PREFACE

In the curicular structure introduced by this University for students of Post-Graduate 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 subjects 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 preparation 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, pioneering 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.

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Post-Graduate : Library and Information Science [MLIS]

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Modules : 1-4

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MLIS -01
Information,
Communication and Society

Module : 1
Information —Its Nature, Property and Scope

Module : 2
Information-Generation and Communication

Module : 3
Knowledge Generation and Management

Module : 4
Information and Society

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MLIS -02
Information Sources, Systems and Services

Module : 1

Multimedia

Module : 2

Organization of Information Sources, System and Services

Module : 3

Information Sources for Users

Module : 4

Information Experts as Resources Personal

Unit 1 ◻ Data : definition and characteristics

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

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

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.

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.

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.

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.

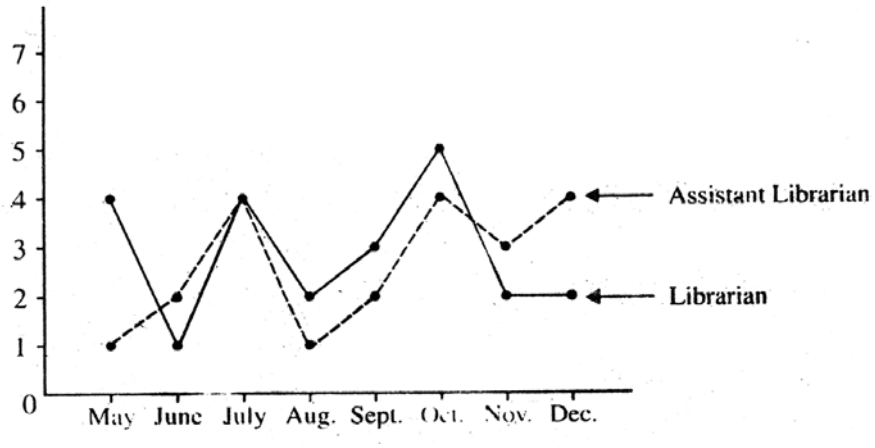
Months	No. of posts	Librarian	Asst. Liban
May	05	04	01
June	03	01	02
July	08	04	04
August	03	02	01
September	05	03	02
October	09	05	04
November	05	02	03
December	06	02	04

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.

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.



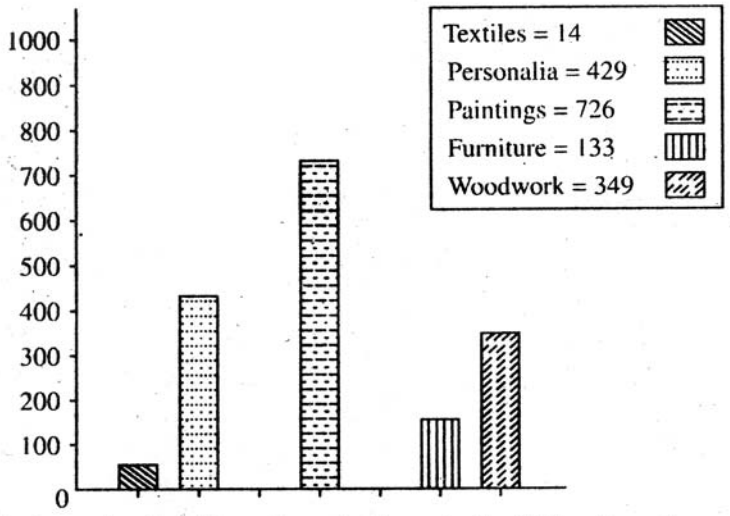
[Line diagram showing the distribution of posts advertised for librarian and assistant librarian in the Statesman from May-December 1973]

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.

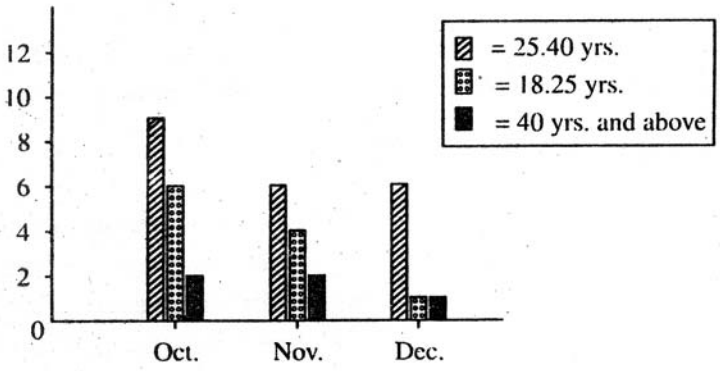
Table 3



Bar diagram, showing the variety of objects in the Vishwabharati museum.

The table below (Table 4) represents an example of multiple bar diagram.

Table 4



Age Requirement Table			
Months	**18-25 yrs**	**25-40yrs,**	**40 yrs and above**
October	6	9	2
November	4	5	2
December	1	5	1

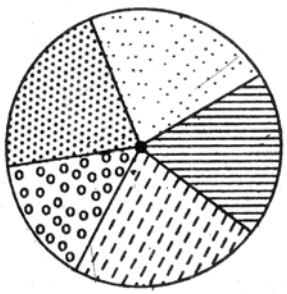
The chart and the diagram above shows the age requirement for the posts of librarian and assistant libraian, as advertised in 'The Statesman' for the month of October-December, 1973. The above is a concrete example of multiple bar diagram.

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 $\frac{360}{100}x = 3.6x$ 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 of India	**M.S. Dhoni**	**R. Dravid**	**V.V.S. Laxman**	**I. Pathan**	**Others**
603	89.96 = 90	102.99 = **103**	147.97 = 148	89.96 = 90	172.09 = 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

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

Unit 2 ❑ Information : scope and characteristics

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.

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

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. The Structural 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

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.

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

some people, and totally inappppropriate 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

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

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

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

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Unit 3 ❑ Information science as a discipline

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

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

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

"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

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.

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

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

Unit 4 ❑ Communication Process

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

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

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.

(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.

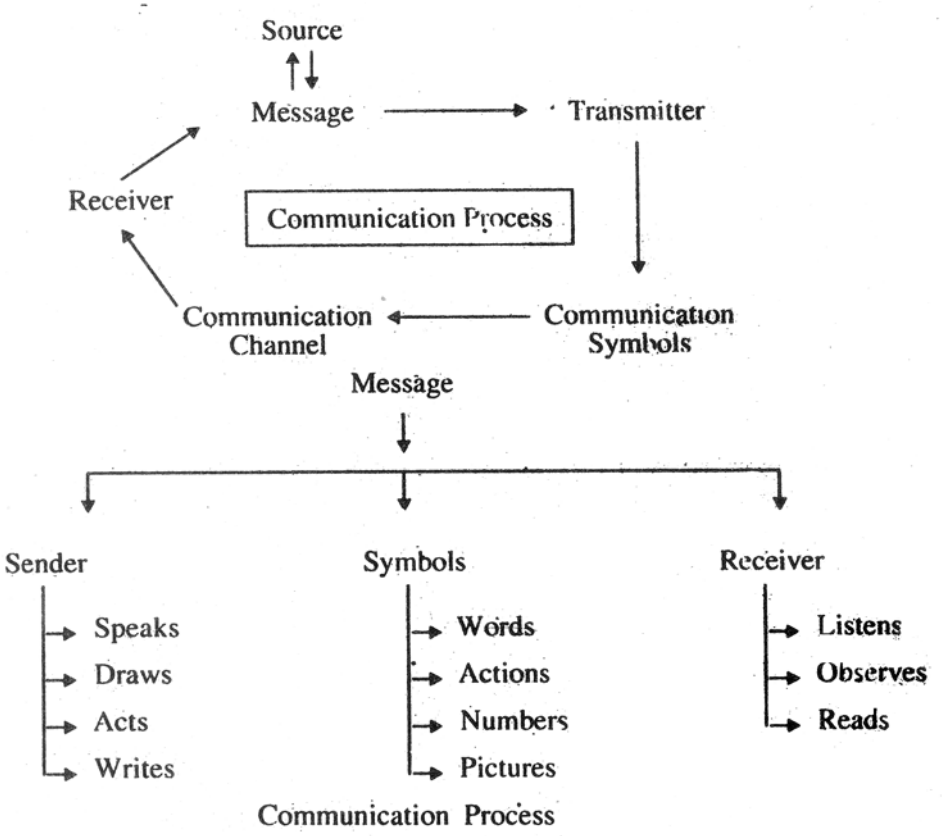
(h) Proxemic communication : Communication resulting from the way the communicator handles space.

(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 :



Communication Process

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

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."

(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:

Literal 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

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

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Unit 5 ❑ Generation and dissemination of Information

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

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.

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

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

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.

(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

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Unit 6 ❑ Information theory and entropy

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

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

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

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.

6.4.1 Zipfs 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 $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{n}$ of x 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

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 $\frac{1}{n^2}$ 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

freedom of choice is gone.

one is completely free and unbiased in the choice) and reduces to zero when one's

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 selecting the first alternative is p_1 and the second is p_2 which is $(1-p_1)$. Here H will signifies maximum entropy. If there are two possible choices then the probability of

This formula is based on probability. So the highest value II can attain is 1 which

is given as H = - $\sum$ (pi $\log_2$ pi)

to choose from and N is the number of bits of information. The formula for entropy

8 ($256 = 2^8$). This is expressed as $\log_2 x = N$; where X is the number of messages a choice among 256 messages, then there are 8 bits of information, since $\log_2 256 = 1$, so the choice is, since $2 = 2^1$. Characterized by 1 bit of information. If there is this relationship is logarithmic. If one has a choice between two messages, the $\log_2$ relationship between the number of possible messages and the number of bits, and source, it is said that its entropy is one bit. Therefore it is seen that there exists a possible messages was generated or sent. As a measure of information content in the one bit of information removes the uncertainty with regard to which one of the two signal or symbol, i.e. a bit. Therefore one bit means one out of two possible messages; uncertainty is removed. Each of these messages can be identified by a very simple regarding which of the two messages, he wants. If he can identify one. all the

When the source can generate one of two possible messages, the receiver is uncertain

in such cases would be high.

is better than the others, then there will obviously be confusion. Entropy, or disorder, with several possible solutions to a problem, and has no reason to think that anyone entropy, the more disordered information may be seen to be. If a person is presented another. Entropy is also a measure of statistical disorder, so the higher the level of choice is unfettered, when one option has no better chance of being selected than Entropy can also be stated as a measure of freedom of choice, and it is highest when that is cleared up for the receiver when a message from a source is communicated. thermodynamics. Entropy can be defined as measure of the amount of uncertainty representation of 'information' is almost identical to that of entropy, as used in He refers to 'information', or the degree of choice, as entropy, because the mathematical information theory. So, Shanon also used the term 'entropy' to represent uncertainty.

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.

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.

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 $\frac{1.75}{2}$ = 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

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Unit 7 ❑ Structure of knowledge

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.

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

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

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).

Empiricism	Rationalism	Historicism	Pragmatism
Relevant : Observations, sense data. Induction from collections of observational data. **Non relevant :** Speculations knowledge transmitted from authorities. Data about the observers' assumptions and preunderstanding.	**Relevant** Pure thinking, logic, mathematical models, computer modelling, systems of axioms definitions and theorems. **Low priority** is given to empirical data becasue such data must be organized in accordance with principles which cannot come from experience.	**Relevant** Background knowledge about preunderstanding. theories, conceptions, context. historical developments and evolutionary perspectives. **Low priority** is given to decontextualized data of which the meanings cannot be interpreted.	**Relevant :** Information about goals and values and consequneces both involving the .researcher and the object of reasearch (subject & objecf). **Low priority** (or outright suspicion) is given to claimed value free or neutral information.

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.

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.

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.

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

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.

Unit 8 ❑ Intellectual Property Rights

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

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

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.

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.

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.

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

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.

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.

Unit 9 ❑ Knowledge Management

9.0 Objectives

This unit provides in a nutshell

- the scope and variety of knowledge and knowledge management.
- the various forms of knowledge.
- the idea of the approaches of the conversion methods of knowledge.
- 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 process, knowledge is converted in four ways,. Knowledge managers role in this process is noteworthy; it is he who mediates the knowledge transfer, conversion and management 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

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 assets. Karl Sveiby defined it as the art of creating value from an organization's intangible assets. World Bank (2001) defines it as the management of knowledge through systematic sharing. In a nutshell, knowledge management can be viewed as the process of identifying, organizing and managing knowledge resources. These include explicit knowledge (information), know-how (learning capacity), know-who (customer 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 reduced, 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 everything 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.

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, learning, 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, enhancement 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 exchanged, 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 operating 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-

ferred via various documents. It deals with the processing of information i.e. documented 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 internalizing 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 knowledge, though knowledge itself is a very slippery concept with many different definitions. 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 important. 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 knowledge 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.

c) Retrieve knowledge capital : Retrieval support implies assisting users in the proper use of information technology to access the available knowledge. The application 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 knowledge 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 intelligence, 1997.
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3. Hawamdeh, Suiiman Al—Knowledge management : cultivating knowledge professional. Chardos, 2003.
4. Nonaka, Ikujiro & Takeuchi, Hirotaka—The knowledge creating company, OUP 1995.

Unit 10 ❑ Information Society

10.0 Objectives

By reading this Unit you will understand the dimensions of the information society, 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 information 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 & economic 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

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, telecommunication networks, and the other applications of information technologies to all corners of the society. Computers and computing have led to an unimaginable fast access to information, information and information resource management, information consolidation and repackaging, economically viable information, better information 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 technological 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 technologies 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.

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 message. '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 company, 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 producers, 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 consists of people whose prime function is creating, processing, and handling information. 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 scientists, teaches, librarians, inventors, journalists, authors, lawyers, managers, typists, computer operators, telephone installers and so on. All these people together constitute 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 become the supreme source of Power. The world is now divided on the basis of information 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 noteworthy. 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

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.

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 cataloguers, 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 information 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 society. 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

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. Information 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 opportunities 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 information 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 producing 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 organizations, a source of power. In this age, the role of information has attained new proportions with the acceleration of research, mounting social and population pressure, 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 businesses and individuals valuable time, effort and additional resources. It has resulted

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 information 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 information professionals, this digital age brings a need for a constant update of their professional knowledge and competencies.

10.6 Knowledge Society

During the last century, there is a major transformation from agriculture to information society. The information society evolved in the last decade. In the 21st century, 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 knowledge 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.

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

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Unit 11 ❑ Information : Economic Aspects

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 information 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.

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 information 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.

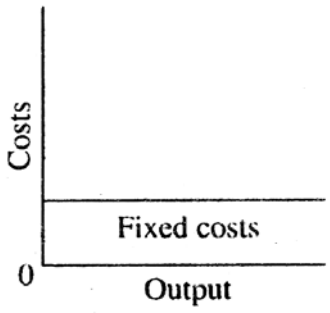
Machlup depicted information activities as education, research and development, media of communication, information machinery and information services. His study showed that the national economy consists of the following components-information work force, information goods and services, emergence of 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 produce 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

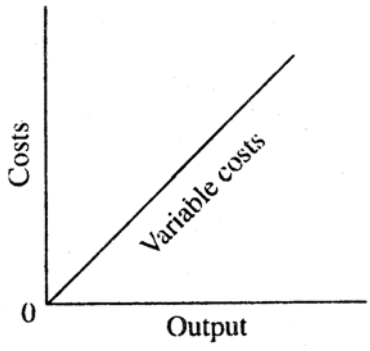
case of libraries. This means the value placed on resources in their best alternative use. Prior to making pricing decisions, one must know costs, and this knowledge can be applied to various library purposes. The value of a service to the customer is realised basing on the costs; whether customers are 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 :



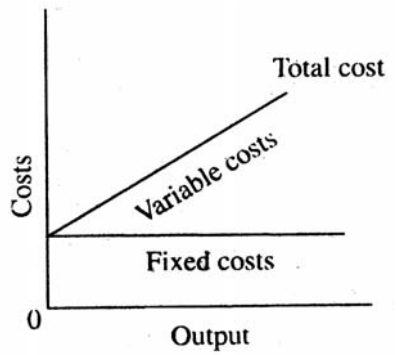
Variable costs vary with the level of output. They are the costs of those inputs which can be verified even in the short run. As output rises, these costs increase.

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 :



Average cost is the total cost divided by the number of units produced

$$\text{Average cost} = \frac{\text{Total cost}}{\text{Output}}$$

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 professionals in the day to day control of library and information system. It means the transformation 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 expenditure.

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.

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.

c) Market size maximization : The resource available in libraries is made available 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 organization 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

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 conditions 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. bringing 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.

Olaisen (1988) has described five types of pricing models in a non profit organization. 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 interactions 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 documents 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 approach. 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 :**

- 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.
- Marketing is to be given at least as much importance as other basic functions such as administration, production and finance.
- 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 marketers need to identify users and determine their information needs. Demands analysis 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 product 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

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 exhibitions 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 network.

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.

11.7 References and Further Reading

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Unit 12 ❑ Right to Information

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.

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 themselves 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 individual 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 European Union, 38% of applications for access to document are said to be refused because of various exceptions and unspecified exception. Direct access to the contents 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;

5) Information which is covered by legal/professional privilege, like communication 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 governments' 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 producers and publishers of masses of information. Information regarding revenues, statistics, 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 corruption. 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, intimately linked to respect for the inherent dignity of all human beings. This right is

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 national 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 information and ideas through any media regardless of frontiers. In 1993. the UN Commission 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 American 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

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 accordance 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 prerequisite 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 throughout 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.

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 corruption. 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 applications 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 electronically in compact discs, video cassettes, audio cassettes, certified samples and diskettes, 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 information 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, disclosure 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.

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.

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, "appropriate 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, documents, 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.

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 information. 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 electronic form, the names, designations and other particulars of the Public Information Officers. Every information shall be disseminated widely and in such form and manner 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 Information 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 Territory. The Commissioner shall hold office for a term of five years from the date on

which he enters upon his office, or till he attains the age of sixty five years, whichever is earlier, and shall not be eligible for reappointment as such Information Commissioner.

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 perform the functions assigned to. it under this Act. The State Information Commissioner and the State Information Commissioners shall be appointed by the Governor. All other qualifications and conditions of service under this chapter shall be equivalent 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 information 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 Commission 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.

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.

Post-Graducte : Library and Information Science [MLIS]

Paper - II
Information Source, Systems and Services
Modules : 1 - 4