeneous subject or group of subjects with a comparatively small seepage of information—e.g. Food technology, Leather technology. (b) Information service covering a fainy well-defined homogeneous subject or group of subjects with a comparatively greater seepage of information, e.g. Instrumentation, Production Engineering, Agriculture. (e) Information service covering a wide range of subject, e.g. Physical Sciences, Medical Sciences, Behavioural Sciences. By Orientation of Service in terms of Clientele (a) Research and Development Personnel (b) Research personnel, production and Industrial personnel (c) Government (d) Public (e) Combination of (a) to (d) By Variety of
Services Provided (a) Current Awareness Services
31 (b) Abstracting and Digest Services (c) Product Information Service (d) Data Bank,
etc. By Type of Material (a) Patents (b) Standards (c) Engineering Drawings (d) Audio-Visual material By Sponsorship (a) Government—Central, State, etc. (b) Semi-Government (c) Autonomous body (d) Private (e) International, etc. 2.5 ORGANISATION OF INFORMATION CENTRES The different patterns of organisation of Information Centres depend on the volume of information handled, level Information Centres and status of the Information Centres within an organisation and the type of users to be served. Local level Information Centres are attached to parent institutions which organise and administer the centres.
At the national level it is the responsibility of the appropriate government agencies to organise and administer the centres. The work of Information centres may be organised on a functional basis and their operations may be organised into three areas of activity. 2.5.1 Areas of Activity 1. Management and Administrative Services : These include developing and implementing policies and standards consistent with an organisation's objectives. 2. Internal Operating Services : The selection of materials viz. books, periodicals, reports, patents, conference proceedings should reflect the suggestion of users and specialists of the Information centres. Classification, Cataloguing, indexing operations are professional jobs and should be done by specialist staff. Analysis, synthesis and summerisation of information by literature search are important areas of internal operation. 3. External Users Services The chief service is circulation. Information Centre staff should cautiously circulate

32 the documents to the authorised clienteles. The Information Centres provide many more services to the external users. 2.6 SERVICES OF INFORMATION CENTRES The IC cannot offer unlimited services. It must select and prioritize which service and level of service that it will offer to user groups. The Information Centre has three basic functions : Acquisition Organisation and dissemination 1. Traditional user services : can vary, based on the organization's needs, but core services that every information centre generally provides at a minimum level are : interlibrary loan/document delivery reference and on-line database searching (if feasible) photocopying current awareness services These services are not very cutting edge, but they have become traditional for a reason, there is a need. Acquisitions, serials control, circulation management, indexing and inventory control, are generally considered to be 'technical' services rather than user services. 2. Reference and online database searching : The most requested service of the information centre will be probably be information retrieval. In his book E. Mount notes that "One of the distinguishing characteristics of special libraries/information centres is their readiness and skills in locating information for their uses, often under difficult circumstances. A retrieval service tends to consist of a wide variety of research or reference questions which range from a quick answer to long, drawn out literature searches or projects which can last for months. Mount describes various types of retrieval services: quick answer— can be answered with a single fact longer searches— require more than a few facts; require several hours or days. Literature surveys— more comprehensive and exhaustive in coverage of a subject topic and will take weeks. Identification of citations— verify incomplete bibliographic information. Interlibrary loans— obtain items not held in the collection. A variety of resources can be used to answer the information requests, including print sources, such as reference books, electronic resources such as an index on CD-ROM; the information centre's on-line catalogue (if it is available), on-line

33 resources, including the Internet and on-line database and of course, using the phone. The most critical step of the information retrieval process is what is known as the reference interview. How the information specialist will find the answer is not as important as having a clean understanding of the request. What is the purpose of the information? Understanding why the information is needed can be helpful to the information specialist in determining where to look. A trained information specialist knows how to determine the 'real question.' The information specialist can discuss the request and suggest that the user limits or broadens the search better to suit his/ her needs. G.T. Griffin suggests some basic questions : What is the geographic scope of the inquiry? What time period is appropriate? What is the budget for this project/request? What is the deadline for this inquiry? A request may involve checking a variety of resources or the answer may be found easily in a reference book. The information specialist needs to be familiar with what resources are available and what would be the most efficient and cost effective way to retrieve the information. Know your print and electronic collection and the scope of your database access. 3. Delivery of information : The information can be delivered in person or via interoffice mail. A facsimile machine is an important delivery tool and should be accessible. Electronic mail is becoming a very popular way to deliver information. 4. Document retrieval: The information specialist will be asked to obtain copies of documents, articles and books for users. The information centre will need a means of obtaining copies of documents if the information cannot be accessed in a full text source internally. 5. Current Awareness : The information centre should devote significant efforts to current awareness service. In essence, current awareness services allow a large number of users to be made aware of the contents of large number of publications— something for which many may not normally have the inclination or time. The adage

the right information to the right person at the right time in the right format and the right

quality never rings more true than when it is applied to dissemination services. Current awareness services can be both computerised and manual. Current awareness services can involve altering users to new information centre materials. Many information centres publish information or library bulletins. These bulletins often take the form of a new acquisitions list and include new books, serial subscriptions, reports and serial materials. Sometime you can incorporate an acquisitions list into another newsletter. Other bulletins may take the form of a newsletter and include information about new services, new electronic resources, etc. MLIS (P 4 & 5, Eng)—3

34 Types of current awarness services : Journal article photocopies, journal article lists, newsletters, abstract bulletions, including short summaries of journal, acquisition newsletters listing new information sources, journal circulation available, patents and standard bulletins, bulletins containing information about forthcoming, tailored news of individuals-selective dissemination of information, press cutting service, data on a particular subject of common interest, report writing and summarizing information, electronic delivery of journal articles, end-user searching putting research and information tools onto users desk. 6. End user searching : The philosophy of most corporate information centres differs from that of an academic, public or school library. In corporate information centres, the information specialist locates the answer to the user's information request and delivers the answer, either as a raw data or as packaged information to the user. The information specialist does not point to the shelves or the on-line catalogue when a user makes a request, unless the end user searching is accepted. Many information centres make their online catalogue, CD-ROM products, the Internet and commercial online services available to their users. In these instances, the information centre also provides training on searching these resources. 7. Bibliography preparation : A request for a more formal search may include the preparations of a bibliography. Mount recommends that several factors should be considered before starting and agreed upon by the information specialist and the user. This includes the audience for which it is to be written, range of publication dates, formats to be included (books, journals articles, technical reports, audiovisual materials, patents, meeting abstracts, web sites), other aspects such as whether the information specialist will provide annotations, arrangement of citations, (by auther, subject, date, material type), and the required duedate should also be discussed. 8. Coordinating translations : Many information centres obtain translations for organizations. If the organisation has locations around the world or subscribes to foreign language publications, the need for the translation of a document, from or into another language will arise. Make sure the translation is necessary. Understand the user's time, expectation and need. 9. Library instruction : Besides training for end-user searching, the information specialist will be performing user instruction in the form of orientation to the information centre. Most organizations have their employers participate in a new staff orientation. Other instruction will include point of use instruction on using reference sources and equipment in the information centre. 10. Abstracting and analysis : Some organizations have a need for prepared abstracts summarizing information presented in journals or gathered in a search., Many users like the information specialist to conduct a search, read the documents and prepare a summary of the literature. The information specialist may be asked to gather

35 information on market or industry. Requests such as these can result in a large volume of relevant information. Someone has to digest the information, analyse and synthesise and then summarise it before it can be used for decision making. 2.7 PLANNING AN INFORMATION CENTRE R. D. Stueart and B. B. Moran in their text on library and information centre management has defined planning as 'the process of getting and organization from where it is to where it wants to be in a given period of time by setting it on a predetermined course of action.' Much of an information centre's effectiveness derives from anticipatory future direction and preparing to meet information needs before they arise. Establish priorities. You will not be able to work on the entire plan at once. Some tasks must be done before others can be achieved and some are just more important than others. Create deadlines for completion or milestones or landmarks for smaller goals needed to achieve larger projects. Other essential elements of a plan include a clear picture of products/services provided, critical success factors, strategy funding and recommendations. Planning is a continuous process. Reviewing and evaluating the development phase should be done for any modification. V. J. Feinman in her article, outlines the five-step strategic planning process : situations and environmental analysis, development of organizational direction, formulation of strategic plan, implementation of plan, and stratigic control, feedback, evaluation. 2.8 EXAMPLES OF INFORMATION CENTRES Although the terms 'information specialist', 'information centre' and 'organization' are used, they should be interpreted to mean any type of librarian or information professional, any type of library or information centre, and any type of organization or company-profit or non-profit. We cite here some international and national information centres. 2.8.1 International 1. The Topography of Terror Foundation—International Documentation and Encounter Centre : The centre is located in the centre of Berlin, near the Potsdamer Platz. The centre was originated from an exhibition in 1987. (the 750 th anniversary of Berlin) to document and explain the represed history of this region during National Socialism. The documentation centre provides information about National Socialism. Serveral exhibitions, audio tours on the site, seminars, a library, a photo archive and

36 a multimedia encyclopedia about the National Socialism have been organised. All departments of the documentation centre are interlinked over one mask and one thesaurus. For example, if searching for information about Joseph Goebbels the searcher will get a listing of all sources which contain information about Goebbels. This listing shows links to the library, the documeat and photoarchives. 2. Ipsen International: Ipsen International is part of a world-wide organization, the Ipsen Beaufour group, with a reputation of being one of the most innovative pharmaceutical companies in Europe. Currently there are more than twenty three subsidiaries operating in over thirteen countries. Ipsen International has its non- laboratry R & D functions centralized in the UK; these are the exploratory development, clinical research and regulatory affairs departments. The service is growing quickly and is looking at new avenues of information provision such as competitor intelligence, knowledge management and daily news update. 3. Centre National de la Recherche Scientifique (CNRS): The National Centre for Scientific Research was established in Paris in 1939. The Scientific and Technical Documentation Centre of CNRS was created in 1940. The documentation centre provides one of the world's major seicentific and technical information services. It abstracts and indexes all relevant worldwide journal literature and stores the results in computer-readable PASCAL-M and PASCAL-S databases which are used to produce more than 75 topical bibliographic bulletins. The PASCAL-M database is a multi- disciplimary file providing comprehesive coverage of the world's scientific and technical literature. The PASCAL-S database compreses 12 specialised subject files maintained in cooperation with outside organisations. It provides exhaustive coverage in the following areas : information science, energy, metallurgy, welding, building and public works, earth sciences, food industries, biotechnology, invertebrate zoology, agromomy, and tropical medicine. The documentation centre effers SDI and magnetic type services from PASCAL databases. PASCAL stands for Programme Applique de la Selection et a la Compilation Automatique de la Literatire. Since 1984 the documentation centre publishes four new service of bibliographic bulletins which replace Bulletin Signaleteque Series : PASCAL SIGMA, 2. PASCAL THEMA, 3. PASCAL FOLIO, 4. PASCAL EXPLORE. 2.8.2 National Many national information centres like NISCAIR, NASSDOC, DESIDOC, SENDOC, BARC and others have been organised to perform

at national level. (i)

National Institute of Science Communication and Information Resources (NISCAIR)

37

NISCAIR has been formed on 30

September 2002

with the merger

of

National Institute of Science Communication (NISCOM)

and Indian

National Scientific Documentation Centre (INSDOC).

The core activity of NISCAIR will be to

collect, store, published and dissemente S & T information through a mix of traditional and modern means

which will benefit different segments of society.

To provide communication links among members of the research community, NISCAIR publishes 19 research journals (including one in Hindi) and two abstracting journals of international repute, covering all the major disciplines of Science & Technology.

The Institute publishes three popular science magazines : Science Reporter (English, monthly), Vigyan

Pragati (Hindi, monthly) and Science Ki Duniya (Urdu, Quarterly).

NISCAIR has also published 60 popular science books in

English under different series. It

brings out CSIR News (fortnightly) and its Hindi version, CSIR Samachar (monthly). NISCAIR has

also other publications and actitivies like consultancy services. (ii) National Social Sciences Documentation Centre (NASSDOC). The National Social Sciences Documentation Centre, renamed so in 1985, was created in 1970 by the Indian Council for Social Science Research, New Delhi. It has been playing an active role by building up a comprehensive collection of different categories of documents such as doctoral dissertations, serial publications; abstracting, reprography and tanslation services; and by compiling union catalogues. NASSDOC has several publications including Union List of 'Social Science Publications' 4 vols, 'Union Catalogue of Social Science Serials', 32 vols., 'Mahatma Gandhi Bibliography (English and various Indian languages). Its current awareness publications include 'Acquisition Update' (monthly), 'Conference Alert' (quarterly) and 'Samajik Vigyan Samachar' (monthly, Hindi). NASSDOC has been actively participating in Unesco's Asia—Pacific Information Network in Social Sciences (APIESS) programme since its inception as a the National Contact Point. (iii) Defence Science Information and Documentation Centre (DESIDOC). Formerly known as Scietific Information Bureau (SIB) established in 1958 in R & D organisation of the Ministry of Defence, it was formed in 1967 in Delhi

to function as scientific information and documentation centre to cater to the information needs of

R & D Headquarters and R & D establishment since 1970. DESIDOC has been functioning in the DRDO (Defence Research and Development Organisation) of the Government of India

as a central agency to collect scientific and technical information from various publsihed and unpublished sources, process it in different usuable forms and disseminate the same to about 40 DRDO laboratories and other establishments of the Ministry of Defence.

The publications of DESIDOC include Defence Science Journal (quarterly) R & D Digest (bi-monthly), R & D Bulletin (quarterly) Popular Science and Technology (half-yearly) and DESIDOC Bulletine (monthly).

38 (iv) The

Small Enterprises National Documentation Centre (SENDOC) SENDOC was established in 1971 at the Small Industry Extension Training (SIET) Institute,

now National Institute of Small Industry Extension Training, Hyderbad. It provides small scale industries with technological and managerial information. The centre collects and organises information on all aspects of small industry development. It brings out a number of bulletins and adhoc publications of interest to small industries. It conducts both for national and international-participants training courses. Besides, it offers technial enquiry services, microfilming and photocopying services, etc. It has a rich collection of industrial profiles, which are periodically updated. 2.9 SUMMARY The unit defines information centre, sums up its activities and services. It explains the need for information centres. It describes different types of information centres, organisation and planning of information centres. It explains ten various types of information services. It describes four national and four international centres. 2.10 EXERCISE 1. How would you define an information centre? 2. State some reasons for the need of information centres. 3. Give details about the different types of information centres. 4. How would you organise an information centre? 5. What are the basic functions of information centre? 6. Enumerate services in detail provided by the information centre. 7. Write short notes on any three national information centres. 2.11 REFERENCE

AND FURTHER READING 1. Atherton, Pauline: Handbook for information systems and services. Unesco, 1977. 2. Kreizman, Karen : Establishing an information centre : a practical guide. Bowker Saur, 1999. 3. Meltzer, Morton F: The Information Centre. American Management Association, 1967. 4. Rajagopalan, T. S. and Rajan, T. N.: Information institutions : pattern of growth and development with a perspective of the future. In Ranganathan's philosophy; assessment, impact and relevance, ed by T. S. Rajagopalan, Vikas, 1989. 5. Seetharama, S ; Guidelines for planning libraries and information centres. Indian Association of libraries and information centres. 1990.

39 UNIT 3 ❑ DATA CENTRES AND DATE BANKS Structure 3.0 Objectives 3.1 Introduction 3.2 Types of Data 3.3 Data Organisation 3.4 Data Centre 3.4.1 Data Centre Vis-a-Vis Data Bank 3.4.2 Role of a Data Centre 3.4.3 Organisation of a Data Centre. 3.4.4 Work Methodology of a Data Centre 3.5 Committee on Data for Science and Technology (CODATA) 3.6 Data Centres in India 3.7 Data Services of Data Centre 3.8 Data Banks 3.8.1 Sectoral Data Bank 3.8.1.1 General Purpose Data Bank 3.8.1.2 Special Purpose Data Bank 3.8.1.3 Data Banks for Different Disciplines 3.9 Conclusion 3.10 Summary 3.11 Exercise 3.12 References and Further Reading 3.0 OBJECTIVES In this unit you will know the meaning of data, their types; know the functions and activities of data centres and its difference with databanks. You will be acquainted with CODATA and national data centres and databanks. Data is defined in its strict sense to mean numeric or quantitative information relating to physicochemical and other properties. 3.1 INTRODUCTION Every modern society needs data for planning and development activitiy in every sphere, namely, in

decision making, policy making as well as in formulating a plan of action. These decisions and plan of actions are needed at various levels, viz. at national level, planning level, administrative level, and execution level. The Department of Science and Technology needs data for

formulating a Science Plan for the nation.

40

A laboratory director will need data for determining priorities and allocating facilities. A research worker will need data for excuting his research work.

Thus requirement of data is different for different purposes. It varies with the purpose and nature of decision involved. The data collected for one purpose may also be used for another purpose, with some manipulation. This means that the raw data could further be processed to yield systmatised and integrated data needed for decision making and other purposes. Data numeric or quantitative information in tabular form is a feature of many handbooks, and as the proportion of tables to text increases, the handbook as a form of literature merges into the book of tables. Tables are a convenient way to present clearly details such as melting points, atomic weights, and solubilities. Indeed in certain fields like thermo-dynamics, or spectroscophy, or crystallography, tables are vital to the whole study and progress of the discipline, simply because such a large amount of information has been collected in tabular form. The purpose of the tables is to save time. Indeed, as R.T. Bottles points out'. . . many details of physical properties are deeply buried in the literature, and effort, patience and time are required to retrieve them.' Data are collected from studies involving observations and surveys. In such form, the data are called 'Raw Data.' Raw Data are not usable for decision making. These become useable only after certain manipulations involving organisation and synthesis. These data are termed 'Systematized Data.' All the 'Systematized Data' may not be required or relevant to a particular decision involving executive action. These data must be further analysed and evaluated. Whatever may be the position of data, these must be stored and be accessible. The sources and uses determine the types of data. 3.2 TYPES OF DATA There are different types of data. We discuss the following types: 1. Scientific data : Under this category comes the observation data collected during the experiment like thermal properties of material, spectroscophic data of the material, and data on chemical analysis of material. In this category we can conveniently include the printed standard data tables or critical tables. Indeed in certain fields like spectroscopy or crystallography, tables are vital to the whole study and progress of the discipline, simply because such a large amount of information has been collected in tabular form, e.g. International Union of Crystallography, International tables of x-ray crystallography (Biirmingham, Kynoch Press, 1952-62) in three volumes. 2. Technical data : In this category the data pertaining to the specifications of

41 various commodities or services are included. These normally cover engineering specifications. 3. Techno-economic data : In this category the data availability of raw material, the semifinished material, the consumption, and both internal and international market are included. 4. Business data : In this category data pertaining to manufacture, sales, warehouses, profits and losses, etc. are included. It also includes employment data on various labour along with the data on capital generation and formulation. 5. Industrial data : In this category are included data on various types of industries, their production capacity, the licensing capacity, the consumption of raw material and power, the product data, etc. It also includes data on the various skills employed in the production of products and services. 6. Man Power data : In this category data on various types of skills, employment potential are included. 7. Socio-demographic data : In this category data pertaining to the geographical distribution of the resources as well as the manufacturing capabilities and manpower are included. Apart from the above categorisation, data are amenable to grouping from the users' view point and from the stability considerations. These groups are stable data which do not change frequently; unstable data which require frequent updating; and live data which change due to on going processes in an industrial context like process control, material control, etc; or by the very use like rolling stock, air-line reservation, etc. The complexity of live data demands computer environment for collection, processing, servicing and display. Unstable data depending on the frequency and types update also require sophisticated skills and equipment. However, stable data and some unstable data needing only replacement as an update operation are to some extent amenable to manual manipulation and servicing. 3.3 DATA ORGANISATION The problem areas relating to the data organisation are : (a) availability, (c) timing, (d) compatibility, (e) processiability. (a) Availability : A major source of data is operational administrative data gathered by institutions during the performance of their functions. For instance, data collection by Government would be guided by its executive responsibility, which data collections by industries and private orgnisation is generally confined to their particular areas of operation. The data so created would not cover the entire information areas. Quite often, even when such data are required by an agency it goes unrecorded either because it is costly to collect it, or because of lack of proper evaluating techniques. The nature of the reporting units can also render data unavailable. For planning

42 purposes the data on projects and forecasts are not available. In any case, availability of data is a continuous problem owing to the dynamic nature of the requirements of the users of data. (b) Reliability : The accuracy with which the phenomenon and its characteristics are recorded is affected by the training and capabilities.of the human recorder and the sensivity and capacity of the mechanical aids used. Therefore, certain degree of subjective evaluation of the recorder should be allowed. As for collected by satellites, etc. the use of data involves interpretation with a high degree of human judgement. (c) Timing : This problem is confined to the time-lag in data compilation and also to the time-coordination in recording different data sets. For instance census and survey methods are so laborious and costly that they cannot be conducted frequently. These methods cannot by themselves provide data sets that are time-correlated, thereby matching of data sets is rendered very difficult. Data from other sources require to be updated continually in relation to other data compilations. (d) Compatibility : Compatibility between different data compilation can be achieved only through standardization of the concepts of the data elements and their attributes. Apart from standerdization the solution lies in data gathering at the level of individual entries to lend flexibility in aggregation. Similarly data-gathering from finely specified location of phenomenon lends greater compatibility between data sets with different spatial aggregations. (e) Processability : The basic equipment of mechanical data-procession is that the input data should be convertible into machine-readable form. 3.4 DATA CENTRE 3.4.1 Data Centre Vis-a-Vis Data Bank As noted earlier Data Centres handle quantative numerical data. Their primary function is

collecting, organising and disseminating data chiefly numerical. They provide a measurement service and advance relevant measurement techniques.

Data centres vary both in size and in scope. Data centres handle only numerical data, mostly for science and technology dealing with physical and chemical properties, Data Banks are multidisciplinary. Every documentation or information centre will have to be suitably linked with national specialised data banks and through them to international banks. Even then smaller information centres can create and maintain databanks and provide data service. In fact the concept of data bank has brought with it a new concept in information service. It can be recognised as a new concept in the information system.

43 Data centre handles data themselves or literature about data where as data bank handles data only. It handles all types of data particularly administrative, statistical, techno-economic, census and survey and management that are produced by various institutions. 3.4.2 Role of a Data Centre An institution in developing data handling capabilities may be called a Data Centre. In the context of National Information System for Science and Technology the data handling capabilities should be developed at the Branch Information Centres; This is logical in the sense that the expertise needed for evaluating and compressing the raw data in a given discipline is available to a Branch Information Centre as its environment. In the totality of all the Branch Information Centres, this distributed facility will provide a ready access to data which are collected at a considerable expense of resources and time over a wide spectrum of discipline. The data handling capability in a Branch Information Centre may be referred to as the Data Centre. 3.4.3 Organization of a Data Centre The organization of a Data Centre has two main aspects-one is a

general aspect and the other applied aspect. If we compare the organization of a complex information system with that of the Data Centre, we should note that the main difference between the two lies in the importance given to the information analysis. This difference is apparent in all stages of the organization and is affected through the following categories of personnel: (a) data coordinators (b) data specialists (c) data analysts and (d) programmers. The data specialists form an essential component of the Data Centre. The need to examine the data leads to the use of highly specialized personnel able to appraise the correctness of the data received to solve all the correlations, which needs numerous contacts between the sources and the users of

the data centre. The general scheme of organization can be represented thus : Needs covered by the Data Centre S O U R C E S Information Information Sources Information Sources Creation actualizing DATA BASE Answer Question User ← → ← ← ← → → → ← → ←

44 The general concept of a Data Centre is based on an analysis of existing data and determination of the needs to meet. The above stated elements help us to determine the general structural organization of Data Centre in terms of (a) the data source; (b) the documents which supply them; (c) the internal technical characteristics of the system; (d) the users need. The most efficient method of organization consists in establishing assumptions, concerning what the Data Centre may offer, thus establishing the data needs. The second and more important aspect of organization of a Data Centre is the applied aspect. The organization of a Data Centre has become all the more necessary only to ensure a contrasted data base to which one may always appeal and which shall include the basic data. The main considerations in the structuring of a Data Centre are : the volume and kind of data and the existence or possibilities of access to a computer. The flow of information of Data Centre may be represented thus : Information Generator Nature of Information DATA CENTRE Acquisition Processing Output Received Information Generator Information Characteristics Characteristics Translation Channel Users A, B, C, D..... B C D Principles involved in the organization of Data Centre : (a) Data are received and collected from different documents by a group of specialists who decide the importance and relevance of the data, control and fit them with the generator source.

45 (b) The received data are organised in order to establish that they represent the basic data which must be processed or synthetic data which may be necessary for further use in their initial form (c) The data are registered on punched cards in order to build the card indexes which represent the data base for the computer. 3.4.4 Work Methodology In order to ensure efficient functioning of a data centre the following operations need to be performed : (

a) data collecting (b) data control (c) data codification (d) data storage (e)

organization of the card indexes and (f) data retrieval. 3.5 THE COMMITTEE ON DATA FOR SCIENCE AND TECHNOLOGY (CODATA) The problem of data collection and maintenance was international in character. Even an affluent country like the USA realised that no single country had the resources of money and manpower to support the massive effort that is needed. The next step inevitably brought about international collaboration in this area of information requirements. Some efforts in this direction culminated in the formation of CODATA in 1966. In fact, International Council of Scientific Union (ICSU) took the initiative in 1966 to organise the CODATA. The objectives are to achieve informal coordination among and provide guidance for numeral data competing projects on a world wide basis and encourage support for data compiling projects by appropriate agencies. The CODATA, is itself not an operating agency for the compilation of data. Data is one field of scientific activity where the benefits of international cooperation is evident, and CODATA has done much to stimulate joint effort. In 1974 it completed a major study for UNISIST (World Science Information System) on

the problems of the accessibility and dissemination of data for science and technology.

The main recommendation was the establishment of world scheme or network comprising three parts : for each subject discipline a data evaluation centre; for each country, a data dissemination centre with broad subject, coverage, and a global referral centre for directing users, enquiries to the most appropriate source. Such World Data Referral Centre has now been established in Paris. CODATA in now compiling a directory of data sources for science and technology.

46 The mission of CODATA is therefore, to ascertain on a worldwide basis the current activities in data compilation and publication activities; to achieve coordination among existing programmes and minimise uninternational or indecisive overlap and to recommend new computation programmes; to encourage the support of needed work by appropriate agencies; to stimulate wider distribution of compilations of high quality, to encourage and coordinate research on new methods for the preparation and dissemination of erotically evaluated data generally expressed in numerical tables. In the CODATA there are two categories of members— union members representing ICSU and members representing countries. CODATA started with 12 union members and 15 national members. Prominent union members are— International Union of Pure and Applied Chemistry (IUPAC), International Union of Biological Sciences (IUBS), International Astronomical Union (IAU), etc. The prominent national members are U.S.A., U.K., etc. Japan is the only Asian member of CODATA-The main executive office of CODATA, Known as the Bureau, is situated in Frankfurt. For better accessibility and dissemination of data a global plan has been drawn up by CODATA. The plan envisages three different types of service centres: Data Evaluation and Compilation Centrei Data Dissemination Centres, and Data Referral Centres. CODATA organises conferences on data handling and its development. It brings out some regular and adhoc publications. For example, CODATA Newsletter— announcing current data compilations; CODATA Directories of data Sources; CODATA Referral database; CODATA Bulletin. Oxford, Pergamon, bimonthly. It publishes conference proceedings on the subject of data in science and technology, research papers, and CODATA reports on new developments in data handling and presentation, it also incorporates the Directory of Data Sources for Science and Technology. Certain issues of the Bulletin are essentially concise directories of data centres and other formal projects which serve as sources of quantitative numerical data on properties of well-defined physical and chemical systems and with each issue devoted to a subject area, such as corrosion and geomagnetism. 3.6 DATA CENTRES IN INDIA In India we are on the way to get into the mainstrean of data activity and service. The NISCAIR has taken up the work related to data dissemination. The DST and INSDOC jointly brought act a 'Directory of Data Centres in India' in 1977. The National Committee for CODATA was set up in India for coordination of all the Data

47 activities in the country. There are serveral institutions and organisations engaged in data activities. A few such institutions are noted below : The Indian Institute of Science, Bangalore is engaged in the collection and evaluation of thermophysical properties programme. This institute lends support to a few centres at : (a) Indian Association for the Cultivation of Science for thermodynamic and transport properties. (b) University of Madras for crytallographic data (NICRYS) (c) University of Allahabad for stability contents of coordinate compounds. The Bhabha Atomic Research Centre (BARC), Bombay is engaged in collecting Nuclear Science and Technology data. This centre is giving Indian input to the International Atomic Energy Agency, Vienna. The Central Glass and Ceramics Research Institute (CGCRI) Kolkata has a hard data centre for advanced ceramics. The National Institute of Oceanography has set up the Indian National Oceano- graphic Data Centre. 3.7 SERVICES OF DATA CENTRE The data centre works in two ways in order to meet the request of the users. It supplies the current information including the synthetic data obtained from the processing on different criteria of the basic data. The second method is to supply answers to the requests of the users. The answers include the basic data stored in the databases and selected on certain constraints imposed by the user as well as synthetic data obtained through processing on other criteria other than those used in the previous case, of the stored data. 3.8 DATA BANKS During the last three decades, may experimental data banks, data centres were created in developed countries, mainly in Sweden, Norway, USA, Great Britain and France. They include sectoral banks for management and general data banks for national, regional and urban planning intended for Gvoernment or for private users. Data banks are of different types according to the type of decision makers, users and nature of rapidly available data. They may pertain to one given sector or to multi-sectoral level. 3.8.1 Sectoral Data Bank The industrial information system proposed by United Nations Industrial Developed Organisation (UNIDO) is a sectoral bank project which has to be started within an

48 industrial firm and investment projects. For example a Management Information System (MIS) or information system within a sector Industrial firm with 20 to 30 employees can be set up at sectoral level whereas data necessary for planning must cover many sectors like commerce and industry, manpower, foreign trade, etc., which are called multi-sectoral or general data banks. It requires several information systems relating to different fields for decision making those these decisions may only concern one field. Data banks are classified as general-purpose and special purpose data banks, depending on the purpose it serves. 3.8.1.1 General Purpose Data Bank A gigantic central databank servicing the general public is impracticable. 3.8.1.2 Special Purpose Data Bank Owing to inadequate resources, it is preferable to set up various types of special purpose data banks linking the producer and specific users, each bank being equipped with an appropriate body of experts to perform the needed intermediary function. 3.8.1.2.1 Data Banks for Different Disciplines Indian National Scientific Documentation Centre (Now NISCAIR), Delhi, Council of Scientific & Industrial Research (CSIR), Department of Science and Industrial Research (DSIR), Electronics Commission (EC), Planning Commission, etc. have been compiling data relevant to Science and Technology Information Bank. The National Committee on Science & Technology and the Council of Scientific & Industrial Research have established a national network of Technology Information Bank for national planning and decision making purpose. They have established Technology Information Bank for Leather, Cement, Food, Instrumentation, and others. The Data bank for social sciences is also a new organizational phenomenon. Keeping in view the needs of the present day, there is a scheme for developing a system for small scale sector. In addition to these, data banks have been developed in different fields like machine tools. 3.9 CONCLUSION Increasingly to be found are data bases containing substantive factual information of many kinds, not merely quantitative or numeric. These are commonly referred

49 to as data banks or factual or factographic data bases. We have been told that non- bibliographic data bases are the wave of the future, and some observers have remarked growing expectations among many library users that the on-line terminals they see should be used to interrogate the growing number of source data bases. Librarians are not resisting this : the Canada Institute for Scientific and Technical Information has already added scientific numeric data bases to its list; 40% of Euronet/ Diane data bases are data banks; the National Library of Medicine already offers TDB (Toxicology data Bank) for online search, and MEDLARS III plans to include several source data bases. The 'confidentiality' problem is one of the factors affecting many aspects of the data bank. Though confidentiality of data may sometimes be a pretended notion, purporting only to avail possible abuse of data, the protection of personal or business secrecy is the legitimate claim in many societies. It may be solved by (a) excluding any possibility of free physical access to data stored in the data bank; (b) classification of the users of data and installation of appropriate methods for controlling their access to data; (c) sufficient aggregation of elementary data when processed for general dissemination. 3.10 SUMMARY In this unit we have explained the meaning of data and their types. We have discussed the functions and activities of data centre and its difference with data banks. We have described the CODATA and other national data centres. We have highlighted the services of data centres and different types of data banks and data banks of different discipline. We have noted the importance of non-bibliographic data bases and the confidentiality problem is one of the factors to be reckoned with. 3.11 EXERCISE 1. Explain the meaning of data and discuss the different types of data. 2. Discuss the problem areas relating to the organisation of data. 3. Explain the difference between data centre and data bank. 4. Discuss the role of a data centre. 5. What are the components of a data centre ? Discuss the needs covered by the data centre. 6. How would you organise a data centre? 7. Write a note on CODATA. 8. Show your acquaintance with data centres in India. MLIS (P 4 & 5, Eng)—4

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51 UNIT 4 ❑ REFERRAL CENTRES AND CLEARING HOUSES Structure 4.0 Objectives 4.1 Introduction 4.2 Referral Centre : Definition 4.3 Need for Referral Centre 4.4 Functions.of Referral Centres 4.5 What is a Resource ? 4.5.1 Types of Resource 4.5.2 Inventory Taking 4.6 Working of a Referral Centre 4.7 Feedback 4.8 Publication 4.9 Collaboration 4.10 Summary 4.11 Exercise 4.12 References and Further Reading 4.0 OBJECTIVES Information services are concerned with users. But the services provided by all kinds of institutions will aim to make information flow from sources to seekers. If the users are not satisfied, the flow would either never take place or take place inefficiently. This unit is meant to get you acquainted with the need and functions of referral centres. 4.1 INTRODUCTION There has been in recent years, increasing recognition of the fact that no perfectly quantitative attack—-even computer armed can ever cope successfully with the growing mass of information contained in the professional and technical journals, in the profusion of research and development reports, in the hard data accumulating from space technology, biological and medical research, and all other myriad facts of our technological world. With this recognition referral centres have come to introduce switching and control mechanisms to make the complex information network function efficiently and effectively.

52 4.2

REFERRAL CENTRE : DEFINITION 'Harrod's Librarian's Glossary. . .' defines Referral Centre thus 1. "

An organization for directing researchers for information and data to appropriate sources such as, libraries, information evaluation centres, documents and

documentation centres and individuals. A referral centre does not supply data or documents." 2. "

A referral centre is some sort of an '

Information Desk' for the scientific and technical community which does not provide

in answer to

enquirers directly with the information they need but suggest sources (organization, facility, individual)

likely to satisfy the

users/clients." 3. "

Referral centre is an organization for the indication of sources (

of persons, institutions and

publications) from which scientific information may be obtained on a given subject."

Here we quote a memorable commentary from J. H. Shera—"the reference librarian, I think, historically came into being because of the gap between the key to the library resources (i.e. the catalogue) and the resources. In other words, the key was only an imperfect key, unlocking only certain doors; there were a lot of other doors around the key wouldn't fit. So in a sense the reference librarian, the keeper of the keys, has all those other resources to investigate." So referral service has come to offer certain switching and control mechanisms to other resources beyond libraries. 4.3 NEED FOR REFERRAL CENTRE Libraries now constitute, as much as ever before, a fundamental part of the information network— but there are factors related to the pressure under which today's researcher works that frequently demand assistance beyond the citation of books or pages. These factors may be discussed below : (a) Bulk is a factor : the researcher needs some kind of information filtering mechanism. (b) Time is a factor : the researcher cannot afford hours or days spent in scanning volume after volume. (c) Current awareness : the researcher needs up-to-date information or he may find himself with absolute statistics or techniques. (d) Evaluation : the researcher needs data that have been evaluated by his peers. (e) Personal contact : the researcher requires access to a problem and will be able to provide him with a direct answer. He needs advice on people and places to which he may turn, and it is for purpose of providing such advice that referral centres have come into being.

53 (f) Another factor in favour of establishing referral centres is that information is not always obtained from documentary sources. In some circumstances it is more helpful to put the user directly in touch with an expert or specialist who can provide an immediate answer than to furnish documents or written summaries of information from which the user must extract what he wants to know. This is specially so when the required knowledge is so new that it has not yet appeared in published form. Sometimes it is more helpful to refer the inquirer to a forthcoming meeting or a symposium when he is likely to gain knowledge that has bearing on his problem. 4.4 FUNCTIONS As noted earlier referral centre may be described as the 'information desk' of the scientific and technical community. It does not provide technical details to inquiries or furnish bibliographic assistance. It functions rather,

as an intermediary, directing those who have questions concerning scientific and technical, subjects to organisations or individuals who have specialised knowledge in

these fields and are willing to share this knowledge with others.

In answer to requests for guidance and assistance, the centre provides names, addresses, telephone numbers, and brief description of appropriate information resources. To achieve this a referral centre has certain basic tasks to perform. These may be listed as : (a) To inventory all significant information resources in science and technology, (b) To compile and publish directories of scientific and technical information resources; (c) To analyse the operating relationships comprised in the scientific information complex. 4.5

WHAT IS A RESOURCE ? For our purpose, an 'Information resource' can be defined broadly to include professional societies, university research bureaus and institutes, government agencies, laboratories, museum specimen collections, testing stations, and individual experts, as well as more traditional sources of information such as technical libraries, information and documents centres, and abstracting and indexing services.

The National Referral Centre for Science and Technology, Library of Congress,

has adopted its own working definition of an 'Information resource' which is

any organization facility or individual willing and able to give authoritative response to scientific or technical inquiries out of an existing store of knowledge or expertise. 4.5.1

Types of Resource There are two types of resources. They have termed as 'direct resources' and 'indirect

54 resources' to denote on the one hand, those resources which respond to an inquiry, on the other those which provide bibliographies, reference lists, or copies of actual documents. The former exist as research teams, laboratories institutes, testing stations, observatories, and other units. In such places are the scientists and engineers who have compiled and distilled information, who have performed experiments, and who have evaluated the data available in their chosen fields. Many of them are willing to share their specialized accumulated knowledge, saving time and effort for their colleagues elsewhere. In many cases, of course, an information resource, may have both 'direct' and 'indirect' capabilities as in the case of centralized data centres. 4.5.2 Inventory Taking Inventory of potential resources is a complex problem for referral centres. There have been many difficulties in conveying to the organizations what referral centres mean by 'resource', but also in obtaining the data needed for effective referral operations. The centre should know what kind of information a given resource deals with, how the resource handles this information, and how the resource makes this information available, to whom and under what conditions. The referral must know the size and kind of collections, if any the particular service provided, and in specific terms, subjects of specialization. In large number of cases, it is necessary to follow up the original contact by correspondence, telephone, or personal visit to obtain these data. Only those resources which are willing to cooperate with the centre are included in the register, and that any restrictions which may apply to services provided by a resource are strictly adhered to by the centre in making referrals, The gathered data may be retrieved or utilized either manually or mechanically. The referral centre will be able at any time, by machine printout to report how many libraries are registered with the centre in what subject areas; how many, and what kind of resource exist in the field of say, electronics; where special collections pertaining to a particular subject are located, what occupational groups are represented among those who have come to the centre for assistance, etc. 4.6 WORKING OF A REFERRAL CENTRE The passing on of the enquirer to another agency for the answer to his question is one possible response that the referral centre can make. Indeed, community information services make extensive referrals as a matter of policy. There is the specially compiled resource file or index of names and places to which enquirers can be referred for specialist advice and help. In some special libraries referrals are almost as common as in community information services. Any referral centre keeps

55 a file of names of addresses of individuals and organizations able to provide specialist information. There are too sound pieces of advice : one, either referral centre must learn how to referrals the right way or they shouldn't do them at all; and two, a referral that has been handled badly is more lethal than a wrong answer'. It should take the form of a deliberate and positive recommendation, decided on as the best means of reaching the solution to a particular problem. And never should referral be made 'blind', in a speculative fashion. Attempts have been made to devise a simple referral form. The form is handed to the enquirer with instructions on it where to go; the reverse is used to report back on the outcome; the numbering of the forms provides an indication as to how many enquirers decide not to bother. A referral centre usually receives requests by letter, telephone, and personal visits. The information given is a list of names and addresses of resources appropriate to the request. A brief description of the subject and service capabilities of each resource are also furnished. 4.7 FEEDBACK To evaluate the effectiveness of its services, most centres rely on a comprehensive 'feedback' programme. Every requester is asked to supply information on how he fared in his search for information, and which resources were the most useful, etc. A referral centre in this way keeps on modifying and updating its files. If is found that a resource has claimed more than what it can honour in terms of supplying information, suitable modifications may be made in the files of the referral centre. Similarly any useful information available with the resource, but initially overlooked or omitted can be added/Feedback also helps a referral centre in enlisting new resources, which the user might have come across accidentally or by its own initiative and about which, the user can write to the referral centre. 4.8 PUBLICATION A referral centre may also have a publications programme. For example, 'the Library of Congress National Referral Centre of the science and Technology Division A Directory of Information Resources in the United States : physical sciences, engineering, Washington, 1971. It is list designed to cover all possible sources. If referral functions are more formally established and emphasized in their programme, they can interlock effectively with traditional acquisition, cataloguing, reference and retrieval activities. For example, through its acquisitions and indexing operations, a library can develop, as a relatively inexpensive by-product, a list of organizations producing the information—professional societies issuing journals, and monographs—

56 and can supply, in addition to literature citations, the names of the originators as resources to which a researcher may turn. Such an activity may be thought of in terms of an annotated bibliography the annotations being in the form of resources rather than the standard explanatory remarks. 4.9 COLLABORATION Referral centres should explore continuously the possibility of collaboration with professional societies, with a view to gaining from professional groups the knowledge individual members have about resources in their special fields and of making these resources, by including them in the registers of the centres, available to all members of such groups. Besides, referral centres welcome registration by any organization having knowledge or expertise that it is willing to share with others, and also a referral centre should be notified directly about any information resources not already listed. 4.10 SUMMARY This unit presents the recognition of some efforts to introduce some switching and control mechanisms in the form of referral centres to make the complex information network function efficiently and effectively. Several factors have been discussed to highlight the need for referral centres. Referral Centres function as an intermediary between those who have certain questions concerning scientific and technical subjects and those organizations and individuals who have specialised knowledge willing to share with others. Information resources along with its working definition has been discussed. Working of referral centre and the feedback mechanism have been highlighted. A referral centre may have source publications channel in the form of directory which gives information on resources in different disciplines. The collaboration with professional societies is also an important factor to gain expertise from professional groups. 4.11 EXERCISE 1. What is referral centre? Why is it needed? 2. Define 'information resource'. Mention its types. 3. Explain why in the working of a referral centre feedback mechanism is needed. 4. Write a short note on the publication programme of referral centre. 5. Why should a referral centre explore the possibility of collaboration with professional societies?

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58

UNIT 5 ❑ INFORMATION ANALYSIS AND CONSOLIDATION CENTRES Structure 5.0 Objectives 5.1 Introduction 5.2 An IAC Centre : Definition and Meaning 5.3 Functions, activities and products 5.4 Information consolidation : Definitions 5.5. Problem of using information 5.6 Users 5.7 Value and benefits of consolidated information 5.8 Products and efforts of IAC 5.9 IAC Centres in India 5.10 Summary 5.11 Exercise 5.12 References and Further Reading 5.0 OBJECTIVES An overabundance of literature or even of information on any one topic today presents a most formidable modern information problem. However, for many information users and potential users, for many decision makers at all levels the problem is quite different; there is lack of appropriate information, namely

of information which they can comprehend, assimilate and use with some confidence on their own level and within the framework of their own circumstances.

This unit will give an idea about Information Analysis and Consolidation Centre, its scope, functions, activities and services. 5.1 INTRODUCTION With enormous growth of the primary scientific literature, the individual scientist or engineer is faced with different problem of its retrieval and evaluation as most of the information remains hidden in published documents. Much information which is published in primary journals never catches the eye of the information seeker. And whatever information is noticed, is generally so diluted that it is of not much use unless it has been distilled by a suitable process. Besides libraries, information centres

59 and other types of information institutions there is need for another type of information institution which has been termed Information analysis and consolidation centres (IAC). This unit discusses such institutions, their origin, growth, need characteristics and functions. A potentially useful tool for the transfer of scientific and technical information exists in this type of centre. Such centres, usually serving specific fields in which large amount of data exist and require critical evaluation, consist of one or more active specialists who (a) systematically collect, index and store information in a field, (b) analyse and evaluate this information, and (c) make it available ina form and language keyed to the needs of specific groups of users. 5.2 AN IAC CENTRE : DEFINITION AND MEANING An IAC Centre as noted earlier,

has been defined as 'an organization which indexes, abstracts, translates, reviews, synthesises and evaluates

information and/or data

in

a clearly defined specialised field

or pertaining to a specific mission,

to provide definite users' groups with digested, repackaged or otherwise, organised pertinent information or data. An IAC, at least in theory is the most efficient system for transferring to a user timely, authoritative, evaluated information in a convenient form. In an era marked by constant expansion of scientific and technical literature, it is apparent that users want

the data and information contained in the literature and not the documents themselves.

To quote Branscomb, "it is just as absurd for the user to take the total collection of raw material for his data as it would be for the jeweller to order six tons of gold-bearing ore when he wants to make a cuff link." The IAC centre helps in making information available in a useful convenient form; "relieving the user from the arduous

task of mining the sand of literature for the few grains of gold."

Retrieval of documents is not the same as retrieval of information; a technical specialist actually needs the information contained in the published literature, not the published literature itself. In order to meet this need, it is necessary to extract and compile the data themselves that is, the results of scientific research and observations. To retrieve information, the technical community has devised and organised information analysis and consolidation centres. An IAC centre

is

a formally structured organizational unit specifically established for the purpose of acquiring,

selecting, storing, retrieving, evaluating, analysing, and

synthesising

a body of information and/or data in a clearly defined specialized field

or pertaining to specific mission

with the

intent of compiling, digesting, repackaging, or otherwise organizing

and presenting pertinent information

and/or data in a form most authoritative, timely and useful to a society of

peers and management.

60 The

following criteria characterise and identify an IAC Centre :

The key activities are the

analysis, interpretation, synthesis, evaluation and repackaging of information for the purpose or numerical data of a specific field.

The

centre prduces

new evaluated information in the form of critical reviews, state of

the

art monographs, or data compilations

and usually provides substantive evaluated responses to queries. An IAC provides assistance to a community of users and not just assistance to 'in-house' personnel.

E.L. Brady originally had put the IAC in the following three categories. 1. "

Discipline Oriented" centres working primarily with the formally published lietarature of a particular field. 2. "Mission Oriented" centres concerned with specific problems of interest to the community they served and which received their input not only from the formal literature but also from government reports, industrial literature, and from other informal communications;

and 3.

The centres handling large volumes of data sometimes called a 'synoptic centre' or a 'census bureau' which collected raw or partially processed data or partially processed results

and

often concerned with large scale phenomena such as encountered in the study of oceanogrophy, the. upper atmosphere or in interplanetary space. This type of information analysis centres also included census type activities providing data on people, goods and materials.

Later, Brady re-categonised them as : 1. Research oriented group working primarily with formal published literature. 2. The problem solving group that obtains

its input not only from the formal literature but from government reports, industrial literature, and other informal communications;

and 3. Research oriented group whose input is primarily raw observational data, usually of multinational studies such as weather, oceanography or acronomy. 5.3 FUNCTIONS, ACTIVITIES AND PRODUCT The functions, products and services of IAC vary in detail and with the needs of its user population—but on the whole are similar. The first step in its functioning is the selection and acquisition of relevant documents. This may yield a comprehensive but unevaluated bibliography. The next step is abstracting and indexing the document. This process often consists of

assigning key words to each document to identify the data or information.

An indexed bibliography is a more useful document, since it can indicate to a user exactly the type of data contained as well as parameters of data points. The next phase consists of selective extraction of chunk of information, such as quantitative data description of methodologies, interpretations,

61 Activities Products Selection and Collection of Bibliographies, current awareness documents Abstracting/Indexing Indexed Bibliographies, custom searches Extraction Descriptive Reviews, compilation (unevaluated) Evaluation Critical Review of area Critical compilation of data Criteria for Experimentation Recommendations Solutions to immediate problem Correlation of data Prediction of Properties

and other material necessary for the ultimate utilization—evaluation of the content. The products resulting from this phase might be an unevaluated compilation of data or a descriptive review, sometimes referred to as the state-of-the-art review.

The descriptive review is a selective extraction of information from the literature on a particular

subjects; some state-of-the art reviews go beyond the desrciption of who did what and what happened and offer some evaluation, but, on the whole, descriptive reviews are summaries of the activities described in the literature for a set period of time, usually a calendar year. Uncritical data compliations can be useful products in that scientific and technical reviews and state-of-the-art reports. Information analysis centres using high levels of selectivity, evaluation and analysis of existing information, particularly in science and technology and then synthesizing products like handbooks containing findings and/or data from a number of sources, compilations of critical evaluated data for given materials, processes or phenomena, and the like. The analysis of barriers and of the solution as presented has led to the evolution of information analysis and consolidated centres. The greatest impetus for the

62 development of information consolidation came from the practices of information analysis centres as instituted from the 1950's onward. 5.4 INFORMATION CONSOLIDATION : DEFINITIONS

The idea of consolidated information comes from discussions of information problems in developing countries. Many of these problems relate to

the lack of information, low resources for information work, inadequacy

of information infrastructure and low propensity of users to use

of information. However,

it is also recognised that mere possession of information—having it available and accessible—is not guarantee of its use. A number of United Nations Organizations have been actively seeking solutions to the information problems in developing countries, UNESCO being the most active

one.

Information consolidation as a suggested solution to the problems of barriers to use of information

was a particular topic of three meetings sponsored by the General Information Programme (PGI), UNESCO. 1.

First Meeting of the UNISIST Working Group on Information Analysis Centres. Unesco House, Paris, 3-5 November, 1975. 2. Symposium on Information Analysis and Consolidation (second meeting) Colombo, Sri Lanka, 12-15 September, 1978. 3. Third Meeting of the UNISIST Working Group on Information Analysis and Consolidation

Kula Lampur, Malaysia, 12-16 September, 1983 they provide a handy, time-saving amalgamation in a convenient format. These products are prerequisites for the fundamental function of the IAC. This results in the creation of new knowledge—like critical reviews, critical data compilations, criteria, recommendations, solutions to problem, correlations, and predictions. 5.5 PROBLEM OF USING INFORMATION Historically, the concept of information consolidation evolved as a response to complaints about and analysis of barriers to fruitful use of information among them: There is too much information on a topic and the potential user is overloaded or overwhelmed—the sheer amount decreases the willingness to use information, taking too much time and effort. Information is presented in a context or with examples that are outside the user's cultural framework—the divergent cultural attributes impede the ability to relate to specific circumstances. The packaging may be an impediment to information absorption.

63 Validity and reliability of information is not evaluated and thus information is questioned. These and similar barriers have been a serious impediment in the use of information throughout the world. Clearly, bibliographic organization, classification, indexing and abstracting services, related databases and the like, are important solutions to the problem of controlling and locating information. Without them there would be total and unthinkable information chaos and a great many activities such as science, would grind to a halt. However, these services contribute directly to overcoming the listed barriers to use of information. It has been recognised that other solutions are needed. Over the years a number of them have been tried and proven sucessful. Some of them may be noted here. The following definition was adopted at the Colombo meeting : "

Information Consolidation Activities is used to define the responsibilities exercised by individuals, departments, or organizations for evaluating and compressing relevant documents in order to provide definite user groups with reliable and concise new bodies of knowledge. Individuals or groups of individuals performing information consolidation activities would each constitute an INFORMATION CONSOLIDATION UNIT (UCI). A

related, but more elaborate definition was offered by T. Saracevic and J. Wood: "

CONSOLIDATED INFORMATION is public knowledge specifically selected, analysed, evaluated, and possibly restructured and repackaged for the purpose of serving

some of the immediate decisions, problems, and information needs of a defined clientele or social group, who otherwise may not be able to effectively and efficiently access and use this knowledge as available in

the

great amounts of documents or in its original form. The criteria for selection, evaluation, restructuring, and repackaging of this knowledge are derived from the potential clientele." 5.6

USERS The users of IAC centres address several distinct types of user groups : Scientists, engineers and professionals engaged in R & D activities, manufacturing, health services, planning, education, etc.

Managers and business people engaged in small and large business, commerce marketing, etc. Policy and decision makers in government. Technicians, supervisors, paraprofessionals.

64 Communicators such as extension workers, local leaders

in adaptings new technology or practices. Agricultural and industrial workers from rural and urban populations. The information needs of the last two groups mentioned above, are receiving particular attention from information consolidation efforts, because these are the groups that are left unserved by majority of existing information services and products produced in both developed and developing countries. Processes in information consolidation Processes in Information Consolidation Implied in the definition noted above are the following basic processes invlved in the preparation of information products. 1. Study of potential users to derive criteria for all other processes. 2. Selection of information source(s) potentially

containing the most useful information for given user problems and information needs; the selection can be done from a variety of primary and secondary sources. 3. Evaluation of information as to its intrinsic merit, validity and reliability. 4. Analysis to identify and extract the most salient features.

65 5. Reconstructing (if necessary) the extracted information into a content that can be used most effectively and efficiently by users; this may involve synthesis, condensation, rewriting, review, state-of-the-art presentation, etc. 6. Packaging and/or repackaging of restructured information in a form that will

enhance the potential of

its use. (Restructuring concerns with the contents or substance of information while packaging deals with the

media, format and

the form of its presentation). 7. Diffusion or Dissemination of information in ways that will encourage and promote its use; this may also involve education of users in the use of information and marketing of information. 8. Feedback from users, evaluation of the

effects, and adjustment. The above figure summarizes the processes, elements and relatios invovled. Although related to other iformation activites, most notably abstracting and indexing, information consolidation is a proposition of much higher complexity and greater demands. In this lies the basic problem of information consolidation. 5.7 VALUE AND BENEFITS OF CONSOLIDATED INFORMATION

On a general level information consolidation is justified for its contribution to the process of social and economic development. On a specific level

its benefits can be argued as a contribution in problem solving and decision making. Let us discuss in turn.

The process of development in an increasingly interdependent world involves and

requires

an increase in sophistication and use of scietific, commerical and related information. The value of such information does not lie in its existence (

or even in the systems that assure its availability and accessibility), but in its acceptance and use. In turn,

chances for acceptance and use of information are increased by its being more appropriate. Consolidated information aims at being more appropriate to the users, their needs and levels, the capacities and time allotments given to information absorption and similar user—related factors.

Clearly, arguments for consolidated information should involve economic aspects (savings, earning, productivity, competitiveness, etc.), but its value may be even greater because it is related to other values in a society.

Consolidated information may contribute to information sophistication of a population, which in turn contributes to quality of life. For instance, consider the value of consolidated information that helps to improve sanitation,

which in turn decreases disease, pain and suffering.

More specifically, the value of consolidated information can be argued in relation to its role in decision making and problem solving. Making decisions and solving problems, even those encountered in

everybody

work, requires information. MLIS (P 4 & 5, Eng)—5

66 Moreover : As complexity of decisions or problems increases, the need for information intensifies;

As the amount of available information proliferates, it becomes harder to get and use
the relevant information; As complexity, interdisciplinarity
and technical sophistication of available information increases, less can be used by decision makers and problem solvers as presented in its original form. All these point to the need for consolidated information.

As the amount of information presented to a decision maker is increasingly consolidated, its value increase; as the information is increasingly expressed in the everyday language and social/cultural framework of the user, its value increase for that user; as the information is increasingly packaged in a way that will make its use easier, its value increases. 5.8

PRODUCTS AND EFFORTS OF IAC Several information centres in developing countries have devoted part of their efforts to development and distribution of information consolidation products particularly aimed at the broader audiences (technicians, villagers, extension wokers, teachers in rural areas, etc.). Among these are : Tata Energy Research Institute, Bombay, India: Biogas Handwork, Biogas Technology: A Manual for Decision Makers, Biogas Technology: A Manual for Extension Workers, Windpump Handhook and Cooking Stoves Hand- book. International Ferrocement Information Center in Bangkok, Thailand publishes a "Do It Yourself Series" among these are : Ferrocement Canoe, and Ferrocement Water Tank. Cassava Information Center in Cali, Columbia : Cassava Drying, Cassava Harvesting Aid. Further description of activities from 15 other information centres from 13 countries can be found in Specialized Information Analysis Centres in International Development from the International Development Research Centre of Canada. Most advanced and among the best designed information consolidation products are produced by the four information centres in geotechnical engineering, environmental sanitation, ferrocement and renewable energy of the Asian Institute of Technology in Thailand, described in some detail in Information Services for Developing Countries by J. Vails. The Canadian International Development Research Centre (IDRC) has devoted considerable efforts to fostering specialized information centres around the world.

67 IDRC efforts in this area have been quite effective, highly visible and noted with great favour among information professionals in developing countries. Unesco has commissioned a handbook on informatio consolidation [Saracevic, T
and Wood, J: Consolidation of Information. A Handbook on Evaluation Restructuring and Repackaging of Scientific and Technical Information. Paris, Unesco, 1981 (
PGI/ 81/WS/16)]
and published a guidelines in 1982 for the establishment of information consolidation units [Mazumder, A: Consolidation of Information: Biogas Handbook. Paris, Unesco, 1982 (PGI/82/WS/19)] Central Machine Tools Institute. Machine Tool Design Handbook. Bangalore, NICMAP. Indian Council of Medical Research Handbook of Radio-immunioassay. New Delhi, 1987. Central Machine Tools Institute. Trend Report on Electrochemical Maching 1965-72. Bangalore, WICMAP. Central Leather Research Institute : Health and safety at work: Leather, Leather goods and Footwear Industries. Madras, NICLAI, 1985. There are mannuals published by Indian Council of Medical Research on Laboratory Techniques from Hyderabad in 1983, on Low Cost balanced diets and school lunch programme suitable for south India from Hyderabad, National Institute of Nutrition in 1977. There are state-of-the-art reports on studies on Himalayan Glaciers, published by Department of Science and Technology, New Delhi, 1984; on Sal Fat published by Central Food Technological Research Institute, Mysore. 5.9 IAC CENTRES IN INDIA In India some of the information centres held by Tata Energy Research Institute, Central Food Research Institute, Leather Research Institute, Defence Science Documentation Centre and few other centres established by the Department of Science and Technology are bringing IAC products to cater to the needs of in-house scientists at various levels. But these centres have not yet been geared up to meet the needs of specialised groups all over the country. At present India needs establishment and all round development Information Analysis and Consolidation centres to meet the needs of research community at various levels in the country. 5.10 SUMMARY This unit addresses the problems of the proper use of information in this age of information explosion. This unit contributes to the clarification of consepts, problems and requirements of specific information practices referred to as information analysis and consolidation. The aim of information analysis and consolidation centre
is to
68 increase the effectiveness of information usage and to widen the circle of
population of users served. Information analysis and consolidation is neither an information panacea, nor substitute for any of the existing information activities. It is one approach in the whole spectrum of information practices needed for various aspects of development. However,

information consolidation is an effective approach to fulfilment of specific informational needs for evaluative and synthesized information services for

yet unserved. Here in this unit we have discussed functions, activities and products of IAC Centres and steps in the processes of information consolidation. Information consolidation has proven its value and benefits in information transfer. Therefore, information consolidation should be given a proper consideration in the institution or refinement efforts serving developing countries. 5.11 EXERCISE 1. What is an IAC centre? How does it differ from other types of information centre? 2. What are the functions of an IAC centre ? Discuss its activities and products. 3. Define information consolidation. Discuss the role of Unesco in this context. 4. Discuss the problems encountered in the use of information. 5. Describe the processes in information consolidation. 6. Explain the value and benefit of consolidated information. 5.12 REFERENCES AND FURTHER READING 1. Atherton, Pauline : Handbook for information systems and services. Paris, Unesco, 1977. 2.

Bhattacharyya, Ganesh: Information analysis for consolidation. DRTC Annual Seminar 18, Paper A 1981. 3. Saracevic, Tefko :

Process and problems in information consolidation. Information Processing and Management 1986, 22(1), 45-60. 4. Seetharama, S : Planning of information analysis centres : some general considerations. DRTC Annual seminar 18, Paper H.D. 1981.

69 UNIT 6 ❑ LITERATURE SEARCHES Structure 6.0 Objectives 6.1 Introduction 6.2 Scope 6.3 Literature search-benefits 6.4 Literature searching—the route 6.5 Locating devices 6.6 Literature searching in library and information science 6.7 Exercise 6.8 References & further study 6.0 OBJECTIVES In this unit you will learn : Literature searching, its benefits, the routes or paths of literature searching, the devices adapted for searching, the locating devices of literature, and especially literature searching in library and information science. 6.1 INTRODUCTION Literature searching is an intrinsic part of scholaiship. A true scholar cannot pursue his search for truth or knowledge without a proper route to the published or unpublished literature in his field. Literature search is especially vital for undertaking a research. It has been and will be a very important part of a research work. 6.2 SCOPE It is vital for researchers to know what has already been done in their fields. They learn this by turning to records of observations and experiments of their predecessors. This record of earlier work on a subject is known as its literature. Locating this information is called making a literature search. Literature searching is a procedure by which the searcher tunes in on the scholarly discussion at the level of generality corresponding to the familiarity of the subject and then follows the discussion through closer analysis of more specific matters to reach the level of detail and currency indicated by the problem. The most generalized and firmly established principles are sought out first, and these provide the necessary

70 background for consideration of more detailed and unsettled matters, closer to the advancing frontiers of knowledge. The literature search is of value to researchers by helping there to regard their studies as contributions to a larger topic of which the inquiry is only a part. 6.3 LITERATURE SEARCH—BENEFITS Literature search is the endeavour to identify, locate, and synthesize the complete research reports, articles, books, and other materials about the specific problems of a research topic. Literature searches help to specify and clearly mark the research problem; it reveals overlooked conclusions and facts that must be considered before a research is to be undertaken; suggests new approaches and plans for investigations; helps to look at the extent to which the particular problems have been dealt with and helps to understand the theoretical approaches of proposed problems. 6.4 LITERATURE SEARCHING—THE ROUTE The route of literature searching encompasses from the general to specific forms of literature. As is known, the most comprehensive, generalized, and many sided account of a subject is presented by a scholarly encyclopedia. Encyclopedias summarize current knowledge as well as the background and developmental history of a subject. The history of a discipline conveys 'what is known' at another level. From the historical perspective, existing knowledge is viewed as the outcome of the scholarly effort as it has developed over time. The textbook represents yet another approach to synthesis. It formulates a systematic body of explanation and definitions derived from the past research effort. An essay collection performs the similar function. The handbook summarizes current activity in a research field, and examines the status of questions of current interest. So its approach to a topic is apt to be more fragmented than that of an encyclopaedia or textbook. Handbooks give more stress on the specifics of data and methodology to the unsolved problems and issues engaging the interest of researchers. The periodic stocktaking review considers the ongoing research effort, outlining its directions and accomplishments and the issues of major current interest. The review article represents a more limited and detailed level of approach to 'what is known'. It examines and infers the evidence from a body of research in quite specific terms and proposes conclusions that may be drawn. Such reviews often reveal gaps in available knowledge and indicates directions for further research.

71 The reports of individual studies view 'What is known' with emphasis on newly acquired knowledge proposed for addition to the existing stock. So the research reports are the gateways through which new information and ideas enter the system, to combine and interact with what is already existing and, potentially to produce changes in what has been set forth all the way back up the line to the generalized formulations of textbooks and encyclopedias. This route from the generalized, comprehensive account of what is known about a subject to the detailed studies of single instances insulates is the basic pattern of information seeking in scholarly literature. This is the case for the advanced scholar as well as undergraduate students for the exhaustive study of a subject. This route from the general comprehensive account of what is known about a subject, to the detailed studies of single instances, is the basic pattern of information seeking in scholarly literature. This is not to say that every search must traverse the full route of publications from encyclopedias to research journals with all immediate steps. Only a portion of the sequence may be involved on any particular occasion, even though the basic pattern and direction are essentially unvarying. The portion of the literature to be traversed in a given instance represents the distance from where the searcher is, in terms of his prior knowledge to where he wants to go. The point at which a literature search ends is determined by what the searcher wants to know. That is, the reader proceeds along the route from more general to more specific publication forms until he reaches the level of detail and specificity corresponding to the question he has in mind. This sequence from more generalized to more detailed accounts can be matched to a corresponding sequence of publication forms, from encyclopedias to journals. 6.5 LOCATING DEVICES There are several methods to identify the literature relating to a subject. One familiar procedure is to follow up references cited in the works that the reader has already seen. An advantage of this method is that it focuses directly on the problem under consideration. But a major drawback of this method is that the process normally moves backward through time and cannot be used to investigate the subsequent development of an idea. The technique of citation indexing is designed to deal with this problem. The second means relies our the searcher's memory and personal familiarity with what has been written on a subject. This approach is employed quite often by scholars and can be used only to a very limited extent by students. The use of bibliographies is another method of locating information in the literature. The current awareness list, 'retrospective bibliography,' 'guide to the literature' are

72 all important bibliographic tools of scholarship which comprise a system whose structure and organization parallels that of scholarly literature. On-line searching is another effective tools which permit an interaction between the searcher and the system. The most important advantage of this is that this system gives current, up-to-date information instantly. Indexing and abstracting databases are also nonetheless important in aiding the researcher in literature search process. In addition to searching the literature through abstracting and indexing services, one should scan through the footnotes in retrieved papers to find other related publications; such citation analysis often points to older materials missed in a search of current databases. 6.6 LITERATURE SEARCHING IN LIBRARY AND INFORMATION SCIENCE An example of literature search in library and information science is 'Library Literature'—the author and subject index to selected library science materials, published by H. W. Wilson Company. It is among the most useful sources for locating relevant contemporary literature. When searches are needed for retrospective or historical information, the indexes like 'A Bibliography of Librarianship', 'Bibliography of Library Economy' proves useful. Theses and dissertations are also valuable sources of research information. The Journal of Education for Librarianship', 'Libri', Journal of Academic Librarianship' provides research topics on library science. A part from these, other bibliographies of library science thesis and dissertations which includes 'Library Science Dissertations', 'Master's theses in Library Science', are worth mentioning. Other specialized reference tools which have proved to be valuable for literature searches are 'Advances in Librarianship', 'Annual Review of Information Science and Technology', 'Encyclopedia of Library and Information Science', 'ERIC Educational Documents Abstracts', and 'Australian Library and Information Science Abstracts'. Other helpful journals in this field which needs regular scanning are 'College and Research Libraries', 'RQ', 'Library and Information Science Research', 'Library Resources and Technical Services', and the 'Journal of the American Society for Information Science'. Some journals not directly related to the field are also worth considering, like Internet Research.' For directories and guides in this field, one has to consult 'The ALA Handbook of Organization', 'Subject Directory of Special Libraries', 'Directory of Special Libraries and Information Centres', British Library Resources. A Bibliographic guide',

73 'Directory of Academic Library Consortia', 'Guide to Reference Sources in Computer Science', and 'Guide to the Research Collections of the New York Public Library'. 6.7 EXERCISE 1. Discuss the importance of literature search in research work. 2. Give an idea of the literature search in library & information science. 6.8 REFERENCES AND FUTHER STUDY 1. Busha, Charles H.— Research methods.

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and others; p. 283-284. Mercel Dekker. 2. Gorman, G. E. and Clayton, Peter— Qualitative research for the information professional: a practical handbook. London : The Library Association, 1998. 3. Mellon, Constance A.— Naturalistic inquiry for library science : methods and applications for research, evaluation and teaching. Westport, C.T. : Greenwood Press, 1990.

74 UNIT 7 ❏ DOCUMENT DELIVERY SERVICE Structure 7.0 Objectives 7.1 Introduction 7.2 Definition and scope 7.3 Document delivery services-categories 7.4 Document delivery—key agencies 7.5 Document delivery—the future 7.6 Exercise 7.7 References & further study 7.0 OBJECTIVES This unit will give you an idea about the second type of information services-document delivery. You will learn its scope and definition and the categories of document delivery services, the key agencies implementing these and lastly, the future of document delivery service. 7.1 INTRODUCTION Document delivery refers to the provision of materials that is provided to the users through the libraries, and that may be retained by the users. The medium of the document delivery have undergone a vast change, but the main framework within which this system works remains the same. It differs from the interlibrary loan service, which is more complex and depends on many factors. Document delivery is much simple, cost effective and userfriendly. 7.2 DEFINITION AND SCOPE Document delivery is the service in which a library or other agency makes some form of publication available when needed and requested by a library user. Earlier this term meant the delivery, to the user of an original publication from the library's own collection or borrowed from another library. Today, the delivery of a publication, or part of it, to a library user can be achieved by a wide variety of methods and sources. The photographic methods of reproduction has become more efficient and economical, and the delivery of an original item has been replaced by the delivery

75 of a photocopy. Document delivery, in a broad sense, means the provision of materials that may be retained by users. Document delivery encompasses the

provision of published or unpublished documents in hard copy, microform or digital form, usually for a fixed fee upon request.

This means that the physical or electronic delivery of documents from a library collection to the residence, or place of business of a library user, upon request, is provided through this service. This service enables users to order copies of materials retrieved by on-line searches, either by direct despatch of items or via an agent. Document delivery can be proactive or reactive, depending our the users and their needs. In the early 1990s Current Alerting Services-Individual Article Supply (CAS - IAS) was launched, which provided a mechanism for alerting end-users and librarians to the existence of new article titles. In this above mentioned service, a database is constructed, chosen from the tables of contents from important journals that are in active use. Searching this database enables individuals to identify titles of particular relevance to their query and to place an order online for the article itself. These services are more costly than interlending or centralized document delivery services, because a royalty payment is made to the copyright holder, or publisher in order to comply with national copyright laws. In case of reactive service, document delivery is used by the librarians according to budgetary requirements. Due to the growth in budgets, it is not possible for the libraries to acquire all types of materials that the users require. Such economic pressures, combined with the rapid increase of information available electronically, has led to the changing role of libraries, which now do not own much material and instead provide access to those materials to the users via document delivery. Document delivery is a complex process which spans time and distance between customer and supplier. The key factors involved here are document discovery, the location of a supplier, request and delivery. In the modern age, librarians, publishers and other document delivery services need to combat with the complexities of this system, since conventional document delivery is nowadays interwined with electronic document delivery. Document delivery has generated significant attention in recent times. Owing to financial crunches, with adequate access to journals for researchers, document delivery seems to be the only solution. Today libraries have a choice in how to provide customers with needed but unowned materials through this service. Another factor, for many libraries is the limitation of space libraries have had difficulty maintaining their operating budgets; when it comes to securing funding for additional space to house the evergrowing collections, it becomes much more difficult. One way to gain space in an existing facility is to look at long back volumes of journals, especially those that have very little usage. Withdrawing the physical volumes provides shelving space. But the question then becomes how to provide access to the withdrawn

76 titles. Buying microfiche film versions is one option; but microfilm storage cabinets take up space, and the cost of microforms and the equipments to use them must be considered. So accepting the document delivery option saves space and the cost of requested materials may never equal the cost of the microforms. 7.3 DOCUMENT DELIVERY SERVICES-CATEGORIES Document delivery consists of three main items— a) creation of a document through authors, editors or publishers; b) alerting to document existence-through library, publisher, subscription agents current awareness service, bibliographic database producer and on-line search service; c) provision of a document through library, library consortium, subscription agents, publishers, current-awareness service, and commercial document delivery service. Documents may be delivered through CD-ROM, fax, on-line or web, or in print form. Different types of documents delivered are books, journals, journal articles, or reference works. The nature of the delivery may be in the form of purchase or loan. The various categories of document delivery services are discussed below : (i) Library networks and consortia— The cooperative activities of the libraries is a relatively old concept, and through these exchange of print based documents or interlibrary loan is facilitated. Now-a- days print delivery has been supplemented by electronic document delivery. The networking of libraries relate to the creation of union catalogue database as a means of accessing and sharing the resources of a group of libraries. The networks help in revealing the contents of a large number of libraries or a large number of publications, especially through accessibility of catalogue databases, and making the resources shown in these databases available to individual libraries and users when required. Many organisations have taken to this networking and various projects are going on in this area, like CONSER (cooperative on-line serials), OCLC, RLG (Research Libraries Group), BLAISE (British Library Automated Information Service), LASER (London and South Eastern Region), JANET (Joint Academic Network), EARN (European Academic Research Network) etc. (ii) Document delivery on CD-ROM Both bibliographic and source databases are supplied on CD-ROM. Where the library acquires a document on CD-ROM, they may provide networked access to the document under appropriate networking licenses. A DONIS is a CD-ROM based

77 article delivery system. There are articles from over 680 titles and more than 70 publishers in the biomedical fields. The documents in ADONIS are images, so the actual text of the article is not searcheable. Items included in the index alone have currency as search terms. This index is assertible using Boolean searching, comparative and proximity searching, and wildcard searching. Printing an article incurs the Publishers Copyrights charges, which is set by each publisher. Update CD-ROMS are produced as soon as ADONIS has processed the journal issues. (iii) Commercial document delivery services. Many new commercial document delivery services are directed towards end users. Most involve partnerships between document providers and on-line services. They rely on a combination of technologies, or on alternative technologies, like fax, Internet, or electronic bulletin board system. OCLC Firs!: Search is on on-line search service that is very much used in the academic community. It provides access to a wide range of databases, with an easy-to-use menu interface with cost controls through end use pricing. KR Source One is another example of a commercial service, linked to a search service. Documents can be ordered through DIALORDER, on DIALOG, or through email, phone, fax or WWW. Un cover is a sister service to KR Source One. Document delivery is from a periodicals database that indexes 17,000 multidisciplinary titles. This database can be searched through a web interface by topic, author name, or periodical title. (iv) Library suppliers & subscription agents. Recently many book suppliers have established electronic ordering systems. These allow the library to consult a book suppliers database on-line for book selection purposes. In the electronic ordering of books, links can be made from author to retailer via publisher, wholesaler and library. Libraries interface with suppliers or wholesalers, and then makes items available, recording transactions through their circulation control systems. Many serial subscription agents such as SWETS, EBSCO and Blackwell have developed a range of services based on the databases of journals and links with publishers and libraries. Services like data swets give electronic access to the subscriptions database enabling users to search for bibliographic and price information, and to look up subscription details. (v) Electronic journal publishers and suppliers There are two forms of electronic journals journals—that are originally published in print form, and which are available in digital form; journals that are born digital which often do not need a publisher, and which can be managed by an editor and a scholarly community. The rise in the 1990s of e-journals available via the world wide web posed a challenge to traditional forms. Such journals are in some cases referred, some are freely available, and some of them command a price. Many of them do not have a printed equivalent, from which a document request might be

78 satisfied. Document delivery is a particularly contentious issue for venders of electronic information, and a clear definition of terms is one of the most valuable functions model licences can perform in supporting the needs of the library's document delivery functions. A model license is an idealized version of a licensing contract that gives both libraries and venders a basis for evaluating and negotiating contracts that will be fair and profitable to all parties. A development in the UK electronic journal environment is the National Electronic Site Licence Initiative (NESLI) established by the Joint Information Systems Committee (JISC). It is intended as a service designed to promote the widespread delivery and use of e-journals in the U.K. higher education and research community. In case of delivery services for e-journals, one should be cautious in choosing an e-journal vendor, and should see to the following criteria- type of acces s provided quality/content of the database ordering options (user, library) costs & what is covered (copyright fees) delivery options (fax/email) reliability payment options customer service availability Lancaster and Sandore (1997) have chalked out a possibility of access/delivery options for journal articles, which is shown below : Ownership by library Inprint form In electronic (or microcopy of print) form Access library resource — commercial — network access to journals; sharing suppliers of copies also available in paper form; only in e-form Delivery options rail - fax - network physical (print based) virtual (digital)

79 According to them, the most physical form of delivery can be considered as the delivery to the user of an original item from the library's collection or from that of another institution. Somewhat less 'physical' is the delivery of the photocopy of that item. The most 'virtual' is the provision of access to journals that exist only in network-accessible form. 7.4 DOCUMENT DELIVERY—KEY AGENCIES The British Library Document Supply Centre (BLDSC) dominates the U. K. Scene for document delivery. It was set up as British Library Lending Division (BLLD) in 1973 by amalgamating the stocks and services of the National Central Library with the National Lending Library for Science & Technology. It receives over 3.8 million requests each year, over a million of which are from outside U.K. Three quarters of the requests received by BLDSC are made electronically. Most of the orders are despatched by mail, and delivery to clients takes place very fast. BLDSC makes provision of service to science, technology and industry, and also supplies documents to the humanities and social science communities. Requests are carried out electronically through the BLDSC's proprietary ART system. Similar services operate in France (INIST), in Germany (Hanover, Cologne), in Canada (CISTI) and in other countries that have adopted the BLDSC model as their basis. EDDIS is a project that is automating to integrate the whole process of information access, from discovery to delivery. EDDIS is designed as an end user service which integrates document discovery, location, request and receipt available through a www interface. This project have demonstrated that electronic document delivery is possible, but implementation depends upon the type of users and also acceptance of standards. BLDSC has contributed to the EDIL (Electronic Document Interchange between Libraries) project, with partners in France, the Netherlands and Germany, working on a system enabling the fast interchange of electronic documents between libraries. This project shared the view that Interned standards and electronic mail are the most appropriate approaches to electronic document delivery. BIDS, the service offered by the UK office for Library Networking, established in 1989, supports the development of networking activities among UK Libraries. It has played an important role in making electronic databases available at competitive rates within the UK academic community. Key databases are BIDS ISI Service, BIDS COMPENDEX service, BIDSEMBASE service, etc. EBSCO, an important name in electronic journal services offers four services which are EBSCO subscription services, EBSCO publishing which publishes electronic indexing, abstracting both on-line and on CD-ROM, EBSCO dock, a document delivery

80 service providing article delivery of print documents, and EBSCO host, an on-line client-server system providing search and retrieval of abstracts & full-text articles. In USA, OCLC plays a boding role in providing an interlibrary lending subsystem to its library management system, thus facilitating the creation, sending, and tracking of document delivery and interlibrary loan requests for materials included on World Cat (OCLC's On-line Union Catalogue), which provides access to the combined resources of over 6700 libraries, totalling over 43 million records. It has developed its own Article First, and Contents First database too. OCLC First Search is the on- line search service that is widely used in the academic community. Document delivery for articles identified through access to OCLC First Search's bibliographic database can be brought through a number of different modes like ASCII full-text on-line, printed document images, and electronic document images. INFLIBNET has initiated a new Document Delivery Service in collaboration with six university libraries :

Banaras Hindu University, Varanasi; University of Hyderabad; Indian Institute of Science, Bangalore; JNU-New Delhi; Punjab University Chandigarh

and

Tata Institute of Social Science-Mumbai. These serve as document delivery centres and deliver, on demand, the copies of papers from learned journals, conference proceedings and other materials. 7.5 DOCUMENT DELIVERY—THE FUTURE Document delivery service will gain immense momentum in the future, though the nature of document supply will inevitably change as an increasing amount of material becomes available only electronically. But side by side, a number of factors will be taken into consideration too. The debate over copyright law and its application is an impatient one as libraries and publishers attempt to deal with the implications of new technologes, new formats for imformation and improved networks of communication. The development of standards for the delivery of materials is another issue. The increasing number of commercial suppliers and the increasing possibility of a changing marketing model are other issues. As libraries move from a traditional model where they are the resource centre and purchase items, to an access-based model, this role becomes even more critical. Document delivery will become more streamlined, more integrated and less reliant on library personnel mediation as suppliers move towards providing direct electronic access to the end-user. The need for a library- based document delivery department will remain but it is likely that its role will change. To sum up, we can say that the following factors will have a direct impact on the document delivery services— a) Increase in information

81 b) The nature of document delivery c) Technological developments. d) Shift from holdings to access based policies e) Integrated and wider catalogue access among libraries f) Current-awareness services. It can be concluded in the words of Suzanne Ward that 'The only certainties in document delivery today are that the number of requests will increase exponentially and that tomorrow there will be ever more suppliers and methods for ordering from them.' 7.6 EXERCISE 1. What are the various categories of document delivery services? 2. Discuss the key agencies imvolved in the document delivery services. 7.7 REFERENCES AND FURTHER STUDY 1. Evans, Edward G. & Zarnorky, M. R. — Developing Library and Information Center Collections. Libraries Unlimited, 2004. 2. Finnie, E. — Document delivery, ASLIB, 1998. 3. Morris, A. & Blagg, E. — Current practices and use of document delivery services in U. K. Academic Libraries. Library Management, 19 : 271-80 MLIS (P 4 & 5, Eng)—6

82 UNIT 8 ❏ TRANSLATION SERVICES Structure 8.0 Objectives 8.1 Introduction 8.2 Definition and Scope 8.3 Translation Services : Role of libraries 8.4 Translation types 8.5 Translation methods 8.6 Translation pools 8.7 Translation tools 8.8 Exercise 8.9 References & Further Study 8.0 OBJECTIVES This unit brings into forefront the third type of information services, i.e. translation services. You will learn the role of libraries in this aspect, the types of translations, the methods of translations, various translation pools and translation tools. 8.1 INTRODUCTION Translations have always been regarded as an important part of information services. The information explosion has much augmented the necessity of translation services as a huge amount of publications are in different languages of the world. The inportance of translation pools and translation tools have soared high and a number of agencies are now involved in this work at Government, Non-government, public and private level. 8.2 DEFINITION AND SCOPE The word 'translation' is a popular one in the English language dictionary. The Random House Dictionary describes it as to turn from one language to another. The Oxford English Dictionary gives its meaning as 'Express the sense of word, speech, book etc. in one or into another language into another form of representation.' So we can say that translation in libraries, is a written work expressed in a language other than the languages in which it was originally composed. The purpose of a translation is to make a document accessible to those who have insufficient knowledge of a

83 language, to be able to comprehend the text in its original form. Language constitutes a very serious barrier in communication. It has been found that more than 50% of the world's scientific and technological information appears in language other than English. So dissemination of non English foreign languages in scientific and technological literature is difficult. Some scientists and engineers feel that they may safely ignore materials written in languages other than their own native tongue. But this is a very serious mistake on their part. The need for translation is increasing rapidly as increased industrialization and national prosperity are causing useful information to appear in one or more languages. On-line access to multilingual database is also contributing to the need for translation, a need which is growing, as scientists attempt to keep up with the immense proliferation of scientific literature in their fields. 8.3 TRANSLATION SERVICES : ROLE OF LIBRARIES The role of libraries in providing translation services is being increased day by day. Libraries often have their own pool of experts who provide translations to their customers. The character of a library in this service should be such that it must be national in scope, and should not duplicate or bypass existing translation projects, should publish & bring out bulletin containing lists of newly reported translations. It should translate data on all known resources, national or international. Not only this, but libraries must have information about translation pools and centres, professional associations conducting translations, government agencies, commercial publications and their products, like cover to cover translations, preparation of digests and abstracts, bibliographical lists in English or other foreign language titles and translation of monographs, and similar others, directories of translators and translation firms. Libraries often maintain

on up-to-date basis, ability to assist clients in identifying institutions holding the needed translations.

The role of libraries or library staff is noteworthy in this respect. The provision, in house, of a Current Awareness Service, may often indicate that the librarian or the library staff possess some foreign language ability, depending on how the service is compiled. The translators, may be often employed by the organization, in which case they are part of the library staff to help users. Staff members should be able either to translate, to abstract or make summaries of materials needed for translation. Translators act as a kind of medium, expressing ideas which would be inexpressible otherwise. The foremost duty of the translator is to keep the style and character as much as similar to the original, and faithful as much as possible to the original.

84 If all these factors play well, then we can prove the saying that translation builds libraries & libraries nurture translations. Often the concept of 'double barrier' is felt in dealing with the translation literature. First is the language barrier, which has been dealt with, and the role of libraries in solving it has also been discussed. The second barrier is

the time lag between the appearance of the original paper, and its

subsequent translation, provided the translation is made. Therefore sometimes a common network is provided by the libraries or by the 'invisible college' of scientific researchers which in some way obviates the need for translation. A prior translation of articles, therefore can be predicted by a citation analysis to have a wide impact, and therefore their publication in a selected translated format. 8.4 TRANSLATION TYPES The types of translation varies according to the nature of material to be translated. Natural, applied and social science documents are translated adhering to the content of the original.

The legal materials, technical information, correspondence, pure and applied sciences all fall under the category of literal translations. In this type of translation, the subject matter is vital, styles and techniques are important. These type of translations are made for mass consumption, and these are repeatedly translated too. For example, Rabindranath Tagore's Gitanjali may be translated for mass consumption repeatedly. On the other hand, the scientific and technological translations are meant for specialists, and these are translated once a while. So these translations need precision and accuracy. Free translation refers to the freedom

to substitute for the original word, that which is more appropriate, timely & understandable to the readers of the target knowledge, who live not only in a different country, but in different

centuries too. Published translations are accessible to a wide audience through conventional outlets such as libraries and booksellers. A translation can be published in the same form as the original (e.g. book, report, journal) or incorporated into a collective publication such as a translation journal. Translation journals contain a selection of translations from either the same source or multiple sources, usually in the same subject field. A cover-to-cover translation journal is a full translation of a journal originally published in another language. A dhoc (unpublished) translations are translations that have been privately commissioned by an individual, commercial or government organization for in-house use. Source organizations make their scientific and technical translations available through the World Translations Index (WTI) database to give other researchers the benefit.

85 8.5 TRANSLATION METHODS There are mainly two methods of translation-human & machine. The most common method of translation is that of human translation performed by someone with a good knowledge of both the subject and the source & target languages. Since the 1960s it has been possible, to a varying extent to employ computers to generate translations. This is known as machine translation. A machine translation is a translation generated by a computer, with or without the assistance of a human intermediary. Machine translations provide translations of entire sentences or texts but can offer translations that are unacceptable. Machine aided translation is another type of translation generated by a human with the help of a computer. This help can be in the form of word processing, terminology banks or dictionaries, other computerized databanks, spelling, grammar or style checkers & electronic publishing. 8.6 TRANSLATION POOLS Translation work is a very expensive and time consuming process. So cooperation at international and national levels is essential for an effective translation process. This cooperation has resulted in the formation of translation pools. These pools publish various tools of translations, like indexes or bulletins. There are pools of translation at ASLIB and BLDSC, and elsewhere. The National Translation Centre at Chicago, the International Translation Centre at Delft, the National Virtual Translation Centre deserves special mention. (a) The National Translation Centre Located at the John Crerar Library, Chicago, it is an important depository and information source for unpublished translations into English from world literature of the natural, physical, medical and social sciences. It is a valuable research tool for the English speaking scientific community. Many scientific and professional societies, government agencies, colleges, universities and other academic institutions in U.S.A., and elsewhere deposit the translations prepared by them in the centre. Inquiries are also answered on the availability of translations from the centre. It acts as the national clearinghouse of information on translations. A number of indexes have been published by the centre which are as follows : i. Author list of translations, 1953 and its supplement, 1954. ii. Translations monthly, 1955-58 iii. Technical translations, 1959-67

86 iv.

Bibliography of translations of Russian scientific and technical literature, 1954-56. v. Consolidated index of translations into English, 1969.

In 1967, the NTC started publishing its new index under the title Translations Register-Index which is a semimonthly journal. This section announces newly accessioned translations of the NTC recorded in subject categories arranged by the COSATI classification and terminology. It also indexes translations from other sources including the NTIS. The NTIS is responsible for collecting translations from both U.S. and foreign government sources. Translations available from the NTC are also available from the BLDSC of Great Britain on loan, or in photocopy. (b) The International Translations Centre Also called Centre International des Traductions, is a non-profit organization, serving as a clear house for information on existing scientific and technical translations from any source language into western languages. Founded in 1961, it is the part of a network that includes national translation centres in a dozen countries. It maintains a central reference catalogue and an information bureau to facilitate identification of and access to nearly one million translations. It produces the World Translations Index, a hardcopy and machine-readable index to scientific translations in all fields. The centre provides reproductions, and acts as a referral centre in relation to the national centers and other organizations holding translations, but it is important to role that the Centre does not perform translations itself. The major input here is in the form of notifications of translations from cooperating national centers and more than two hundred other organizations throughout the world. The centre maintains the machine readable World Translations Index data base, which holds approximately 250,000 references and covers the period from 1977 to the present. Approximately 28,000 items are added each year. The World Translations Index is published jointly with the Documentation Centre of the Centre National de la Recherche Scientific, Paris, and in cooperation with the National Translations Centre at the University of Chicago. It announces more there 28,000 translations per year (both completed & in-progress) of serial articles, patents, standards and monographs. The Journals in Translation is one of the Centres, publication, published jointly with the British Library Document Supply Centre, Boston Spa. Five-Year Cumulation of the World Index of Scientific Translations (1967-1971 & 1972-1976) is its another publication. Nine-year Cumulation World Transindex (1977-1985) published jointly with the Documentation Centre of the National Scientific Research Centre, Paris. It contains more than 190,000 notifications of scientific and technical translations, which includes source and author indexes. The World Translations Index data base is also available on-line through ESA/

87 IRS, and it is produced by means of the PASCAL system. The database provides such bibliographic data as author name, title of translations, number of pages of translations, agency name from which the translation is available, price, language, name, year, volume & number of the original periodical. Reproduction of translations can be ordered'through the Questorder service of ESA/IRS. (c) National Virtual Translation Centre Established in 2003, it is an inter-agency element with a small, but diverse office staff coming from different agencies, academia, industry, etc. The main work of this centre is to develop policies, procedures & systems for managing translation requirements & services; create a virtual information sharing architecture that connects the translation tasks, language resources and linguists anywhere in U.S.A.; identify and utilize translation resources from U.S. Government, academia and private industry; support continued development and fielding of proven human language technologies designed to help processing of foreign language data. It was established for the purpose of providing timely & accurate translation of foreign intelligence for all elements of the intelligence community. (d) The British Library Document Supply Centre The BLDSC is the most important depository of translations in Britain. It collects and promotes translations from and to various sources. The BLDSC holds a comprehensive collection of translation into more than half a million Journals translated by English from a wide variety of languages particularly several articles translated from Japanese, Russian, German and French ranging from 1800 to present day. It holds cover to cover translation of selected Russian scientific serials many available through ZETOC. Patents, Standards, conference papers and books translated into English are also available. BLDSC often checks for an existing English version of the document required by any one. As an alternative it supplies documents in its original language item. (e) NISCAIR Formerly known as INSDOC, this Indian centre provides a translation service since the inception of INSDOC. The demand on this service is mainly for important European languages like German, Russian, French, into English. There is source demand of translations from Japanese & Chinese too. INSDOC had brought out a bulletin entitled National Index of Formulations (NIT). At present this index lists the translations of INSDOC and 22 collaborating institutions. Translations done in NISCAIR and a few other institutions in the country are regularly announced in the World Transindex of the International Translations Centre.

88 (f) Centre for Translations—Sahitya Akademi. Sahitya Akademi, the famous Indian centre for literature, has established four centres for translation at Bangalore, Ahmedabad, Delhi and Santiniketan. These centres bring out special series of books from the language of one area of India, translated into English and other languages. Beginning with a series of premodern classics from the Bangalore centre, these centres will also translate books for the scheme "one hundred twentieth century classics," being brought out in English by Sahitya Akademi in collaboration with National Book Trust, India. The Bangalore Centre is stated to bring out translations of premodern classics in different languages under the series 'Prachya'. Apart from these, there are other important translations pools which cater to the needs of the scientists and researchers all over the world. These are as follows : Royal Library of Belgium-National Centre for Scientific & Technological Documentation; Linguistic Research centre of the University of Texas, Austin; Institute for the Translation of Hebrew Literature; Canadian Index of Scientific & Technical Translation (CISTI) etc. In the Indian scenario, National Centre for Software Technology (C— DAC) is worth mentioning. It is a scientific society of the Department of Information Technology, Govt. of India, involved in research and development into the area of software technology. The project undertaken by it is called Matra which is the human aided machine translation system of English, Hindi and other languages. 8.7 TRANSLATION TOOLS Translation indexes are the most important tools of translations which cover translations produced by a single organization or a country, or pertaining to a specific subject field. The most significant of these indexes is the Index Translationum which is the International Bibliography of Translation. It lists translation of books published by member states of UNESCO. It does not include journal articles. Articles covered are from 1932 to date. Searching mode is by author or title. It is published annually. Arrangement in it is by names of countries and ten main divisions of UDC. The details of World Translations Index has been discussed earlier. The subjects covered here are engineering and aeronautics and aerospace technology, biological and marine sciences, chemistry, earth sciences, iconography, agriculture, maths, physics, nuclear science, energy and technology. Half of the English translations were originally published in Russian and 30 percent were from Japanese and German originals. Other important translation tools are Consolidated Index of Translations into English (1969), supplemented by Translations Register Index (1969); World Index of Scientific Translations (1972); National Institute of Health's Translation Index (1954-

89 63); Literature of the World in English Translations : A Bibliography (3 volumes) etc. 1969, the NTC issued an important guide, Consolidated index of translations in English (CITE). CITE contains details of 142,000 translations. CITE II, covering the years 1967-1984, appeared in 1987. In the USA, the Joint Publications Research Service (JPRS) produces many pages of scientific and technical translations each year. JPRS translations are notified in the announcement service Transdex index. Current announcements of translations from British sources are carried out in British reports translations and theses (BRTT). 8.8 EXERCISE 1. Discuss the importance of translations in the modern society. 2. Describe the important translation pools. 8.9 REFERENCES AND FURTHER STUDY 1. Guha, B. — Documentation & information, services, techniques & systems. Calcutta, World Press, 1983. 2. Kent, Allen, ed. — Encyclopedia of library & information science. Vol. 31, Mercel Dekker. 3. Mann, Thomas — A guide to library research methods. New York. Oxford University Press, 1987. 90 UNIT 9 ❑ TRADE LITERATURE Structure 9.0 Objectives 9.1 Introduction 9.2 Forms of Trade Literature 9.3 House Journals 9.3.1 Internal House Journals 9.3.2 External House Journals 9.4 Problems of trade literature 9.5 Commercially available trade literature services 9.6 Uses 9.7 Guides to trade literature 9.8 Summary 9.9 Exercise 9.10 References and Further Reading 9.0 OBJECTIVES We take trade literature to mean literature which an organization produces in connection with its products or services. By reading this unit you will know that manufacturers or dealers issue in a tremendous variety of forms, ranging from single sheets to multi-volumed sets, to describe and instruct their goods or services, of course such 'product data' as it is often called is his prestige. You will know different forms of trade literature, one of them is house journals. You will also understand the problems of their acquisition, arrangement, retrieval and use. 9.1 INTRODUCTION One authoritative estimate is that in the United Kingdom alone there are over 30,000 companies producing trade literature. Its function may be to advertise or instruct the reader in the use, exploitation or maintenance of these products. Some of this literature is more information oriented than sales oriented, and some even encourages the reader to find new application for the products or materials available. The literature may take the form of sales brochures, catalogues, manuals, house journal, annual report, a handbook, a newsletter or a trade journal. Commonly it is very technical: in the case of chemicals, for instance, as Crane points out, it will
frequently summarize
91 the chemistry of compounds, give extensive information on physical properties, tell how to use them
in various ways, and give references to the literature. In many cases the aim is as much

to inform potential customers, users and others, e.g. students, teachers, research workers, about commercially available materials, equipment and processes, as to stimulate sales as such. In recent years

manufacturers have been stepping up the informational content of the literature to encourage users themselves to find new applications and new markets for particular products. In some companies as much as half the advertising budget is devoted to trade literature. It has been estimated, noted by Grogan that in the field of electronic engineering, for instance, suppliers use 200,000 pages of trade literature to describe their wares. Some of these publications are merely trade catalogues, i.e. basically little more than enumeration of available goods, with brief details and sometimes supplementary indexes or keys, Prices are usually omitted, although separate price lists are sometimes available on request. Often of course this information is of commercial rather than strictly scientific or technical value. Even so they serve a

vital function for the scientist and technologist: the chemist who needs a substance with certain characteristics, or the engineer looking for a piece of equipment to perform a specific task finds such

catalogues invaluable, for without their aid he may not be able to ascertain easily whether they are available commercially and may thus be obliged to synthesize or builds for himself. But what raises manufactures' publications to the level of a primary source of scientific and technical information is the continuous flow of sheets, folders, pamphlets, bound and loose- leaf volumes, on new products and processes, theory and applications, containing original data that has not yet appeared in the regular literature. It would be a mistake to assume that trade literature has only ephemeral importance. It is being increasingly realised how valuable are

retrospective collections of trade literature for studies such as industrial archaeology, business history and the history of science and technology.

It has frequently been discovered that contemporary manufacturers' brochures are often the only source of information on various museum objects or industrial relics particularly of the nineteenth century and early twentieth centuries. Unique so far is L. B. Romaine A Guide to American Trade Catalogues 1744-1900 (New York, Backer, 1960). It may be mentioned in passing that not all trade literature is published by individual firms : trade associations sometimes issue catalogues listing their members' products, e.g. British Chemicals and their manufacturers (Association of British Chemical Manufacturers). Works of this kind are very similar in layout and use to the conventional trade directories. In fact trade directories are often regarded as a form of trade literature, though their publication in most cases through normal book-

92 trade channels would seem to indicate that they are best looked on as a specialized form of directory. Some trade directories do make a feature of including what is undeniably trade literature, e.g. the manufacturers' data sheets and catalogue pages describing products and services in concrete yearbook. Other examples are : Kelly's Manufacturers and Merchants Directory. East Grinstead, Kelly's Directories, annually. Key British Enterprises. The top 20,000 British Companies 2 vols. London, Dun and Bradstreet annually. Sell's Directory : products and services. Epsom, Sell's Publications, annually. Thomas Register of America Manufacturers and Thomas Register Catalog File. New York, Thomas Publishing Company, annually. 9.2 FORMS OF TRADE LITERATURE The typical piece of trade literature is a folder or pamphlet, glossily produced but commonly of a nonstandard size and thousands of each pieces are distributed by manufacturers daily.

What distinguishes such publications from general advertising is the wealth of technical detail and the
very
solid body of information conveyed. Substantial pamphlets with dozens of pages of well written text and diagrams are common,

e.g. Shell chemicals Ltd. Building with plastics (1965), Foredo Ltd. Friction materials for engineers (1961) and booklets of a hundred or more pages are frequent e.g. NV philipes Audio amplifier systems (1970), ICI Ltd. Dyestuffs Division. Rubber Chemicals for footwear (Manchester, 1961). They may be no more than a single page, e.g. the data sheets on British Oxygen Chemicals Ltd. range of products issued as BOC information. Some catalogues appear in serial from, e.g. Elastomers notebook (Du Pont), though they are usually too irregular to rank as journals. Some of the trade literature are almost equivalent of a standard work in their field e.g. C.E.A. Shannon Chemical analysis of flat rolled steel products (Richard Thomas and Baldwins Ltd., 1961). In some cases, they are indistinguishable from regular textbooks or monographs, save for the fact that they are issued by an industrial firm and not a publishing house, e.g. Sir Joseph Lockwood Flour milling (Stockport, Henry Simon Ltd. fourth edition, 1960) is the basic text on the subject. A number have attained the status of recognized reference books in their fields, e.g. Yorkshire Engineering Supplies Ltd. Bronze : a reference book (Leeds, 1962), Alcoa aluminium hand-out (Pittsburgh, Aluminium Company of America, 1962). The number of trade publications in the form of bibliographies is a further indication of the sophisticated approach to the user, e.g.. ICI Fibres Ltd. Select bibliography on nylon (Pontypool, 1966). The amount of literature produced by a number of the major companies is

93 so great that some have felt it necessary to produce bibliographies of their own publications, eg. ICI Ltd. Dyestuffs Division Technical publications subject index to June 1963 (Manchester, seventh edition, 1964): some indication of the range of materials is given by the list of series

covered—sales circulars, Chemicals pamphlets, technical information series, technical circulars, pattern cards, swatches, manuals. A special form of this literature is the customer's handbook, or maintenance manual, service manual, or user's guide, as they are variously called. These are basically textbooks and/or reference books prepared by the manufacturer for his customers on how to

install or operate or maintain or repair his particular equipment. The best known examples of this type are the workshop manuals for the various makes of cars,

but there are similar compilations for most kinds of scientific and technical hardware, such as electron microscopes, furnaces, lathes, etc. Some are necessarily very elaborate, eg. the series of volumes known as the IBM Systems Reference Library, covering the hardware and software of all IBM Computers and peripherals. 9.3 HOUSE JOURNALS One of the distinctive forms of trade literature is the periodical published by a particular industrial or commercial firm or public corporation

e.g. Atom news (UKAEA), Dupont magazine, Welder, the 'Planters Chronicle' (First house journal in India), NCR World (USA). These are known as house journals or house magazines (also as house organs in USA).

Like other forms of trade literature they are basically advertising publications, but in some instances they also have great information value. 9.3.1

Internal House Journals In the United Kingdom the total number probably approaches more than two thousand, and in the United States perhaps five times that number. A large proportion of house journals are designed for internal consumption, that is, by the companies own employees or shareholders, and may indeed by restricted to them e.g. Vickers news, The lamp (Exxon Corporation), Nobel times, British Aerospace news. The internal house journals are meant for the employees of the concerned organization. Their aims are to inform and educate the employees about the organization. They also aim to provide the employees with a form to express their views and grievances. They are also meant for the welfare of the organization. They serve the function of newspapers written a firm and certain information, for instance, personnel changes, suggestion schemes, expansion plans, although a number do have roles other than communication and morale building. The importance attached to them by the companies and the

94 care with which they are directed at their particular audiences can be seen in the fact that Esso Petroleum Co. Ltd. have a whole range of such journals : Esso Oilways international, Esso newsline. Esso magazine, Esso air World, and Esso farmer. The international character of many modern companies can be seen reflected in the separate language editions of a number of their journals, e.g. Philips technical review appears in Dutch, English, French and German. Of Course many of them have little scientific or technical interest, e.g. bank reviews. 9.3.2 External House Journals The journals of most concern to us are those which circulate outside the companies and these fall into three main categories and are meant for the external audience. Categories are: (

a) Prestige : Usually aimed at the nontechnical reader, and often lavishly produced, but more with creating goodwill and preserving a favourable public image, e.g. Ciba-

Geigy journal, Aramco World Magazine, Oil lifestream of progress (Caltex Petroleum Corporation), one of the best of all, the now defunct Far and Wide (Guest keen and Nettlefolds) (b) Scientific technical: these are clearly aimed at a knowledgeable audience and qualitatively may be equal of some of the research and technical journals e.g. IBM journal of research and development, steel research (British Steel Corporation), GEC journal of science and technology, The Bell System technical journal. (c) Popular : these are similar in appeal to the commercially produced popular subject periodicals e.g. Decorating review (Wall Paper Manufacturers Ltd.). Motoring journals are particularly well represented, e.g. Ford news, Austin—Morris express, Specialist car (British Leyland). And yet when the joint research team reported on their study of house journals they called their article. 'The hidden literature'. They had concluded that 'House Journals' are generally regarded as and proved to be, an extremely elusive form of literature'. Only a small proportion can be found in standard bibliographies such as the World list of scientific periodicals,the British- catalogue of periodicals, or the Union list of serials. 9.4 PROBLEMS OF TRADE LITERATURE Trade literature abounds with problems of acquisition, arrangement, retrieval and use. Since virtually all such literature (including house journals) is available free of charge from the manufacturer, simply for the asking, the librarian might well wonder whence comes the acquisition problem. In point of fact, it is the very availability which causes one of the major difficulties : like the research reports trade literature is outside the usual source of literature supply, the book trade. Booksellers are naturally reluctant

95 to deal on large scale with producers of literature other than regular publishers and even more disinclined to deal with free material. This means that librarians are obliged to employ direct or do-it yourself acquisition procedures, by first identifying appropriate manufactures from trade directories, advertisements and other sources, and then writing either for particular items or with a request to be placed on the mailing list. Trade literature is either ignored or deliberately excluded from most current bibliographical lists (including abstracting and indexing services). The quarterly COPNIP list published by the committee on Pharmaceutical Non-serial Industrial Publications of the Special Libraries Association is a unique example of a current list devoted to trade literature. The best sources of information on new trade publications are the scientific and technical periodicals a number of which make a feature of noticing or at least listing new titles, eg. Engineering Metallurgia, R & D, Chemical Week. But acquisition is a simple task compared to the organization of a collection. Despite the British and American standards the variety of sizes and shapes encountered is immense, no doubt because to a manufacture whose products have to compete with rivals a publication in an unusual non-standard format has a head-start, and for a collection composed mainly of folders and pamphlets even the simple question of storage needs careful thought. As to arrangement, it will suffice to indicate the nature of the

problem. Ideally, any system should provide for access by name of manufacture, name of the product, trade name, and subject; yet one trade catalogue may describe hundreds of different products.

And perhaps more than any other form of scientific and technical literature the information content, and therefore its value, varies unpredictably. A particularly acute problem is maintenance. The provision of accurate and up-to-date prices is a particular headache. Because access to the information in trade literature is devoid by indexing and abstracting services, adequate arrangement, indexing and maintenance is more than usually crucial, without it a collection is virtually unusable. 9.5 COMMERCIALLY AVAILABLE TRADE LITERATURE SERVICES

A partial solution to the librarian's problems is to subscribe to one of the 'package libraries' or 'catalogue services' which are now increasingly available. Known also as product information services, for an annual fee they will provide within a particular subject field an indexed collection of trade literature in standard format:

the newer services will also guarantee to maintain the collection, usually on a monthly basis. Commercially available 'product data services' take the form of collections of trade

96 literature with specially compiled product and company indexes. These collections are hired out and maintained by service organizations. Two examples are as follows: The Technical Indexes System, available from Technical Indexes Ltd. Willoughby Road, Bracknell, Berkshire. Barbour Index. Barbour Microfiles, New Lodge, Drift Road, Windsor, Berkshire. 9.6 USES To help you choose suitable products, equipment, materials, services, etc. for your requirements. To give you detailed information about products, equipment, materials, etc. which are already in your possession and which you wish to use or maintain. To give you details about rival products or services. 9.7 GUIDES TO TRADE LITERATURE If the name of the supplier or manufacture is known, but their literature is not available in your organization or locally, the problem is usually to find their address or telephone number, so that you can approach them direct. The directories to the various types of organizations or their database equivalents will help you here : for example, telephone directories or KOMPASS : United Kingdom for British commercial organizations. The Science Reference Library publishes Trade Literature in British Libraries (a brief directory). If you only know the type of product you want, the first problem is to identify the name of a suitable supplier or manufacturer. You may do this via the product or subject index of your local collection of trade literature, if you have one, or via the indexes in the directories. If you wish to keep up-to-date with new products in a particular field, you have to rely on the various periodicals for advertisements, or ask appropriate suppliers or manufacturers to keep you informed of their own products. There are some journals which consist entirely of advertisements, and there are those which actually list details of new trade catalogues. 9.8 SUMMARY We have discussed the importance of trade literature to the scientists and technologists. We have noted the different forms of trade literature. One of the distinctive forms is the house journals-both internal and external. We have highlighted the different 97 problems of trade literature, commercially available trade literature services, and uses and guides to trade literature. The functions of telephone directories and KOMPASS in locating various trade literature have been discussed. 9.9 EXERCISE 1. What do you understand by 'trade literature'? Illustrate. 2. Give examples of at least five trade directories. 3. What are house Journals? Discuss their functions. 4. Discuss the problems of retrieving information from the trade literature. 5. What are the guides to trade literature? Give examples. 6. Show your acquaintance with the commercially available trade literature services. 9.10 REFERENCES AND FURTHER READING 1. Drott, M. C. and others : 'The hidden literature : the scientific journals of industry. Aslib Proceedings 1975, 27, 376-84 2. Ford, M : 'The technical indexes system for the control of trade literature'. Aslib Proceedings 1972, 24, 284-292 3. Grogan, Denis : Science and technology : An introduction to the literature, 4th ed. Clive Bingley, 1982 4. Kelbrick, N : 'Trade literature as a library material'. Library Association Record 1971,73,65-67. 5. Kennington, D : 'Product information services— some comparisons'. Aslib Proceeding 1969, 21, 312-316 MLIS (P 4 & 5, Eng)—7

98 UNIT 10 ❏ STATE-OF-THE-ART REPORT Structure 10.0 Objectives 10.1 Introduction 10.2 Reviews of progress 10.3 Types of Review Publications 10.4 Classification of Review on the basis of their Intellectual level 10.5 Comprehensive Reviews 10.6 Topical Reviews 10.7 Review Journals 10.8 Bibliographical control 10.9 Summary 10.10 Exercise 10.11 References and Further Reading 10.0 OBJECTIVES Side by side with the growth in the volume of information, attention has been given to the limitations of the systems that have been made use of during the past three centuries for the dissemination of information. This unit presents with the aim to overcome the complaint 'so much has already been written about everything that one can't find out everything about it' and to make the proper use of information. 10.1 INTRODUCTION Of the various phenomena that have occurred in the field of communication of information during the past few decades, two are particularly noteworthy. First, scientific and technological information has been accorded the status of a vital resource. The benefits that a nation can aspire to derive from this resource are no less important than those derivable from the material resources like mineral, plant or animal wealth, energy sources, etc. However, the information resource differs radically from other resources in that its exploitation is not limited by barriers of national interests. Through a network of media, imformation has over the decades been flowing into a common pool of knowledge for anybody to exploit it. The second notable phenomenon has been the explosive rate of generation of information. Particularly during the last five decades, the volume of scientific

99 information has been growing in geometric progression. Surveys of recent trends indicate that at the moment the rate of generation of technical information is faster than that of scientific information. The two major weaknesses of the primary periodical system recognized are dilution and dispersion of information. New information gets distributed over some 50,000 and odd primary periodicals. An active research worker is bound to get bewildered in trying to get at articles of specific interest to him through primary sources. Thus, information of specific interest to the research worker lies scattered in a high state of dilution. The search for alternatives aimed at ridding the research worker of the tedium of having to go through all that is relevant to his work and the work in related areas has been going on for the past few decades. A number of systems have been emerging in the form of secondary media of different types the abstracting, alerting and indexing media on the one hand and the review publications on the other. It has been clear for some years that even the scanning of indexes and abstracts is proving too much for some workers, and there have been urgent pleas for more digestible forms of secondary publication. In response we have seen a remarkable revival of the review, a literature form far older than abstract, but which has lain in its shadow for a hundred years or more. 10.2 REVIEWS OF PROGRESS Reviews of progress are now seen very definitely

to be of great importance; by some they are regarded as offering a possible pathway out of the literature jungle.

In some fields they are used more heavily for literature searching than abstracts and indexes.

H.V. Wyatt for instance considers that 'The future of biological literature lies not in classification by words but in distillation by review'. The

preface to the first (1962) Advances in nuclear science and technology refers to the 'bewildering information problem to both expert working along its narrow crevices and the dilettantes hoping to keep abreast of the ever expanding frontiers. Clearly what is needed by both groups are well-organized review articles'

The preface to the first (1960) Advances in computers describes how the review is 'intended to occupy a position

of intermediate between a technical journal and a collection of handbooks or monographs. It is customary for a new

scientific or technical result to appear first in a journal, in a form which makes it accessible to specialists only. Years later

it may be combined with many other related results into a comprehensive treatise or monograph. There appears

to be a need for bridging the gap between these modes of publication, by surveying recent progress in a field at intervals of

a

few years and presenting it in

100 a form suitable for wider

accdience.' Such reviews are seen as supplementing rather than supplanting the abstract journals. 10.3 TYPES OF REVIEW PUBLICATIONS The basic difference between the traditional retrieval systems and the reviews is the failure of the former to give the following essential treatments to information handled: Condensation Analysis Interpretation Synthesis Evaluation By giving these treatments to the mass of information handled, reviews possess the unique advantage of converting information into usable knowledge. There are different types of review publications. The most common types are as follows : (i) Periodic reviews which are usually annual review type containing state-of-the- art reviews, published in book format. These reviews are concerned with a limited subject area and limited period of time. Annual review of nuclear and particle science Annual review of biochemistry (ii) Advances type containing both critical and state-of-the- art reviews, published somewhat less regularly in book format. Advances in computers Advances in chemical engineering (iii) Journal type containing critical reviews, often published as a quarterly or monthly journal Chemical reviews Recent progress in surface science (iv) Popular journals—generally broad in scope, providing popular articles in topical areas Scientific American Science Today (v) Yearbook type— a form of the state-of-the art reviews dealing with individual copies. Yearbook of radiology Yearbook of science & Technology (vi) Monograph series, usually irregular series of long treatises in a particular field, forming a definitive work or milestone in the development of subject. 101

Botanical and Zoological monographs brought out by the Publications & Information Directorate., CSIR, New Delhi. (vii) Essay types, generally providing tutorial type reviews aimed at a broader audience than the subject specialist, particularly teachers and lecturers. Essays in toxicology (viii) Comments type, usually containing brief review of a subject, taking one or a small number of recent papers as the nucleus. Comments on Atomic and Molecular Physics. 10.4 CLASSIFICATION OF REVIEW ON THE BASIS OF THEIR INTELLECTUAL LEVEL An alternative system of classifying reviews bases the distinction on their intellectual content. Thus, there are (i) the critical reviews, the preparation of which involves lot of intellectual effort and subject knowledge on the part of the expert who prepares the review and (ii) an indicative or bibliographic review which represents more or less a bibliography in narrative forms. In between two extremes lie other variations, the preparation of which requires varying degrees of effort, skill and subject knowledge. Thus, there are the interpretive, the state-of-the-art, the evaluative and finally the critical review. On the basis of the intellectual effort involved, reviews may be arranged as follows : Type of review Function Performed Evaluative Expert Critical Analytical State-of-the art Topical Interpretive Explanatory Popular Informative Bibliographic Indicative The value of a well prepared review is immense, since it neglects the trivial, omits the mediocre, selects the significant and stresses the important. 10.5 COMPREHENSIVE REVIEWS These are thorough, systematic, and condensed accounts of developments in broad field over a narrow time interval (and sometimes within a particular geographical } } }

102 area). Long-established examples to study are Annual reports on the progress of chemistry (1904-) and Annual review of biochemistry (1931—). Firmly based on the literature, they provide extensive references e.g. in Annual surveys of organometal- lic Chemistry for 1965 the six-page survey on aluminium has 76 references; the fifteen-page account of carpets in Review of textile progress for 1965-66 has 114 references.

Some surveys are published as articles in periodicals, eg. 'Progression in heat transfer—review of current literature; annually in Progress engineering; 'Annual review of the literature on fats, oils and detergents' in Journal of the American Oil Chemists' Society. One issue each year of Rubber Chemistry and technology is 'Rubber reviews'. Surveys of this kind have an obvious appeal to the specialist in that their comprehensive nature enables him to fill any gaps in his knowledge of recent developments and their broad coverage can often give him a new angle on his subject. 10.6

TOPICAL REVIEWS These are 'state-of-the-art' reports on selected, specific topic of active current interest. Increasingly in the last five decades these have appeared collected in volumes issued as a series e.g. Progress in Semi-conductors, Reviews in engineering geology. Examples of individual reviews in such volumes are 'Jewels for industry in Modern materials : advances in development and application 6 (1968), 'Immunity to ticks Advances in parasitology 18 (1980); 'History of noise research' in Advances in electronics and electron physics 50 (1980); 'Dehydrated mashed potatoes' in Advances in food research (1979). They are specifically designed to be intelligible to the non-specialist, and while not 'popular' in approach are aimed at all levels of readership from the student to the director of research. One particular aim they have is interdisciplinary cross- fertilization, and their target is the worker

in related fields of science and technology anxious to remain in touch with the more significant developments outside his immediate area of

interest. Such reviews of progress are evidenced by the reaction to the first (1960) Advances in computers Volume, 'felt by many readers as a welcome attitude to the ever-growing specialization of technical fields'. Although written by specialists, like the comprehensive surveys, topical reviews are seen by their editors as something much more flexible. Topical surveys can obviously be published in a variety of forms, but it is burgeoning review services such as Advances is chemical engineering, progress in optics, Recent progress in surface science, Macromolecules reviews, which have been responsible for the spectacular rise to its present prominence of this form of scientific and technical

103 literature. Each of these new series follows more or less the same pattern, with separate volumes containing half-a-dozen or more review articles, appearing at intervals. Reviews need not be published in collected volumes : they can be issued separately as are the paperback sigma science surveys, deliberately limited to 5000 words in length and issued at the rate of four a mouth. Some appears in both forms : each article in Progress in material science is also published separately to make it a available quickly. A popular way of or the 'state-of-the-art' surveys to appear is in the form of papers read at conferences, and these may be later published separately in a periodical or collected in a volume of conference proceedings. A number of scientific societies try to include such review papers in their programme as a matter of deliberate policy. Occasionally the whole conference may consist of reviews or review-type papers : the series Advances in the astronautical sciences are the proceedings of annual and other meetings of the American Astronautical Society, and Progress in astronautics and aeronautics series is based on papers read at symposia of the American Institute of Aeronautics and Astronautics. 10.7 REVIEW JOURNALS For many years there has been a special category of periodical solely devoted to review articles, e.g. Science progress, Chemical reviews, Biological reviews, Quarterly review of biology, Contemporary physics. Apart from their format and frequency, these review journals are often indistinguishable from review series discussed above. The editorial policy of the Review of modern physics is that 'The best papers in the journal should be milestones of physics, embodying the intellectual contributions of hundreds of others whose work appears in the original literature' the objective is to publish perspectives and tutorial articles in rapidly developing fields of physics as well as comprehensive scholarly reviews of significant topics.' 10.8 BIBLIOGRAPHICAL CONTROL The ways in which reviews of current progress serve the scientist and technologists are obvious. Currently they help them to remain aware of the major advances outside their particular areas of activity. So the demand is there. The attempt by librarians to satisfy it soon brings home the fact that even for the resources which already exist bibliographical control although improving still has some way to go. A useful aid to identify, appropriate collected reviews is UNESCO List of annual reviews of progress in science and technology [Paris], 2nd edition, 1969, with some two hundred titles in subject order; the then British Library Lending Division produced lists which

104 included review journals as well, eg Some current review series (1964) and KWIC index to some of the review publications in the English language (1966). The most comprehensive list is A M Woodward Directory of review serials in science and technology, 1970-1973 (ASLIB, 1974) with about five hundred titles. Reviews are not always easy to recognise : out of 8601 reviews in the field of chemistry it was found that only two contained the word 'review 1 in the title. Some indexing and abstracting do try to signal reviews. Chemical abstracts uses R to mark reviews in its index; Biological abstracts augments the title with the word 'review'. Science Citation Index uses (R) to indicate review article. Fortunately, the need for special tools is gradually being recognized and there now available a handful of bibliographical confined to reviews : Bibliography of medical reviews is a cumulated listing based on the corresponding section in the monthly Index mediates; Bibliography of reviews in chemistry derived from Chemical abstracts, but ceased publication after 1962 for lack of support, although it was revived in 1975 in the shape of CA reviews index, a computer produced KWIC index produced twice a year with some 20,000 review articles per issue. Bibliographically much remains to be done. And if what we read in the introduction to Macromolecular reviews for 1966 is true '... the review article is becoming the primary [in principle] source of information to a large majority of scientists'. One hopeful sign is the first general index to appear, the computer-produced Index to scientific reviews from the Institute for scientific Information. 10.9 SUMMARY Information is one among the major resources of a country such as its raw

materials, finances, manpower, etc. that needs to be mobilised, organised and utilized for the progress and well being of the people. Any work undertaken, invariably begins with a search for information already generated and recorded in that area. The serval barriers to fruitful use of existing information and the solutions proposed to overcome the barriers have been discussed. Thus the state-of-the-art reports are more appropriate than the traditional reviews. We have discussed in this unit reviews of progress, types of review publications, classification of reviews, comprehensive reviews and topical reviews on selected, specific topic of current interest. The demand for such reviews is obvious and the bibliographical control of reviews is all the more necessary. 10.10 EXERCISE 1. Discuss the Characteristics and functions of reviews. 2. Indicate the important barriers to the use of information.

105 3. Describe the different types of review publications. 4. Highlight the values of well prepared review. 5. What is understood by 'topical reviews'. Illustrate. 6. Discuss the various attempts to control reviews bibliographically. 10.11 REFERENCES AND FURTHER READING 1. Atherton, Pauline ; Handbook for information systems and services. Paris, Unesco, 1977. 2.

Grogan, Denis : Science and technology : an introduction to the literature, 4th ed. Clive Bingley, 1982. 3. Virgo, J. A : 'The review article : its characteristics and problems'. Library Quarterly 1971, 41, 275-91 4. Woodward, A. M : 'The role of reviews in information transfer'. JASIS 1977, 28, 175-80.

106 UNIT 11 ❏ TECHNICAL REPORTS Structure 11.0 Objectives 11.1 Introduction 11.2 History of Report literature 11.3 Characteristics of Report literature 11.4 Status of technical reports 11.5 Types of technical reports 11.6 Security classification 11.7 Technical report numbers 11.8 Clearing houses 11.8.1 National Technical Information Service 11.8.2 Defence Documentation Centre 11.8.3 National Aeronautics and Space Administration 11.9 Summary 11.10 Exercise 11.11 References and Further Reading 11.0 OBJECTIVES Engineers are found to depend more heavily on internal (inter-corporate) sources of information than on outside sources. In sharp contrast to the approach of the scientists, the technologists are not quite free to communicate the results of his R&D effort. Here in this unit you will know about the accepted bibliographic format for dissemination of technical information. 11.1 INTRODUCTION The term technical literature encompasses a number of different types of publications : technical reports, standards and specifications, patents, company publications (including house journals) and trade catalogues. The technical report is an accepted bibliographic format for the dissemination of technical information generated through applied R&D effort, in the same way as the scholarly journal article is the accepted channel for communicating the results of scientific research. According to C.P. Augur '

A report is a document which gives the results of or the progress with research and/or

107 development investigation. Where appropriate it draws conclusions and makes recommendations and is initially submitted to

the

person or body for whom the work was carried out, commonly a report bears a number which identifies both the report and the issuing

organization'. The report normally contains sufficient data to enable the qualified reader to evaluate the investigative process of the original research or development. A very large number of technical reports are issued each year. In 1963 the Weinberg Panel estimated about 100,000 Government reports written each year in the United States. About 85% of the world output of report literature is produced in the United States. Report literature has been regarded by the regular bibliographical tools, as a 'minefield in which only the wary venture'. 11.2 HISTORY OF REPORT LITERATURE Neil Brearley suggests that technical reports predate scientific journals and that 'scientists were exchanging reports with one another long before scientific communication was institutionalized'. Copernicus distributed a preliminary draft of his new cosmology to a few selected scientists two decades prior to publishing his monumental work in 1543. [Edward Rosen, 'Copernicus published as he perished' Nature, 1973, 241 (5390), 433-444] Industrial research laboratories have always used technical reports for internal communication. But the history of technical service reports as a distinct format dates back only to the beginning of the 20th century. The Professional papers of the United States Gaeological Survey (1902-) and the Technological Papers of national bureau of standards (1910-) may be said to mark the beginnings of report literature. Since 1928 the Technologic papers have been incorporated in the NBS Journal of Research. The earliest reports issued

in Great Britain were the Reports and Memoranda series of the Advisory Committee for Aeronautics (now

known as the Aeronautical Research Council) which began in 1909. The Second World War spurred a great deal of research activity, especially in subjects directly or indirectly affecting the war effort. Government expenditure on R & D increased greatly as a large number of defence-related projects were sponsored by numerous government agencies, including the Army, Navy, and the War Production Department. A separate agency called the Office of Scientific Research and Development (OSRD) was set up in June 1941 to mobilize scientific and technical information resources for national defense. With the cessation of hostilities, the OSRD was abandoned, but the pace of government-sponsored research effort and the generation of technical reports from these were not lessened in the years following the war. After the war in June 1945

108 a cabinet Committee Called the Publications Board (PB) was established by the executive order to release scientific and technical information generated during the war. Each report was given a PB accession number, and weekly announcement service titled Bibliography of Scientific and Industrial Reports (BSIR) was established with a view to promoting wider dissemination of reports. The announcement service has evolved into the present Government Reports Announcements and Index. The Publication Board merged with a new agency called the Office of Technical Services (OTS) was set up in 1946 under the Department of Commerce to look into the distribution of technical reports. During the years 1957 and 1958, and number of nongovernmental libraries were designated as depositories of PB reports. In 1964 a new facility the Clearinghouse for Federal Scientific and Technical Information (CFSTI), was established under the National Bureau of Standards and functions of the OTS were transferred to the clearing house. In 1970 CFSTI was merged with the newly established National Technical Information Service (NTIS), a part of the Department of Commerce. This series of developments represents one stream of events that led to the establishment of NTIS as a national agency for the Centralized bibliographic control and distribution of technical reports. Cousequently, a number of parallel series of events took place, and these culminated in the establishment of various agencies such as the United States Atomic Energy Commission (USAEC), the Defence Documentation Centre (DDC) and the National Aeronauties and Space Administration (NASA) all of which have been responsible for the production and distribution of large quantities of report literature. 11.3 CHARACTERISTICS OF REPORT LITERATURE In view of great variations in the nature and quality of the contents the boundaries of reports literature are not easy to delineate. On the heterogeneous nature of report literature, the following observation was mode in the SATCOM Report: 'Other attributes of technical reports as a whole are so heterogeneous that one- can find ready examples to support almost any generalization that happens to strike his fancy : that they are too long or too short; badly refereed or well refereed— or not refereed at all; reliable or unreliable; inadequately distributed or too widely distributer; too detailed and technical or not technical enough; to expensively printed or shoddily assembled; a valuable complement to journals or a serious handicap to conventional publications.' Much of the debate recurring in published literature centres around three themes: (a) the uneven quality : Most technical reports are of uneven quality because

109 (i) most of them are written by engineers or technologists (ii) the reports are addressed to the technical experts of the sponsoring agency and not to entire scientific and technical community (iii) the time available for the preparation of reports is usually very limited (iv) because of the confidential nature of their contents, reports are not refereed by outside experts (v) technical editing expertise and facilities available for report editing are usually very limited. (b) Diversity of contents : Technical reports vary greatly in the nature of their contents. Besides the results of research and developmental work, diverse types of material such as literature reviews, bibliographies, compilations of statistical data, catalogues, directories and conference papers and proceedings appear as technical reports. The subject covered in technical reports encompass all branches of science, engineering, technology, the social and behavioural sciences that include various aspects of energy and environment, and even some branches of humanities. 11.4 STATUS OF TECHNICAL REPORTS The uncertain status of technical reports as a form of scientific literature was described by the Weinberg Panel thus : 'The documentation community has taken an equivocal attitude toward informal reports : in some cases the existence of these reports is acknowledged and their content abstracted in the abstracting journals. In other cases informal reports are given no status; they alleged to be not worth retaining as part of permanent record unless their contents finally appear in a standard hard-copy journal. Editors of many scholarly scientific journals have criticized the uncertain quality and uncentrolled proliferation of technical reports. Notwithstanding the controversy over the status, technical reports are becoming increasingly important as vehicles for the dissemination of technical information. The strength of technical reports lies in their timeliness and flexibility. As vehicles for disseminating technical information, technical reports are much faster than journal articles. 11.5 TYPES OF TECHNICAL REPORTS The COSATI Task Group on the Role of Technical Report has identified the following eight types of technical reports. (i) "Pre-Print" Reports : Manuscripts of reports or papers intended for publication

110 in a journal or for presentation in a conference, after distributed by the author to a select group of specialists known to him. Sometimes the PrePrint is given some degree of formal or official status for example, the "p" papers of the Rand Corporation. (ii) Corporate "Proposal-type' Reports : These are of a proprietary nature, and their circulation is usually limited to the staff of the agency commissioning the report. (iii) Institutional Reports : These are periodic reports of activities and progress, usually issued annually, by government agencies, foundations, corporations, societies. Much of this material is directed at general public audiences, customers, shareholders and society members. (iv) Contract Progress Reports : These are primarily directed at the sponsors of contractual R & D effort who require the periodic reporting of progress on the contractual project. (v) Contract Final Reports : These are perhaps the most valuable type of technical reports. (vi) "Separate" Topical Reports : Encouraged either by research sponsors or by a desire to disseminate their findings to a wider audience, contractual investigators often publish separate, topical reports in addition to the progress reports and final reports submitted by the sponsors. Variously called 'research memoranda', 'technical memoranda' or 'technical notes' these come closest to journal articles in style and they are after submitted to journals for publication, usually in an abbreviated form, after expert review. (vii) "Books" in Report form : State-of-the-art reports, reviews and surveys prepared by information analysis centres or agency contractors are after issued as technical reports. (viii) Committee Reports : There are issued by the investigative and advisory committees of governments, national and international societies, and other agencies. They incorporate details of investigations, hearings, findings, conclusions, and recommendations. 11.6 SECURITY CLASSIFICATION Since some technical reports contain sensitive nature of contents, their distribution is restricted to varying degrees by a system of security classification. Reports of research in aerospace, nuclear energy and the like containing sensitive information of importance to national security are usually classified, at least for an initial period of time. Typical security designations are "Top Secret", "Secret", "Confidential", and "Restricted Circulation" Numerous other designators for example, "Addressee only",

111 "For U. S. Government use only" are used in government documentation to indicate various levels of restricted access to documents. The Freedom of Information Act (PL 89-487), which became a law on July 4, 1967, was promulgated to maximize the disclosure of information to the general public, without prejudice to national security. 11.7 TECHNICAL REPORT NUMBERS One of the principal features of a technical report is their issue in series, characterised by number or letter code. Originally adopted for security reasons, was intended to be a helpful device for facilitating for physical and bibliographical control of reports. But the uncontrolled proliferation of reports and report numbering schemes has been a vexing problem to technical librarians and users of report literature. Indeed they may be deliberately contrived not to reveal but to conceal their origin and availability. In his book on report literature C P Auger cited one announced in scientific and technical aerospace reports with no fewer than thirty characters : N72-28275 [NLL- M-20984-(5828, 4F): NEN 3005]. Over 20,000 such codes are listed in L.E. Godfrey and H F Redman Dictionary of report series codes (New York, Special Libraries Association, Second edition 1973); they describe the situation as 'Chaotic', with an 'astouuding number of codes blossoming each year'. Complementary to some extent is D Simontom Directory of engineering scientific and management document sources (Newport. Beach, cal, Global Engineering, 1974) Report numbers are made up of code designators that indicate several of the following data elements : Sponsoring agency issuing agency (where the report was written) Location of specific branch or department of the issuing agency where research was done Distributing agency or chearinghouse Subject matter Type or form of report Date of preparation or release Individualizing identifer Security classification code. It is obvious that not all report numbers contain designators for each of these data elements. Most report numbers consist of three or four of the elements in various permutations.

112 11.8 CLEARINGHOUSES A clearinghouse is
a control agency for collection, classification, and distribution, specially of information. The definition would encompass all information centres and most special and conventional libraries.
For our purpose it is a depository of
documents with the additional mission of serving as a central agency for collection, classification, and distribution of information. It also includes such functions as collecting and maintaining records of research and development
in the planning stage, in progress
and completion.
Sometimes, substantive questions about items in these records are referred to the source, and thus a
clearinghouse may act as a referral centre also. The National Technical Information Service combines the functions of a
document centre with those of a clearinghouse, and referral centre.

The Defence Documentation Centre (DDC) is a depository of reports and other documents generated by the Defence Department, both classified and unclassified; it is also a referral centre for indentifying experts in various fields. The function of a clearinghouse is primarily to collect, and disseminate scientific and technical information with the purpose of making the results of technological research and development more readily available to industry and business, and to the general public. Clearinghouses came into existence because it began to be generally felt that the information explosion required effective information dissemination and analysis mechanism, and there was need to develop some effective central mechanism to achieve the above ends. Let us discuss some important clearinghouses. 11.8.1 National Technical Information Service (NTIS) NTIS whose history can be traced back to 1945 is one of the world's largest specialized information service organizations. It is responsible for the bibliographic control and distribution of America and foreign technical report literature and other speciality information products. The principal announcement service for technical reports is the Government Reports Announcement and Index (GRAI), a biweekly abstracting and indexing service that has evolved through a services of changes from the Bibliography of Scientific and Industrial Reports started by the erstwhile office of Technical Services in 1946. The report summaries are arranged under the subject categories developed by the Committee on Scientific and Technical Information (COSATI) of the Federal Council for Science and Technology. 11.8.2 Defense Documentation Centre (DDC) The Armed Services Technical Information Agency (ASTIA) was set up in 1951 under

113 the operational control of the United States Air Force by merging two earlier agencies which were responsible for handling classified technical reports (a) the Navy Research Section of the Library of Congress, established in 1946 and (b) the Central Air Documents Offices at Daytime, Ohio, Started in 1948 and operated by the United States Air Force. ASTIA gave accession numbers starting with letter AD (ASTIA Document) to reports received from the Department of Defence (DOD) research facilities and their contractors. In 1963 ASTIA was renamed the Defence Documentation Centra (DDC). DDC receives technical reports from various research laboratories of the DOD and their contractors. It continues to assign AD numbers initiated by ASTIA, but the abbreviation now stands for Accession Document. 11.8.3 National Aeronautics and Space Administration (NASA) NASA was created by the National Aerospace and Space Act of 1958. The act required that the aerospace activities of the US should contribute to the expansion of human knowledge of phenomena in atmosphere and space. Six program offices, 10 field centres and the National Space Technology Laboratories Constitute the principal components of NASA for planning, directing and managing its activities. NASA publishers a semimonthly abstracting journal entitled Scientific and Technical Aerospace Reports (STAR). The abstracts are grouped under 34 subject categories and arranged in an unbroken series of accession numbers starting with the letter N and the last two digits of year of accession (e.g. N 72-10856). A complementary abstracting service entitled International Aerospace Abstracts (IAA) covering journal articles, books and conference papers is published semi-monthly by the American Institute of Aeronauties and Astronautics under NASA contract. NASA operates a SDI service 'Selective Current Aerospace Announcements' (SCAN), especially designed for scientists and engineers employed by NASA and its contractors. 11.9 SUMMARY This unit describes the history of report literature and its characteristics features. It discusses the quality, states and types of technical reports. Technical reports involve security classification and technical report numbers are assigned to each report for control. It highlights the functions of clearinghouses and discusses the three most clearinghouses in the United States. MLIS (P 4 & 5, Eng)—8

114 11.10 EXERCISE 1. What is understood by 'Report literature'? What led to the development of report literature? 2. Discuss the characteristics and states of report literature. 3. Write a note on the uncertain states of technical report. 4. Describe the different types of technical reports. 5. What is clearinghouse? Give a brief description of three clearinghouses for report literature. 11.11 REFERENCES AND FURTHER READING 1. Augur, C. P. ed. : Use of Report literature; Shoe String Press, Hamden, Conn. 1975. 2. Brearley, Neil: "The Role of technical reports in scientific and technical communication' IEEE Trans. Professional commun 1973 16/3, 117-119 3. Klempner, Irving : 'The concept of national security and its effects on information transfer'. Special Lib 1973, 64(7), 263-269. 4. Redman, Helen F : 'Report number chaos'. Special Lib 1962, 53 (10), 54-60.

115 UNIT 12 ❑ TRADE CATALOGUES Structure 12.0 Objectives 12.1 Introduction 12.2 Commercially available trade catalogues 12.3 Characteristic of Trade Catalogues 12.4 Types of Trade Catalogues 12.5 Trade Catalogue Services 12.6 Acquisition and Control of Trade Catalogues 12.7 Summary 12.8 Exercise 12.9 References and Further Reading 12.0 OBJECTIVES By reading this unit you will understand the characteristic features of trade catalogues along with their functions. Trade catalogues with the dual function of information and persuasion appear in a variety of sizes, formats and colours. Because of their peculiar nature systematic acquisition and organisation in libraries and information centres are tedious. 12.1 INTRODUCTION The term 'Trade Catalogues' denotes a variety of literature produced by manufacturers and distributors of every kind of material, product, or service from pets, books, drugs, and chemicals to extremely complicated equipment and components used in research and industry. The basic purpose of trade catalogues is : (i) to provide information on the various attributes of a product process, material or service, (ii) to stimulate sales of the product, process, material or service. The earliest trade catalogues were book lists distributed by booksellers. A catalogue of books issued in 1564 by Gorge Wilier, an Augsburg bookseller, is believed to be the first such catalogue. This was a subject list of 256 books. Andrew Munsell brought out the first trade catalogue of books in England in 1596. Benjamin Franklin issued a catalogue of books in 1744. According to Romaine, the first American drug catalogue was issued in 1760 by John Tweedy of Newport. The second drug catalogue of John Day and Company was printed in 1771.

116 During the 17 80s metal manufacturers of Birmingham and Sheffield were sending out elaborately illustrated catalogues to their agents in France, Italy, America and also perhaps to India and Russia. In many of these early British trade catalogues, the manufacturers names were omitted so that customers were forced to order goods through agents. In contrast to this, American trade catalogues always contain the manufacturer's name to facilitate direct ordering of books to the manufacturer. An excellent

annotated guide to early American trade catalogues is Lawrence B. Romaine's A Guide to American Trade Catalogs, 1744-1900 (

R.R. Bowker, New York, 1960). Columbia University, the Centre for Research Libraries in Chicago, and Smithsonian Institution Library have large collections of trade catalogues. 12.2 COMMERCIALLY AVAILABLE TRADE CATALOGUES The conception of assembling in standard format the catalogues of several manufacturers goes back at least 75 years, as can be seen in the publication of organizations like standard Catalogue Co. Ltd. of London; e.g. the four volumes of the Architects Standard catalogues for 1981 comprise over three thousand pages on building materials, components, and services, one third of which are the manufacturers' own leaflets and brochures. In the United States, the Reinhold Publishing Corporation have for many years been providing a similar consolidated bound set of manufacturers' literature with the title Chemical Engineering catalogo. Best known of all is probably the massive series of volumes from Me Graw-Hill, Sweet's Catalogue file, covering mainly engineering and building. In 1963 the Microcard Corporation Started a service to supply in the form of 6 in by 4 in microfiches some 14,000 catalogues of the companies listed in Thomas' register of American manufacturers. There are on the market a number of product information services using microforms, and some former hard copy services have added microfiche or microfilm also and some have switched almost entirely to microforms, e.g. Technical Indexes Ltd. 12.3 CHARACTERISTIC OF TRADE CATALOGUES A cursory glance through Thomas Register of American Manufactures is enough to reveal the vast variety of products described in trade catalogues. Apart from this tremendous variety in the products themselves, there is considerable diversity in the format, size, and source of catalogues, as well as in the nature and amount of information provided therein. Trade catalogues range from a small advertisement in

117 a periodical or a piece of paper briefly announcing a simple product, to elegantly bound multimvolume compendia or frequently up-dated loose-leaf services describing in detail thousands of products of a large number of manufactures, often with photographs, drawings and even bibliographic references to literature. Some product advertisements are so indistinguishable from journal articles that editors of some journals (e.g. the Reader's Digest) label them as "Advertisement" to distinguish them from feature articles. Some general characteristics of trade catalogues are trade catalogues contain application-oriented descriptive information rather than discourses on theoretical principles. However, trade literature describing medicines and complex scientific instruments frequently includes a brief description of relevant background research, supported by charts, diagrams, equations, and literature references. Trade catalogues are primary sources in which information about products or processes appears prior to its publication in journals or other forms of literature. In fact, much of the information about specific commercial products depicted in trade catalogues is not likely to be published at all in other forms of literature. Much of the information contained in trade catalogues loses currency very quickly as need products and processes are contantly being developed and improvements are made to existing ones. In general the following types of data are included in product catalogues : 1. Historical overview of the manufacturing company. 2. Research background leading to the development of the product. 3. Product description (dimensions, capacities, materials of construction, shape, size, colour, or other physical or engineering properties) 4. Applications. 5. Operating characteristics. 6. Installation instruction. 7. Operation and maintenance procedures, repairs. 8. Mode of acquisition, terms of licensing or lease, shipping and insurance data, delivery period, availability of spares and auxiliaries and the like. 9. Illustrations, including photographs, layout plans, circuit diagrams, etc. 10. List of customers, testimonials from satisfied customers. 11. Names, addresses, and telephone numbers, agents, local distributors, and service centres. Trade catalogues are often undated, supplied free. Price is usually not included and has to be requested by interested customers. Some technical journals for example, Chemical Engineering with plenty product news and advertisements are supplied free to qualified professional engineers. Because of their dual function of information and persuation trade catalogues come in a variety of sizes, formats and colours. The
118 American National Standard Institute and the British Standards Institution have formulated several specifying the format and contents of trade catalogues. 12.4 TYPES OF TRADE CATALOGUES The design of trade catalogues seems to be governed by the psychology and economics of advertising and selling rather than by consideration of their use and preservation. Despite bewilderig variety in the physical characteristics of trade catalogues, a few basic types can be identified : (a) Advertisements and announcements in technical journals and trade magazines. (b) Special issues and supplements of journals. (c) Manufacturers' Catalogues and data sheets. (d) Directories of industries, products, and companies. (e) Product descriptions supplied at trade expositions, convention exhibits, etc. (f) Trade catalogue services. 12.4.1 Advertisements and Announcements in Journals Most technical journals and trade maganizes carry product advertisements as well as product news and notes complied by staff writers. Almost always each issue has an advertisers' index. Some journals (e.g. Production Equipmen Digest, Chemical Processing, and Product Engineering) carry entirely new product announcements and advertisements. Another feature that is becoming increasingly common in Journals containing product announcements and advertisements is the inclusion of one or more "Reader Service Cards" (RSC) in each issue. The RSC is a simple mechanism for the reader of the journal to obtain more detailed information about a product or service advertisement or announced in the journal from the manufacturer or distributor. Some journal publishers periodically send bunch of postage-paid product inquiry cards to journal subscribes. Each card contains a description of one product and address of the manufacturer or supplier. The user simply has to write his own address on the card and mail it. 12.4.2 Special Issues and Supplements of Journals Many technical journals publish an annual special issue or a supplement, usually called "Buyers' Guide" or "Directory Issue". Annual buyers' guides issued by Chemical Engineering, Electronics, Hydrocarbon Processing, Chemical Week, Machinery, and Nuclear News are typical examples. These special issues are independent publications

119 containing product and company information and advertisements. The Nuclear News Buyers' Guide contains : (a) an annual survey of important developments in the nuclear industry; (b) a world list nuclear power plants; (c) a directory of nuclear products, materials, and services; (d) a directory of suppliers, including companies located outside the United States. Each year in November, the journal Science (published by the American Association for the Advancement of Science) issues a special directory of scientific instruments. The American Chemical Society's annual Lab Guide is a directory of laboratory supply houses, manufacturing companies, instruments, equipment, chemicals, supplies, analytical and research services, trade names and new books in analytical chemistry. In most libraries these special issues and supplements are treated as reference works of the directory type and are shelved along with other directories. 12.4.3 Manufacturers' Catalogues and Data Sheets These range from a single sheet of paper with a technical description of one product to a bound volume containing detailed descriptions and technical data on numerous products of a company, or loose-leaf service kept up-to-date by periodic supplements. Some catalogues for example, Alcoa Aluminium Handbook, published by the Aluminium Company of America, Pittsburgh, have attained the status of a reference work. 12.4.4 Directories These are independent publicatins containing data on a number of companies and their products in one branch of science, engineering or technology. World Aviation Directory (published by Ziff Davis Publishing Company, New York) is an international directory of air carriers, manufacturers of aircraft and related equipment, government agencies and other organizations concerned with aviation in some 160 countries. The Directory of Chemical Producers, USA (published by Stanford Research Institute) is kept up-to-date by quarterly supplements. Chemical Engineering Catalogue (published by Reinhold Publishing Company, New York, 1916-) is a book of reference for engineers, buyers and others seeking information on chemicals, equipment also publishes an annual Chemical Materials Catalogue. 12.4.5 Trade Fair Catalogues Manufactuers exhibit their products and distribute catalogues at conventions and conferences organized by professional societies. Trade catalogues are also issued at international trade fairs and expositions such as the famous Leizig and Frankfurt Fairs.

120 12.5 TRADE CATALOGUE SERVICES A number of commercial catalogue services have started providing copies of manufacturers' catalogues on a continuing basis; sometimes this subscription service also includes an inquiry service. The Thomas Publishing Company, New York— publishers of the well-known Thomas Register of American Manufacturers (annual)— supplies microfilm copies of catalogues of most of the manufacturers listed in the annual Register. Another trade catalogue service on microfilm is the Visual Search Microfilm File (VSMF) offered by-Information Handling Services, Inc., Denver, Colorado. R. A. Wall has described an SDI service for trade catalogues offered by Indata Limited, in England. Interest profiles of subscribers are matched every week with new additions to a computerized database of trade catalogues and subscribers receive weekly lists of new items as well as data cards containing specifications of the products. Collection and subject indexing of the catalogues are done in collaboration with the British Scientific Instruments Research Association. 12.6 ACQUISITION AND CONTROL OF TRADE CATALOGUES Trade catalogues are seen as ephemeral materials that become obsolete very quickly; they are also thought of as expendable material because of the case with which they are available to the users free of charge. Most engineers who regularly use trade catalogues do not find it difficult to acquire and maintain their own personal collection of trade catalogues. Conventional abstracting and indexing services do not cover trade catalogues. The acquisition of trade catalogues is relatively simple. Many manufacturers routinely mail their catalogues and promotional material to technical librarians and information officers in companies. Reader service cards can be used to acquire additional material free of charge. The organization of trade catalogues is also simple. The catalogues themselves can be filed in vertical files or pamphlet boxes, alphabetically by manufacturer's name. A card index can be service maintained to provide access by product name. A simple coordinate index of Uniterm type is adequate for this purpose. Trade catalogues usually do not contain publication dates, and it is difficult to determine their currency. Without constant attention and weeding, a collection of current trade catalogues will soon become a retrospective collection of archival material, more useful for historical purposes than for obtaining current and accurate information on companies and their

121 products. Subscription to a commercial catalogue service will ensure the availability of up-to-date information on companies, materials, products and process. One specific feature of trade catalogues is the extensive use of trade names to identify specific products. Many directories of companies and products include trade name index. Where such is not available, the following two publications may be noted for obtaining explanations of product names and the names of their manufacturers : 1. Crowley, Ellen T Ed: Trade names dictionary. Gale Research Company, Detroit, 1976. This is a "guide to trade names, brand names, product names, coined names, model names and design names, with addresses of their manufacturers, importers, marketers or distributors"—described by its publishers. 2. Gardner, Willian : Chemical Synonyms and tiade names. 7th ed. rev. and enlarged by Edward. I. Cooke, Ohio, Chemical rubber Co. Press. 1971. This handbook provides definictions of trade names and where available, it gives the names of manufacturers. 12.7 SUMMARY We have discussed about the manufacturers and distributors of various kinds of materials. We have noted an excellent trade cataloge by Romaine. Commercially available trade catalogues are highlighted. Trade catalogues are primary sources in which information about products appears prior to its publication in a formal channel. We have described the various types of data that are included in the trade catalogues. There are six types of trade catalogues and these types are discussed in detail. Acquisition, arrangement and control of trade catalogues are very simple and librarians can achieve all these very easily. Finally we have noted two publications for obtaining the names of the manufacturers and their products. 12.8 EXERCISE 1. What is a trade catalogue ? What purpose does it serve? 2. Discuss the characteric features of trade catalogues highlighting their different types. 3. Describe some trade catalogue services. Give examples. 4. How would you organise trade catalogues in a library? 5. Write a note on product advertisements, product news and notes. 6. What are the functions of trade catalogues ?

122 12.9 REFERENCES AND FURTHER READING 1. Auger, C. P. Ed : Use of report literature. Hamden, Shoe string Press, 1975. 2. Boylan, N. T. G.: "Technical reports, identification and acquisition." RQ 1970, 10, 18-21. 3. Godfrey, L. E. and Redman, H. F. : Dictionary of report series codes 2nd ed. Special Libraries. 1973, p. 9 4. Grogan, Denis : Science and technology : An introduction to the literature. 4th ed. Clive Bingley, 1982. 5. Subramanyam, K : "Technical literature." In Encyclopedia of library and information science. Vol. 30. pp. 144-197.

123 UNIT 13 ❏ DATABASES : TYPES AND USES Structure 13.0 Objectives 13.1 Introduction 13.2 Database : Definition and Characteristics 13.3 Types of Data 13.3.1 Word-Oriented Databases 13.3.2 Bibliographic Databases 13.3.3 Full text Databases 13.3.4 Number Oriented Databases 13.3.5 Image Databases 13.3.6 Sound Databases 13.4 Public Databases 13.5 Production and Distribution 13.6 Search Services 13.7 Accessing Databases 13.8 Database use in India 13.9 Summary 13.10 Exercise 13.11 References and Further Reading 13.0 OBJECTIVES By availing of in-house resources and resources available elsewhere we have seen in earlier units various information services and products can be offered to users. Here we shall discuss the Database Support services. In this unit we shall explain what is a database, its various type, importance of each type, search services and the use of database in India. 13.1 INTRODUCTION The term database needs to be explored fully if one is to gain an understanding of and appreciation for it. The initial focus is on bibliographic information, but many other types of information and databases are created and used. A database starts when a publisher creates a format for information. This information might be a bibliographic citation, a statistical table, or a bibliographical fact, to name a few. The publisher

124 determines which elements of information are important, how these elements are to be displayed or printed and which elements can be manipulated by the computer. Machine-readable files of this information are created in the form of computer tapes or discs. Once the data is in machine-readable form, the file can be put to multiple use. One of the principal uses is to print a publication, such as an index or abstract, which is sold or distributed to the organization's members or subscribers. Another use is as an internal information database for the organization's own use; the telephone directory is an example of this process. A telephone company compiles data from its customers and puts the data into machine-readable form. This electronic version is used to create the published directories that are sent to the telephone company's customers and to subscribing libraries. A second use is for the telephone company's information operators as a machine-readable database. A third use is the learning or sale of these files to external information service companies. Information service companies are sometimes called vendors, to distinguish them from the organizations that create the databases, which are called producers. A few organizations such the National Library of Medicine, serve both functions. Vendors serve as a link between the databases and these who use them. Using their own software and its associated search language, these companies make further decisions about which data elements are important, how to format each data element, which elements will be retrievable or searchable, and which elements will merely be displayed at the terminal or printable. These decisions are extremely important to database users, since they determine the ways in which these databases can be searched. 13.2 DATABASE : DEFINITION AND CHARACTERISTICS The noun database has one meaning : an organized body of related information. (1) A database is an application used to store and manipulate data. The application may be a simple one that provides for flat files only and that cannot be programmed, or it may have the capability of producing databases that are programmable and relational. (2) A collection of specified related information. Database field : The part of a database record that contains a specific item of information; the basic unit of a database record. Database file : A file made up of records of information in distinct, related fields. Database set : A growth of linked database files containing related data. For example, a set may contain one database with customer names and addresses, another database with price and quality information about items held in inventory for sale, and the third database with a record of order entered. Creating an invoice or statement may involve combining the customer information (complete with mailing address and

125 terms) and the order information which is supplemented by pricing from the inventory database. Each unit of information stored in a database consists of discrete data elements, each consisting of a specific characteristic of the entity being described. For example, a bibliographic database will contain information relating to books, periodical articles, reports etc. Author Title Call Number Accession Number Edition Imprint Collation Series Keywords Each of the above represents a field. Thus a total of 9 fields, corresponding to each book will be there. This constitutes one record. The database will be as large as many are records or number of books. 13.3 TYPES OF DATA Databases may be set up to organize form different categories of information : words, numbers, images (pictures or graphs), and sound. In addition, there are multimedia databases combining information on more than one medium. Each category has a distinct machine representation and requires a distinct kind of software (computer programs). Word-oriented databases have as their principal data words in the form of phrases, sentences, paragraphs, flat-text or structured factual data such as names and addresses. The principal data in numeric databases, often called databanks, consist of numbers and symbols representing numbers. They take the form of time series, tables of numbers, and graphs based on such tables. The term time series refers to events or phenomena observed over a span of time. Image databases, many of which are used for scientific or engineering purposes, may contain representations of virtually any multidimensional structure, including chemical structures, unclear predates, scientific photography, architectural plans, and geographic maps. Audio databases contain sounds—recorded or computer—generated sounds (discrete sounds, music or aural words). 13.3.1 Word-Oriented Databases Word-orianted databases consist primarily of strings of alphabetic or alphanumeric

126 symbols known as character strings. A user's query typically is answered by a search of the database for strings of characters that match the string of characters in names, titles or other words or phrases listed in the query. 13.3.2 Bibliographic Databases The earliest electronic databases introduced in the 1960s, were in the fields of science, engineering, technology and medicine. These databases were word-oriented, containing bibliographic references to published literature and only a few dozen were available. The first comprehensive directory of publicly available databases was published in 1976, with 301 databases listed. By the early 1990s over 7,000 electronic databases were publicly available. Bibliographic databases range in size from small specially files such as Genetics Toxity (GENTOX), covering 2,600 chemicals and produced by the U.S. Environmental Protection Agency; to CAD/CAM, a database containing 10,000 records and published by Bowker A & I Publications; to COM-PENDEX, by Engineering Information, Inc., which has approximately 2 million citations in Engineering; to CA SEARCH, produced by Chemical Abstracts Services, which contains more than 10 million citations. These databases are handled by libraries and information centres in various ways such as CAS, SDI, compilation of bibliographies, etc. 13.3.3 Full-Text Databases Full-text databases provide immediate access to the texts of documents such as legal cases and statutes, newspapers, journal articles, encyclopedias and even textbooks. The pioneer full-text legal database, LEXIS, was established in 1973 by Mead Data Central and has long been regarded as one of the world's largest databases, most other full-text databases were established after 1980. Full-text news databases include those of the United Press International and the Associated Press, among wire services; the New York Times and Wall Street Journal, among newspapers, and US News and World Report and Newsreels, among news magazines. Full-text journal databases are exemplified by the Harvard Business Review and many of the American Chemical Society journals; by the electronic journal Current Clinical Trials of the American Association for the advancement of Science, and by electronic encyclopedias such as Encyclopedia Americana and Academic American Encyclopedia. Textbook databases include Gray's Anatonery Textbook of Surgery and Principles and Practices of Emergency Medicine. 13.3.4 Number-Oriented Databases Numeric databases Contain transactional data, statistics, time series, properties and other numeric data. The large databases called transactional databases record events

127 (transaction) in real time that is, as they occur and new data continually replace prior data. Examples of number-oriented databases include the FOREIGN EXCHANGE DATABASE of Interactive Data Corporation, which covers monthly exchange rates for 22 currencies, and the DRICOM (DRI Commodity Database) of DRI/McGraw-Hill, a time-series database of commodity futures. 13.3.5 Image Databases Image databases are highly specialized and few in number. Their data consist chiefly of specifications for shapes, distances, geometrical relationships, colours, and the like. Image data include animated images and the use of images to represent numeric data in visual form (visualization). 13.3.6 Sound Databases Audio databases of recorded or computer-generated sounds contain more than just sounds. An example of an audio database would be one that tracked the development of a particular type of music. The database might contain recorded music, images of music scores, narration and perhaps textual information describing the music. 13.4 PUBLIC DATABASES The range of public databases has grown so enormously that it is now passible to find data on almost any subject. Databases have been created for nearly every field, including most major branches of science, business, management, law, politics, social sciences, arts, humanities, and religion, as well as news, consumer interest areas, stock quotations, and various subfields and problem areas such as transportation, shipping, rebates, oil spills, and child abuse. One-third of all public databases can be classified as business databases, these are followed by science, technology and engineering databases and then by health and life-science databases. Databases in the arts and humanities are less numerous. When a database is developed for public use, it is usually made accessible to users through a telephone ('on-line') or on a distributable medium. Distribution media include CD-ROMS (Compact disks with read-only memory) and floppy disks for use on personal computers and workstations and magnetic tape for local loading on a mainframe. An online service may be provided by the producer of the database and offer online searching of several to many databases. Such online search services, also known as database vendors in the united states or 'hosts' in Europe, have computers and software that allow outside users to search the databases for numerical data, facts or textual information.

128 Users of public databases include most groups of people where occupations require that they have quick access to information such as scientists, lawyers, doctors, financial analysts, librarians, executives, and researchers. 13.5 PRODUCTION AND DISTRIBUTION Databases are produced by a wide variety of commercial, non-profit and government organizations. The way in which database is created depends on its types. To prepare a bibliographic or reference, databases, for example, the producers cull the primary literature—journals, and conference proceedings for articles relevant to the subject area of the database. For each article selected, they prepare a bibliographic record that lists the author or authors, the title of the article, and any further identification needed to find the publication cited. The record is then entered into the database. In some bibliographic databases the records include index terms for the articles and book referenced; abstracts also may be included. Most large databases are issued periodically (monthly, weekly or even daily) on magnetic tape. Some databases are issued on floppy disks or on CD-ROM for use on personal computers. Large databases are sold chiefly to government agencies and corporations for in-house use and to on-line search services, which retail access to the database to their subscribers. 13.6 SEARCH SERVICES The principal mode of access to electronic databases is through on-line search services, also known as vendors. However, databases available in CD-ROM format may be used rather than on-line database, particularly in academic libraries. Database vendors provide on-line databases together with software for search and retrieval, data manipulation, and modelling. They are often called information utilities, because an on-line search service serves a far-flung network of users, providing access to information from databases, residing in a distant computer facility. Several hundred such services in the United States and Europe provided access to more than 3000 databases and databanks by the early 1990s. Among the leading on-line services for searching numeric databases are DRI/ Me GrawN-Hill, General Electric Information Services Company (GEISCO), the WEFA Group-all three of which provide business databases and the Chemical Information System (CIS), which provide mostly scientific databases. Among the Vendors of word-oriented databases are Mead Data Central (MDC);

129 DIA LOG Information Services Inc; ORBIT Search Service; the National Library of Medicine (NLM); WESTLAW; BRS Information Technologies; Compu Serve; and others. 13.7 ACCESSING DATABASES Online use of a database requires an account with a search service that offers access to the database, a password to log onto the service, knowledge of how to use the service, and information about specific features of the database. The equipment required includes a computer terminal or personal computer (PC), a modem, and a telephone. The modem, a device that allows the PC to communicate over telephone lines, may be built into the terminal or PC, or it may be a separate, connected unit. Procedures for using search services and the databases to which they provide access very widely. The degree of complexity in using a database depends on the type of information and on the nature of the group of users that the database is designed to serve. For example, searching a database for thermo dynamic properties of a certain class of substances knowledge than does searching a database for the names of hospitals in Kolkata. Similarly, an on-line system intended for professional researchers who are expected to use the system everyday can be considerably more complex—and therefore can contain more useful features than one aimed at occasional users. 13.8 DATABASE USE IN INDIA Databases are some of the most primary components of an information retrieval system. In some subjects areas in-depth treatment is lacking in global databases, while in others local information has more importance than international information. Keeping these problems in view a major thuust has been given under the NISS AT (National information system for science and Technology) programme to the development of indigenous databases by the sectorial information centres set up on machine tools at the Central Machine Tools Institute, Bangalore; latter at the Central Leather Research Institute, Madras; food at the Central Technology Research Institute, Mysore; drugs and pharmaceuticals at the Central Drug Research Institute, Lucknow, textiles at the Ahmedabad Textiles Industry Research Association, Ahmedabad; Chemicals at the National Chemical laboratory, Pure; ceramics at the Central Glass and Ceramics Research Institute, Kolkata, and some others. At present in India more than 150 indigenous databases covering most of the disciplines are available to users. MLIS (P 4 & 5, Eng)—9

130 The Physical Research Laboratory (PRL), Ahmedabad has developed an online bibliographic information storage and retrieval system called READ Fast which enables users to retrieve details of information using appropriate keywords, author names, classification numbers, accession numbers, date of publication, etc. The Patent Information System (PIS) has been developed by NIC for on-line retrieval of patent information. The data and Information Centre at the National Institute of Oceanography, Goa has been developing a bibliographic database called OCEANLINE. The Defence Scientific Information and Documentation Centre (DESIDOC), New Delhi has already developed the software for creating a database on Military

Science and allied subjects.

National Institute of Science Communication and Information Resources (NISCAIR)

formed on September 30, 2002

has developed expertise in the design and development of databases. Some databases include

Indian Science Abstracts. Database, National Union Catalogue of Scientific Serials in India Database, Indian

Patents database and Aromatic Plants Abstracts Database. All these databases are available on-line. One of the main objectives of INFLIBNET is

to create database of projects institutions and specialists for providing online information services.

INFLIBNET will provide database services—Bibliographic database services and nonbibliographic database services. Both public and private sector organizations are now showing keen interest in the activities relating to database creation, maintenance and use in India. With the development of INFLIBNET and other regional networks it is that the database use will be strengthened in near future. 13.9 SUMMARY In this unit we have defined database and its charecteristic features. Different types of databases are identified and explained. At present databases are created for nearly every field. These databases have been developed for public use. It is made accessible through online services. Database are produced depending on its type. Some databases are created on magnetic tape, floppy disks or on CD-ROM for use on personal computers. We have defined vendors. They provide online databases since 1990 several hundred such services are being initated in the United States and Europe. Accessing databases is an area that depends on the type of information and on the nature of group of users. Finally we have discussed the database use in India. NISSAT has created several databases and with the development of INFLIBNET India will have several users of databases in near future. 131 13.10 EXERCISE 1. Define 'database' and explain its characteristic features. 2. Discuss the different types of data and databases. 3. Describe the use of databases in India. 4. How would you develop 'database' for public use? 5. What is the mode of access to electronic databases? 6. Show you acquaintance with database vendors. 13.11 REFERENCES AND FURTHER READING 1. Cuadra, C.A. Ed. : Directory of portable databases. New York, Elsevier, 1990. 2. Frank, Lars : Database : theory and practice. Addison-Wesley, 1988. 3. Lahiri, A : An Indian model for database services. New Delhi, NISSAT, 1991. 4. Williams, Martha E. Ed.; Computer readable databases : A directory and data sourcebook. 8th ed. Gale Research. 1992.

132 UNIT 14 ❏ DATABASE INTERMEDIARIES Structure 14.0 Objectives 14.1 Introduction 14.2 Database Intermediary 14.2.1 Definition 14.2.2 Intermediaries are everywhere 14.2.3 Anatomy of an intermediary 14.2.4 End points and middle points 14.2.5 Message streams 14.2.6 Transaction streams 14.3 Search intermediaries 14.4 Role of Intermediaries 14.4.1 As Searchers 14.4.2 As Editors 14.5 Future of Database intermediaries 14.6 Summary 14.7 Exercise 14.8 References and Further Reading 14.0 OBJECTIVES Information flows all around us all the time. Intermediaries can manipulate information streams. This unit introduces you database intermediaries who can help users to search databases. The most successful searches are those in which intermediary knows sufficient about the background of the user's query to ask pertinent questions, which would draw full answers about his requirements from the user. Here you will understand the role of intermediaries and know the their functions in searching databases. 14.1 INTRODUCTION The major components of an information network are the user, the database producers, search service vendors, telecommunication networks and the intermediary who will carry out the search to the entire satisfaction of end user. As information becomes ever more pervasive and important, users increase on a variety of information streams

133 to meet their information needs. Rather stream replacing another in this economy of information, each stream has its own niche. An information stream conveys data from an information provider to an information consumer. For instance, on the WWW (World Wide Web), servers generally provide information. Browsers generally consume information. Often the stream simply conveys the information after additional processing, as the telephone does, but sometimes information can be usefully injected or modified along the stream. For instance, some telephone companies provide real-time language translation, or some webs communicate from one network to another through a firewell. Nevertheless, the student can be forgiven for feeling confused by the proliferation of providers of information. And it does not make for clear understanding to find particular kinds of providers playing a variety of roles at the same time : service suppliers may also be data base producers, producers may also be suppliers etc. Libraries, with which student will be particularly concerned, in addition to provide in-house search services for their own readers may also be database producers (as the National Library of Medicine with MEDLARS) or agents for database producers (as the University of Loughborough with COMPENDESX) or online search brokers (as the Science Reference Library). 14.2 DATABASE INTERMEDIARY Database contains information which intermediary collects on behalf of the users. It is the role of the intermediary to search database and provides answers to the user according to his requirement. The intermediary is the vital link between the database and the user. Intermediaries are information specialist and have the proper skills in searching databases. Their role is to identify the requirement of the user and meet his requirement by searching the database. The user may lack the capability to formulate his queries in the proper form and the intermediary help him in this regard. The intermediary selects the proper database to answer the queries of the user. 14.2.1 Definition We define intermediarees as computational entities that operate on information flows along a stream. Because of the tremendous numbers of information streams that are now available, there is new opportunity to take advantage of intermediary computations. We believe intermediaries can add several different ways. Namely, an intermediary can (a) produce new information injecting it into the stream, (b) enhance the information that is flowing along and (c) connect different streams, possibly translating communication process. It may be noted that intermediaries do not create new

134 information devices (such as telephones or web browsers) but increase the value of existing devices by the streams up which the devices operate. Likewise, intermediaries do not create information streams but enhance existing streams. In any way intermediaries need knowledge and experience of hardware, software, communication technology and the database. He should have skills in interviewing and communicating with end users. He needs efficiency to get access to database information. In a word, the database intermediary is an information specialist skilled in database searching and satisfying the end users. Intermediaries can do more than simple network translation and caching. A web intermediary can compress large images before sending them across network link such as a telephone line. 14.2.2 Intermediaries are everywhere The concept of an intermediary is not a new one. In fact, intermediaries are commonplace that it is sometimes difficult to notice them. For instance intermediaries abound. Travel agents translate customers requests into data airline reservation computers. In this way a travel agent acts as a protocol intermediary, effectively connecting a customer on the telephone to a main computer running the airline reservation system. Scientific journal editors comprise another intermediary based system. To receive submissions from authors, send manuscripts to referees or reviewers, forward back to authors, receive corrections from authors, and deliver final copy to these activities are designed to add value to the information stream that requires authors writing down their findings. The journal editors enhances the value of information stream by providing competent reviewing, ensuring anonymity, organizing and indexing articles, and editing completed manuscripts. Intermediaries are common in many other kinds of information streams as e-mail depends on intermediaries to hold messages after they have been sent and they have been received. The collection web directories in Yahoo! Is another example of intermediary. These directories do not themselves contain topical information to provide an intermediary service for connecting web users to information. Analysing such commonplace and complex systems of information flow in information origin, destination, and intermediaries illuminate design principle of computational intermediating systems. 14.2.3 Anatomy of an Intermediary Though intermediaries on information streams are ubiquitous in both bumble

135 computational systems, a thorough and systematic study of their properties has been undertaken. In this section, we begin such a study by considering how many parts are needed to make up an intermediary process. 14.2.4 End points and middle points Information streams consist of origin and end points, the stream itself, and various intermediaries that are located at and that operate upon the stream. A serious complication in analysing such that they may be decomposed into these constituent elements in many ways at many different levels. Consider the case of a person browsing a database in the Web. The basic elements include the user, a Web Internet, the Web server, and a database. In one decomposition of the system the database is the origin endpoint, the Web browser is the destination midpoint. Interment and webserver are intermediaries. However, Web servers are often as the information origin, even if they actually use a database. In that case, the Internet is the only intermediary. Partitioning an information stream into origin endpoint, destination midpoint, intermediaries involves several division points : everything beyond origin point is the origin; everything beyond chosen destination point is destination; and various points in between are chosen as breaks between intermediaries. Many decompositions are possible, but the most suitable one matches the needs. Now let us consider the functions of the three basic entities: origin midpoint, destination endpoint and intermediary. The origin endpoint has connection point and transmits information to it. It may also receive requests for information may transmit proactively. The destination endpoint also has one connection point receives information from it. It may also transmit requests for information required to do so. An intermediary is most easily conceptualized by considering everything on one side of it to be an origin endpoint and everything on the other side to be a destination endpoint. The intermediary has two connection points : one to be an origin and the other to a destination. 14.2.5 Message Streams Information streams vary widely in complexity, which roles of the processes involved in information transfer. The simplest information stream consists of a unidirectional flow from origin to destination. We refer to this system as a unidirectional message stream. The next level of complexity occurs when the origin and destination endpoint are allowed to play both roles; that is the destination can transmit messages to the origin. If the endpoints can act in either role arbitrarily the system is bidirectional message stream. One example of such a system is a simple two-party chat either party can chat at any time. 136 14.2.6 Transaction streams A more structured bidirectional system results if the reverse roles in a regular way occur. The most common example is when the destination sends a request message to the origin and then the origin sends a response to the destination. The terms origin and destination are chosen because the request normally includes a description of some desired information the response contains that information. The desired information flows from the destination; the request is simply a mechanism for accessing the desired information. An example of this system is the Hyper Text Transfer Protocol (HTTP) that is the World Wide Web. A browser sends a request message to a server with resource locator (URL) that describes the desired information. The server sends the response message that contains the information referred to by the URL. We call the system as a Unidirectional transaction stream. A transaction is defined as request- response pair. The final structure we consider is the bidirectional transaction stream, and the previous case in which the origin and destination can reverse roles arbitrary special case of the bidirectional message stream because each request requires response, rather than simple message transmission. To see this classification scheme in action, let us consider the standard telephone which consists of three parts : an origin telephone, a destination telephone, telephone central office intermediary. When the system is in its quiescent telephones are 'on- hook' and idle. One party lifts the receiver, which sends 'hook' request down the stream. This request is intercepted by the telephone office intermediary, which sends a 'dial tone' response back to the telephone completing the first transaction. The originating party then dials a destination number. The central office intercepts this request, sends a 'ring' request to the destination telephone, 'ringing tone' response back to the origin telephone. The second transaction is complete, and the third transaction has begun. When the destination phones it sends an 'off-hook' response to the central office intermediary, which completes third transaction. The central office now connects the two telephones together begins acting as a transparent intermediary, simply passing audio message forth between the two telephones. The system has switched modes : from unidirectional transaction system to a bidirectional message system. 14.3 SEARCH INTERMEDIARIES On-line searches can be made by the scientist or technologist in person. Put at its simplest, the case for scientist or technologist undertaking his own search is that he alone knows exactly what he wants and he is familiar with the subject field. But bibliographical search has never been an easy task even for a professional searchers

137 and the complexities of on-line have added to the difficulties. We have seen that on-line search in many cases has to be combined with manual search to be fully effective. No one can deny that many of these computerised systems lack what has been called 'transparency' letting a searcher use this service without first becoming an expert in the complexities of its structure. To what is basically the intellectual barrier of search formulation and strategy the advent of on-line has added a further hazard, immediacy, and has erected a quite new barrier, the command language. Both are direct consequences of the interactive nature of the search process. In the first place, his search strategy needs to be flexible. In the second place, because instructions to the computer on how to proceed with the search have to be individually given in each case, the searcher has to be familiar with the range of commands that may be needed. We should be careful to distinguish these commands about how to search from the distributors used in the search statement which indicate the subject of the search, that is, what to search for. The Science Reference Library advises its readers that 'effective searching … requires carefulprior preparation involving the consultation of manuals, thesauri and term lists'. Such work usually confines themselves to one database, e.g. AGRICOLA on-line users guide, BIOSIS search guide. Sometimes there are two or more manuals for the same database, e.g. Engineering index COMPENDEX online user's manual for the Lockheed DIALOG Information Retrieval Service and SDC COMPENDEX user manual. In had been very clear even in the earliest days of batch searching that there was a major problem, familiar to reference librarian the world over : the need for some kind of skilled and experienced intermediary between the users and the system, to explain, advise, teach and indeed to search on their behalf. In his pioneering 1968 evaluation of the MEDLARS demand search service F W Lancaster found that 'The greatest potential for improvement in MEDLARS exists at the interface between user and system'. The plain statistical facts of the matter are that ever since on-line searching was introduced the great majority of searches have been undertaken by intermediaries. Such as librarians, information scientists, search analysts, etc. Even the Science Reference Library now states that 'searches will be carried out for you by trained intermediaries.' At the library KTH where all searches are carried out by intermediaries. Results from a research study of on-line searching at the University of Manchester Institute of Science and Technology showed that' the most successful searches were those in which the intermediary knew sufficient about the background of the user's query to ask pertinent questions, which would draw full answers about his requirements from the user'. From the foregoing analysis, it can be inferred that intermediaries should have

138 self-confidence, logical mind, good communication skill, knowledge about subject area, patience, and technological awareness. 14.4 ROLE OF INTERMEDIAREES The database intermediaries usually play two major roles in providing data services from databases. 14.4.1 As Searchers The searching process begins with the request from the end user and ends with completing the search after getting the probable answers to the request. When the search ends, the searcher keys the command to exit from the system. 14.4.2 As Editors A properly edited and formatted copy of the search should be handed over to the user. So the editor's role includes—formatting the search, references/citations, database name, source, searcher's name, cost, document availability, and the like. 14.5 FUTURE OF DATABASE INTERMEDIARIES Intermediaries effectively open up pervasive computing devices, establish to manipulate data within data flows of the device. In the future, it is likely that end users will perform their own searches when search procedures will be more simplified or user- friendly. So the end users should be trained properly to face the role of information consultant. A good deal of research is needed to make the role of intermediaries brighter and more effective. 14.6 SUMMARY We have discussed in this unit the major components in the information network and the role of intermediaries in the process of search. We have defined the role of intermediaries and the end-users. The search strategy should be flexible and the searcher has to be familiar with the range of commands. The future has been predicted when the search procedure will be more user-friendly. 14.7 EXERCISE 1. Discuss the role of database intermediary. 2. Explain the message streams and transaction streams in database searching.

139 3. Explain what is the intellectual barrier to the search formulation and strategy. 4. What should be the qualities of intermediaries? 5. How can intermediaries play the role of information consultant? 14.8 REFERENCES AND FURTHER STUDY 1. Chen, C-C : On-line bibliographic searching : a learning manual. Neal-schuman, 1981. 2. Grogan, Denis : Science and technology : An introduction to the literature. 4th ed., Clive Bingley, 1982. 3. Henry, W M and others : On-line searching : an introduction. Butterworths, 1980. 4. Houghton, B and Convey, J : On-line unformation retrieval systems. Clive Bingley, 1977. 5. Oulton, A J and Pearce A : 'Perspectives on online systems in science and technology'. JASIS 1980, 31, 153-200.

140 UNIT 15 ❏ ONLINE INFORMATION SYSTEMS AND INFORMATION NETWORKS Structure 15.0 Objectives 15.1 Introduction 15.2 Technological Development 15.3 Online Searching 15.4 Functions of Online Services 15.5 Online Service Suppliers 15.6 Online Search Service Brokers 15.7 Service Charging 15.8 End-user Access 15.9 Problems of Online Searching 15.10 Information Networks 15.11 Online Information Systems and Networks in India 15.12 Summary 15.13 Exercise 15.14 References and Further Reading 15.0 OBJECTIVES You will have an idea about technological developments in accessing online information systems and information networks. You will know the various online bibliographic services offered through networks. You will understand the benefits and problems of online service. You will know the networking systems available in India. 15.1 INTRODUCTION The key technological components of online systems are computers that can act in time-shared mode and teleprocessing systems with terminal equipment. On-line services employ on-line systems technology to provide remote users with access to information organized in databases with greater flexibility, precision and speed than comparable print resources can. The development of networks ensures equitable access to services and contents especially in the public domain as well as facilitating the free flow of information.

141 In promoting the development of electronic networks, Unesco lays emphasis on policies and strategies to develop the most appropriate methodology to meet the specific needs of the different communities. Through its global and regional networks, the organization seeks to effectuate social development, democ-ratisation and good governance. By providing access to relevant information in an interactive format and in an easily assimilated form Unesco fosters capacities to acquire new knowledge and skills. Regional information networks, virtual laboratories and learning communities and other information networks offer a new paradigm for global cooperation using traditional and multimedia technologies to promote applications in the organization's field of competence. 15.2 TECHNOLOGICAL DEVELOPMENT Online systems have developed rapidly since the 1960's through the convergence of several streams of technological advances : time-sharing computers that permit large number of users to conduct simultaneous interactions with systems that may be located far from the central computer and its information store; interactive computer programmes {software) that are increasingly efficient, powerful and user-friendly; rapid—access storage devices that are growing in capacity and decreasing its data storage costs; computer terminals and compact, inexpensive personal computers that can transmit, receive and display information; telecommunication networks that provide fast, cheap data transmission; growing volumes of numerical and textual and graphical information {databases) created by publishers and other organizations in computer readable form. Local area networks permit online access over a limited site (e.g. University Campus). Wide area networks operate nationally and internationally and may themselves be linked together in a network of networks {Internet). 15.3 ONLINE SEARCHING In the late 1960s and early 1970s three simultaneous technological advances brought online bibliographical searching into the realm of the practical: firstly, the development of random-access computer memories on disk with greatly increased storage capacity, secondly, the availability of simple and cheap acoustic couplers and the more reliable modulator—demodulators (modems) to convert analogue signals to digital (and vice versa) and thus allow computer terminals to be linked to the regular telephone system; and thirdly, improvements in cable, microwave and satellite telecommunication which allowed greatly increased amounts of computer data to be transmitted faithfully over

142 greatly increased distances. Such online facilities permit the individual user to conduct his own biliographical search of a distant computerized database using a two-way telecommunication link from a teletype terminal (which is like an electronic typewriter with more keys than usual and is sometimes fitted with a visual display unit) in his own laboratory, office or library. It should be explained that the terminals can be connected to the computer by private lines or dedicated lines leased from the telecommunications authorities or connection can be made by the user by dialling up the computer as required, over the regular telephone system. Increasingly, these methods may use the facilities of data (as opposed to voice) telecommunications networks, designed especially for computer traffic. This shows a great saving in cost, particularly if the data is transmitted by the 'packet-switching' technique, that is, interleaved automatically on a time-sharing basis with other packet-based traffic. Would-be users normally take out a subscription with a service supplier; they are then allocated a unique and confidential 'password' which allows them to identify themselves to the computer and thus gain access to the database they wish to search. Online bibliographical searches have increased enormously in number in recent years, particularly in the US and Western Europe. Online access is now possible to well over two hundred bibliographic databses containing over 75 million records, mostly in science and atechnology. Currently the largest, most succesfful and most heavily used onlne database in the world is MEDLINE, the online version of MEDLARS. 15.4 FUNCTIONS OF ONLINE SERVICES Most database producers, particularly those compiling bibliographic databases, license their databses to other organizations called 'online services' or 'host computer services' or simply host, which provide the computer, software and telecommunications support that enables remote users to access databases. There are more than 1500 commercial hosts operating worldwide. The larger one—of which DIALOG is an example— provide access to several hundreds of databases in a wide range of subject areas (they are sometimes calle 'supermarket' hosts). The functions of hosts are structuring, loading and subsquently updating the databases into large time-sharing computers; maintaining 24-hour access; connecting their computers to national and international networks; maintaining user-friendly programmes so that databases can be interrogated easily and efficiently; offering downloading facilities enabling users to store and display retrieved information locally; providing gateway access that permits users to switch to other hosts; connecting to document delivery services by means of which the full text of retrieved references are delivered electronically (e-mail, fax) or by post.
143 15.5 ONLINE SERVICE SUPPLIERS Thus we saw emerge yet another category information profiders, the big-league service supplier, sometimes called system operator, concentrating exclusively on online provision and offering access to databases on an international scale over variety of telecommunications links. The market leader is DIALOG Information Services at Palo Alto, California, a subsidiary of the Lockheed Corporation. DIALOG provides 'fingertip access' to well over a hundred databases. This access is by dialling direct, or by leased line, or via TYMNET or TELENET which are major commerical data communications networks mainly serving North America but with modes around the globe. The second major US-based supplier is the Search Service of System Developoment Corporation at Santa Monica, California, a subsidiary of the Burroughs Corporation. Using the ORBIT retrieval system, SDC offer over sixty databses for searching. In the UK the largest supplier is BLAISE (British Library Automated Information service) which commenced in April 1977 under the auspices of the British Library but using a rented computer. Linked with this development is MERLIN (Machine Readable Library Information), a new integrated computerized system being developed by the British Library to support bibliographical and cataloguing services and other library house-keeping activities for its own purposes as well as for external users. The largest service supplier in Europe is the Information Retrieval Service of the European Space Agency (IRS-ESA) at Frascati, near Rome. 15.6 ONLINE SEARCH SERVICE BROKERS This has led to the emergence of another category of information provider in the shape of the 'broker' (or service intermediary), whose role is to provide or sell online search services on demand to those who do not have access to a computer terminal. Unlike service suppliers such brokers do not necessarily require their own computer facilities or database tapes: all they need is a terminal providing online access to distant computerized databases, together with some experience in searching them. 15.7 SERVICE CHARGING The main components of most charging systems relate to telecommunications rates; the elapsed time a user is connected to a host computer; storage of regular routines;

144 downloading and printing fees for retrieved information. The latter are often components of the royalty charges paid by hosts to database producers, with whom the copyright of the database usually resides. Some hosts charge a fixed annual subscription to their specialized services which allow unlimited access over a twelve month period. 15.8 END-USER ACCESS In the earlier years of online services, connecting to hosts and searching databases was a complex, expensive activity and the task was often delegated to specialist 'intermediaries' (librarians and information officers), Recently the trend has been towards encouraging the individuals actually seeking the information—'the end- users'—to do their own searching. Users can download the searches of their results into a e-mail service. Complementary document delivery services have been implemented though which an end-user can request (and pay for credit card transfer) copies of original documents. 15.9 PROBLEMS OF ONLINE SEARCHING Perhaps two controversial issues are cost and effectiveness: of course they are intimately linked. On the face of it at least, measuring the cost of an online search in order to compare it with alternative, that is, a traditional manual search, should be a simple straightforward matter. While one camp arguing that online is cheaper, the other retorting that when properly costed it is not. A. J. Hartley in discussing MEDLARS searches make the point that 'if the person using the output was a professor of medicine, it was almost always cheaper to the computer. If he was a research student it was cheaper to make him use Index medicus in the library'. But cost comparisons alone prove nothing: what is really important is the effectiveness of the search. Whatever the truth about the relative cost and effectiveness of online and manual searches the comparison to be fair can only drawn for those searches that are judged appropriate in the first place for an online search. There is widespread agreement that for the less intricate everyday and background searches, for exhaustive searches covering many years, and for browsing, manual methods are not only more economical but also more effective. Experience has shown that it is usually misguided to embark on an online search with a vague or imperfectly- formulated question. A number of much more fundamental probelms stem from the fact that many databases were not created primarily.for online searching : they usually originated as by-products of a publication system, consequent to computerization. On one matter

145 there does seem to be no doubt: online searching does save time. Many searches can be carried out either way, some must be undertaken using both methods. Even when the decision has been taken to search online, many would still agree with the conclusions of a team of lubrication engineers who compared CA CONDENSATES and ASCA : 'One cannot totally dispense with some hand searching and following- up references to be reasonably sure of good coverage'. 15.10 INFORMATION NETWORKS It seemed logical to many that linking information users and all the various information providers (database producers, suppliers, brokers, etc.) in an online network would be an obvious next step, certainly quite feasible with current technology. The aim would be to make the information in any one system available to as large a group of users as possible. Such a development is very much in line with the objectives of UNISIST. For some countries of Western Europe such a data transmission network has been established under the direct sponorship of the commission of the European Communities, which stated that its policy was to incorporate in the European network all information centres, systems or other useful institutions, which exist or are being set up in the Member States and link them together'. Agreement was reached in 1976 by the postal and telecommunication authorities (PTTOS) on the nine EEC countries on the establishment of EURONET, the actual telecommunication network. The ensemble of information services available to users via this network has itself been christened DIANE (Direct Information access network for Europe) and was opened in 1980. The President of the Commission, Roy Jenkins described it as 'a new highroad on which to transport a key resource—information.' At the early phase of consortium or cooperative networks were planned, designed and operational dependig on the network membership of particular region. The network structures were based on usualy the following types : Libraries of similar types like Research Libraries Group. Libraries of different kinds in a particular geographical area or region, for example NELINET, the New England Library Network. Libraries which required particular function or service for hardware and software consultancy. The primary objective of most early networks was creation and maintenance of computerized union catalogue basically for the following purposes : 1 To support interlibrary loan services, and MLIS (P 4 & 5, Eng)—10

146 2 Shared cataloguing on cooperative basis in some sort of standardized format mostly to share the exhorbitant and repetitive cataloguing costs and other management expenses. To achieve primary objective all the libraries got the union catalogue, larger database and database management system required for the member libraries. The system was known as cataloguing support system. It was the beginning of standardized catalogue format within the network system. The system eradicated the necessary and inherently evil problem backlogs of the member libraries. There are a number of information networks (online) and many of them are international in their scope and services. Some of them are discussed below : (a) Online Computer Library Centre (OCLC) OCLC, formerly known as Ohio College Library Centre was founded in 1967 by University Presidents to share library resources and reduce library costs. OCLC introduced online cataloguing system as early as 1971 for libaries and now it is used by libraries around the world. The inter library loan service was introduced in 1979 and since them it has been used for 110 million loans among 6,600 libraries around the world. OCLC is a nonprofit organization serving more than 40,000 libraries in 76 countries around the world. The public purpose is to further access to the world's information and to reduce costs by offering services for libraries and their users. OCLC membership is a unique cooperative venture giving global access to all the services and database including World Cat. OCLC libraries also offer the OCLC First Search Service, which delivers oline reference information through a rich collection of databases with links to online full text, electronic journals, web resources, library holdings, interlibrary loan and document delivery. It provides information on Electronic collections Online services, Site Search software and Contents Alert service. The OCLC MARC Record Service (MARS) is a complete, comprehensive database preparation and authority control service that provides high-quality, accurate, standardized bibliographic and authority data functions for libraries and research institutions. This service provides authority control, customised record processing, bibliographic record updating, smart barcode number generation, manual review, ongoing authority updating and notification services, now bibliographic record processing and TOC MARC Enrichment. The future programmes of OCLC are to transform Worl Cat from a bibliographic database and online union catalogue to a globally networked information resource of text, graphics, sound and motion. This enhanced version of World Cat will include a shared knowledge base supported by a set of integrated, Web-based tools and services that facilitate contribution, discovery, exchange, delivery, and preservation of knowledge objects and shared expertise of participating institutions.

147 (b) Research Libraries Information Network (RLIN) The Research Libraries Group (RLG) was established in 1974 by Harvard, Yale, Columbia University and the New York Public Library. RLG acquired the BALLOTS bibliographic data system of Stanford University and started its own bibliographic utilities known as the Research Libraries Information Network (RLIN) in 1978. The prime reason for the establishment of the RLIN was the need of researches for specialised research materials which could not be provided by a general database, even as large as that of OCLC. With only 159 resource sharing members, RLIN database has a record count of some 63 million, and a database focused on scholarly materials. But because RLIN allows for multiple item entries and higher quality cataloguing, this database is enriched by more than 170 million catalogue records. RLIN is now an internationally available bibliographic information system used with RLG's Library resources. For RLIN's cataloguing, archival control, and interlibrary loan facilities RLIN Terminal for Windows software and an internet connection is needed. This software and connection also support searching in Arabic, Chinese, Cyrillic, Hibrew, Japanese and Korean. The resources of Research Library Group are a set of online catalogues that offer reference libraries, archivists, cataloguers, bibliographers, scholars and other researchers million of records describing materials created around the world. The RLG union catalogue comprises eight bibliographic files. The RLG's EUREKA search system presents them as one file, as well as the RLIN technical processing interface presents them separately. (c) WLN Washington Library Network (WLN) was first operated by Washington State Library with its juristdiction within the state. It was relatively a small library network. But the software development for its regional database which was developed since the late 1960's made the WLN software a very important one. The computerized bibliographic databse was established in 1972 with the cooperation of the Washington's Libraries. The online system was introduced in 1975. More than 80 larger libraries or library systems in the six states became online participants in the Washington Library Network. As the area of operation was extended beyond Washington state to six adjacent states, it was renamed as Western Library Network keeping the same abbreviation, WLN. WLN provides a broad range of innovative, high quality technical and database services to public libraries, university, college, corporate, legal, medical and other libraries throughout North America and abroad. WLN's union catalogue contains 15 million bibliographic records and over 30 million local library holdings.

148 With effect from 1st January, 1999, WLN, a non-profit corporation serving over 600 libraries in The Pacific Northwest region of the USA and Canada, merged with OCLC, having its headquarters in Lacey, Washington. OCLC and WLN believe the synergy created by the merger will allow the organization to more effectively meet a wide range of information needs of libraries and the end-users. Working together, OCLC and WLN eliminate duplicate services, introduce new and better products at lower costs for member libraries. OCLC, RLIN and WLN were established as non-profit organizations supported and governed by the member libraries. There are no commercial considerations, whether for the use of databases or for technical innovations in bibliographic services. (d) UTLAS The University of Toronto Library Automation Systems (UTLAS) in Canada is a regional library network created on commercial basis. The UTLAS network is diverse in the types of libraries—academic, public, government, special, etc. It has no relationship with the University of Toronto, Canada. It has made an integrated approach to library automation based on the distributed processing network. During early 1980's the users of UTLAS had access to a database of over 6 million records growing at the rate of over 2.5 million records per year. The database included source files from the Library of Congress, the National Library of Canada, the Bibliotheque Nationale du Quebec, and the records of the National Library of Medicine. Bibliographic records are available for monographs, serials, audiovisual materials, music, maps, manuscripts. UTLAS has changed its name to Utlas International. In addition to the national source files, there are users-created files. The Catalogue Support System of UTLAS (CATSS) supported both external databases and member- created databases. 15.11 ONLINE INFORMATION SYSTEMS AND NETWORKS IN INDIA During the last sixty years the process of modernisation of library and the establishment of networks in India has not been encouraging. Although India has good expertise in the technologies of computers and communication technologies, their applications to online bibliographic databases or networks are sketchy. In the 1980s organised efforts were made to collect and disseminate information. The 1983 Technology information base. The 1983 Technology Policy Statement put stress on the need for a technology information base. The National Policy on Library and Information System submitted in 1988 recommended, among many other recommendations, using of information technology on a national level. However,
the National Information System
149 for Science and Technology (NISSAT) in 1986
initiated the establishment of CALIBNET (Calcutta Library Network), and supported the establishment of DELNET (Delhi Library Network) in Delhi in 1988, PUNENET in Pune in 1992, ADINET in Ahmedabad in 1993 and BONET in Mumbai in 1994. The then INSDOC supported the formation of MALIBNET in Chennai in 1993. The UGC (University Grants Commission) established INFLIBNET (Information and Library Network) in 1988. However, this scenario of networks does not ensure the growth library networks in India. It is worth to refer to
the report of the Working Group of the Planning Commission on Libraries and Informaties for the ninth five year plan (1997-2002). The
report includes the following major recommendations for the networking and modernisation of libraries. 1. Special attention should be given to all libraries in the domain of Humanities with particular reference to Arts. 2. There should be a National Library System (NLS) comprising the National Library, Kolkata, National Depository Libraries in Delhi, Mumbai, and Chennai, National Subject Libraries such as National Science Library, National Medical Library, etc. and National Documentation Centres such as DESI DOC, NISCAIR (then INSDOC), National Social Science Documentation Centre (NASSDOC), etc. and such other libraries of national importance. These should form part of one cohesive integrated system. 3. The automation and modernisation of university and college libraries should be accelerated. The databases in these libraries should be created using intermational standards. 4. The Information and Library Network (INFLIBNET) programme of the UGC, and Information Centres at Baroda, Bangalore and Mumbai should be made fully operational. 5. Among the city networks, it has been found that the DELNET has emerged as an operational library network in India with 103 libraries as its members. It is recommended that DELNET be supported to create National Database and develop on the OCLC pattern covering all subjects. It is also recommended that CALIBNET, MALIBNET, etc. be financially supported to undertake creation of databases as state and city levels. 6. INFLIBNET should coordinate with the existing networks in institution so that duplication in various categories may be avoided. INFLIBNET began its operations in 1991. For promoting resource sharing MALIBNET in Chennai has created database of current serials in 50 libraries. It may be noted that BONET, MYLIBNET in Mysore, PUNENET, BALNET and ADINET have not yet created their value added databases. As DELNET has been regularly

150 increasing its services, the membership growth has been positive DELNET's membership outside Delhi is increasing phenomenally because DELNET databases can be accessed by users through internet. DELNET is a growing network. 15.12 SUMMARY In this unit we have discussed technological development, online searching along with its functions, online service suppliers, online search service brokers and end- user access. We have noted the problems of online searching. We have also described some of the well-known information networks functioning in the USA, Canada and the UK. India's attempts to build up online information systems and networks have been highlighted. 15.13 EXERCISE 1. How would you define information networks? Discuss at least four information networks in the world. 2. Discuss the problems in online searching. 3. Who are online search service brokers? Who are end-users? Who are online service suppliers? Explain. 4. Describe the functions of online services. 5. Write a note on online searching and key components of online systems. 15.14 REFERENCES AND FURTHER READING 1.

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151

Post-Graduate : Library and Information Science [MLIS] Paper - V Management of Library and Information Centres Modules : 1 – 4

152

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