PRINT AND ELECTRONIC SOURCES AND LITERATURE IN NATURAL SCIENCES

M.LIB.-105

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Printed and Published by : VIDYA Prakashan Mandir (P) Ltd.
Vidya Industrial Estate, Baghpat Road
Meerut-250 002 (Delhi-NCR)
info@vidyaprakashan.com

(M.LIB.—105)

Print and Electronic Sources and Literature in Natural Sciences

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UNIT 1

Historical Development

1.1 Introduction

In this chapter, we will learn about research as well as study different methods of research. Together we will study about the discipline as well. We will also study how research trends are promoted. Apart from this, we will also study historical development.

1.2 Different Methods of Research

Research work is to find out about the past, future, present of any event by scientific method. Some research work is done to satisfy some curiosity, some is done to gain knowledge, and some is done to check the truth of any hypothesis. On the basis of these different goals and purposes, the following methods of research can be :

(i) Scientific Method, (ii) Historical Method,
(iii) Descriptive Method, (iv) Sampling Method,
(v) Observation Method, (vi) Statistical Method,
(vii) Comparative Method, (viii) Survey Method,
(ix) Experimental Method, (x) Logical method (d).

Out of the above mentioned methods, three major topics will be studied in detail here.

1.2.1 Scientific Method

Scientific method is the method used in research and survey. If the scientific method is explained on the basis of the meaning of the term, then it will be more convenient to understand. The word science is commonly used to denote a group of subjects. Like Physics, Chemistry, Biology etc. If

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we proceed with the word science on the basis of subjects, then it will be concluded that scientific method is the method of study and research of science subjects. While this is not entirely correct. But it is also true that the method works completely only in the study of science subjects. This method is being used to a large extent in sociology and social subjects nowadays. Historical method and descriptive method are specially used in the disciplines of sociology and humanities. On the contrary, to say that historical and descriptive methods are not used in science subjects is also wrong. Both these methods are used to some extent in science subjects, so we have to think clearly further that the word scientific does not mean only for study and research in science subjects, but it is a method which is used more or less. It can be done in all subjects. So by scientific method we mean the following:

1. The word science is derived from the Latin language which means to obtain information, hence science is associated with knowledge, that is why Bernal has given its definition that science as its name appears is knowledge. Similarly, William Shakespeare has defined the term science as "the systematic knowledge of natural things, methods of research in natural sciences, social sciences and humanities."

   Therefore, proceeding on the basis of the above definitions of the word science, we find that the scientific method is an organized and systematic method of research work.
2. The word science is said to be synonymous with the word strict and hard. It has been seen in the general perception of the people that science subjects are more difficult and intense than other subjects. Therefore, on the basis of this it can be said that scientific method is a rigorously organized and organized method of research.
3. Tests and experiments are associated with the term science. Therefore, the scientific method is a rigorously organized and systematic method of research, which depends on experimentation and use.
4. Scientific method is the method which helps in arriving at rational decisions. This right is away from central thinking and rigid thinking systems. The scientific method accepts only those judgments that satisfy all the evidence.

Thus, the scientific method is a rigorously organized, systematic method based on experimentation and application, and by which such decisions are obtained which can be said to be correct on the basis of all available facts and experiments. Scientific method is an important method of research work. Under this, facts are collected and analyzed and interpreted like historical and descriptive methods, which is not in the descriptive method.

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All the facts and results are scrutinized and verified and they are not accepted until all the facts are found to be consistent. This is the reason why the research done by the scientific method is called complete research.

Features of Scientific Method

The following features are found in the scientific method :

1. **Verifiability :** The scientific method has the characteristic that the truth of the conclusions obtained by it can be tested and checked and any person can reach the same results by checking those conclusions under similar conditions.
2. **Objectivity :** This method also has the specialty that in this method the pre-made feelings and perceptions of the person studying in this method do not affect his study.
3. **Generality :** The scientific method lays more emphasis on the ubiquity of the mostly realistic nature of any law. It simply means that the rules to be set in scientific research should not apply to a single fact but to a group.
4. **Definiteness :** The scientific method is definite and specific. Due to this feature, a clear definition of facts is given in scientific study so that it can be verified.
5. **Predictability :** The scientific method emphasizes the correlation of cause and effect. Therefore, the ability to predict is born in him.

Steps of Scientific Method : Before getting to the point, the scientific method tries to find answers to the following four questions :

1. Is it so?
2. If so, to what extent,
3. Why is that?
4. What are the circumstances which determine this to happen?

In other words, when a scientist faces a problem, he gets information about some facts and events related to it and asks himself the above question. He ponders over the problem over and over again. Examines the facts of the event and tries to identify the extent to which it happens. When he sees that this is happening again and again, he probably goes ahead and tries to find out why it is happening and this effort is done to the extent that he can determine the general conditions that lead to the event. doesn't do it. The scientific method involves the following steps :

1. **Selection and Analysis of Problem :** Before starting the study work, one or the other problem is selected which explains the

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objectives of the research. The problem which has to be solved is first explained and all the facts related to that problem are considered and the articles related to this problem which are found in the magazines, texts etc. Once some information is received among the connected persons, it is also collected and on the basis of these, efforts are made to understand the problem.

2. **Formulation of Hypothesis :** This is the second stage of the scientific method. Hypothesis means almost certainty. Therefore, in this stage, a determination near to some truth is reached. In this phase something is assumed to be true without any proof. It is a provisional decision which is the culmination of an in-principle interpretation. In other words, there is a possible solution to the problem and after examining other facts in the same direction, it moves towards the final decision.

   Hypothesis is a general hypothesis or belief that is based on available evidence. Without a vision, we cannot proceed towards the final decision. Therefore, this stage is an important step in the research process.

3. **Formulation of Research Design :** The researcher prepares the outline of the dissertation to move in the right direction and according to the nature and form of the research problem, its design is prepared, under which the decision is to be implemented. Before the situation of the decision, a brief description of the prescribed procedure is done and on the basis of this, the researcher brings the situations coming in his research under control.

   With this, the research is decided in terms of models, methods, parameters and tools to be carried out well in order to perform the research.

4. **Selection of Study Methods :** In this stage the researcher selects those methods by which the correct knowledge of facts can be obtained. On the basis of the nature of the problem, it is decided that in the stipulated time which type of equipment will be used for inspection and data collection.

   To collect the necessary data by sending questionnaires by post to a far-flung area. Information is collected. Some of the materials required for the study are pre-compiled information such as it is obtained through government and non-government published or unpublished books etc.

5. **Data Collection:** After selecting the necessary methods, tools

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and equipment for the study, the researcher goes out in his field and collects the information related to his subject there without any discrimination. In this way the information obtained through observation and interview is recorded.

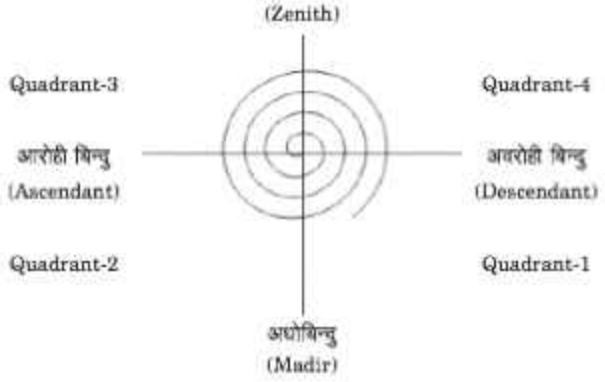
After collecting the facts in this way, their editing, classification, categorization and notation. They are then tabulated and then analyzed and interpreted.

6. **Generalization :** In this step it is seen that the obtained conclusion can be applied to the population under similar conditions. On the basis of the analysis in the collected facts, the researcher is finally able to select such facts from which either his hypothesis can be confirmed, that hypothesis can be held to be unproven.
7. **Preparation of Report :** This is the last stage of the scientific method and in the phase, how has the researcher completed his study and on the basis of which facts but what he has been able to conclude, he gives a systematic description of it.

In this way, it is natural for the selection of the problem to make a close report and the information acquired through the major stages of the scientific method become self-organised.

Spiral of Scientific Method

The scientific method proceeds in an infinite spiral motion and this is its specialty. It is a never ending cycle method whose movement is clockwise. For the convenience of the study, Ranganathan has determined the four cardinal points of the circle, which are in the following order :



1. **Madir :** It is the starting point of the work which reveals the accumulation of facts obtained by observation, experiment and other methods of experience.

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2. **Ascendant :** It represents the accumulation of inductive rules derived from the accumulated facts at the bottom point through inductive reasoning and other aids based on statistical imagination.
3. **Zenith :** This point begins with the determination of such fundamental rules which are used by the researcher to understand all the inductives collected at the ascending point and the meanings contained in them, to understand which he can use his insight.
4. **Descendant :** This point represents the set of deductive rules. These rules are derived from the basic principles formulated at the apex with the help of deductive reasoning and all kinds of mathematical formulations.

Different Stages of the Cycle of the Science Method

1. **Experience Phase :** This is the first phase of research where the researcher determines the problem on the basis of his experience. Ranganathan has written for the stage of experience that in motion we move from the hypocritical to a fact or personal experience. Personal experience is the use of the mind to make sense of a fact or event.
2. **Hypothesis Stage :** Hypothesis is formed by applying inductive reasoning with basic facts or intuition. This hypothesis starts from the ascending point and ends at the apex.
3. **Deductive Phase :** This is the third phase of research in which rules are derived from facts and general principles are made. This cycle starts from the vertex and continues till the descending point.
4. **Verification Phase :** This is the fourth stage of research, under which the basic truth is reached by checking the general principle or rule. At this level, other necessary facts are re-compiled and checked. This phase of the cycle starts from the descending point and continues till the lower point.

Application of Scientific Method to Various Subjects: Only those subjects can be called science which can traverse the whole cycle of scientific method *i.e.* that subject will be science if its quantity has passed through all four stages of scientific method. Humanities subjects are those subjects in which literature, fine arts, religion words etc. Literature and fine arts directly depend on imagination and insight. Therefore, these subjects appear directly from the second half of the cycle of science and are not able to complete the quantity till the point of peak. Dharmashastra is based on scriptures which have been considered as awakened thought. Its quantity does not start from the lower point in the cycle or it does not start from the point as soon as

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it comes because there is no scope for any experience or imagination in it. Therefore, we can say that the humanities are not able to travel to the four quadrants of the subject knowledge system, so they cannot be called science. As far as the subjects of natural science are concerned, all these subjects complete the journey of four dry seasons of science and nature, so they are clearly science subjects.

The disciplines of social science, although not completely all the sciences, complete the journey of the dry phases of nature, yet they complete quite a few stages of the science system, so they can be called valid science.

Application of the Scientific Method in the Field of Science : In those subjects all the requirements of all stages of science are fulfilled, that is, facts and experiences are collected and classified and combined, that is, generalization is done to obtain the theory and the principles obtained. The normalization is done rigorously in the laboratory. The research report on the same is carried forward. So, we can say that these subjects complete the four dry journey of research nature *i.e.* experience stage, hypothesis stage, deductive stage and generalization stage. So, it is definitely a science subject.

1.2.2 Historical Method

This historical method is used to study the goals or any historical event related to the past. The researcher cannot repeat the events of the past and neither is their repetition possible. They can be controlled. In such a situation, a research method is used *i.e.* comparative study of different aspects of ancient records can reach important conclusions and useful results can be drawn. Generally two such groups are selected for the study by this method. In this, an attempt is made that a particular group has contributed to the occurrence of that event. Through this method, the causes of present conditions or events are discovered by tracing the historical events. This method is called historical and documentation method. Through this we can know about the past, future and present etc. of civilization, society and science.

Objectives of Historical Method : Objectives of Historical Method are following :

1. To find out the relevance of the present on the basis of the past.
2. To find out the then library system, policies and ideals through the study of the past, as well as to find out its relevance or utility in the present.
3. Correction of past errors in the present.
4. To forecast the direction and development of librarianship.
5. To find out the shortcomings of the present educational institutions, libraries etc. on the basis of history.
6. To find out the sequence of events that happened in the past.
7. To find out how a society or group behaved in a situation in the past.

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Steps of Historical Method

The historical method can be divided into the following four stages :

1. **Formulation or Selection of Subjects :** The first stage of research is very important. No study work can be started until the subject has not been selected. While choosing the subject for research, it has to be seen whether the necessary facts can be discovered in relation to the subject or not, whether the facts can be compiled or not, whether due to the limited resources will be completed on time or not or the subject which has been selected. Is it useful or not? Wrong choice of subject leads to wastage of labor and resources.
2. **Collection of Facts :** This is the second stage of researching a topic. The literature related to this is studied. Related literature includes articles, documents, letters, books, reports etc. Researchers use two types of sources to collect data :
   (a) **Primary Sources :** Primary sources are those human remains which are the direct witnesses of some event or fact. They are the sources of basic data of historical research, the information available in these sources is called primary data.
   (b) **Secondary Sources :** Persons who have neither seen the actual event nor have been a participant in that event, but have recorded the description expressed or narrated by the other. The facts or data obtained from them are called secondary sources.
3. **Interpretation of Facts :** At this stage the collected facts are analyzed and discussed. Here an attempt is made to make sense of the facts gathered and to find out the truth, falsity of the hypothesis. The relationship between facts, events and different situations is known. This helps in drawing scientific conclusions. Conclusions obtained by this type of method differ from those obtained by the scientific method. In the scientific method, the information of facts is obtained from one's own experience, whereas in the historical method, the facts, ancient documents, articles etc. materials are collected and analyzed on the basis of the new environment. Such conclusions are huge and not always true and we cannot call them false either.

Limitations of Historical Method

The historical method has the following limitations :

1. The task of collecting facts is a difficult task because data about ancient events is not available.

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2. We cannot prove Ramayana, Mahabharata because there is not enough data about them.
3. Ancient historical events have happened in the past and happen only once. They cannot be replicated for use.
4. Historical articles can be biased.
5. Historic maintenance requires repairs so that they cannot remain in that condition. Thus their study leads to faulty results.

Despite the above limitations and other defects, the historical method is used in many areas. Especially history, language and literature has greatly increased the knowledge of man by this method of research and if the research is based on the facts gathered by good documents then we have to accept it.

1.2.3 Descriptive Method

In this type of research, after collecting the real or real facts about the topic or problem, each detail is presented on the basis of them. It is a main method for research of social science subjects because research in these subjects is based on surveys. There are many aspects related to social life in relation to which no in-depth study has been done in the past. In such a situation, it becomes necessary that information should be obtained regarding various aspects related to social life and real facts or information should be collected and presented to the public. The facts collected should be genuine and reliable. Obtaining the facts, the following methods are adopted :

1. **Case Study Method :** The use of this method is very ancient. In this method complete and in-depth information about a person, organization or community is obtained. In ancient times, we used this method for the existence of life accounts and important events of famous historical men of history. This method was used by Herbert Spencer but the credit for using it systematically and scientifically goes to Charles Dupley.
2. **Interview Method :** Interview is a process from the sociological point of view. There is a face-to-face between the interviewer and the informant regarding a specific objective. In this case there is conversation or reply to reply. It is a psychological condition in which the interviewer and the informant come close to each other and have an independent discussion. The purpose of the interview is to find out the thoughts, beliefs, values, feelings, past experiences and future intentions of the person.
3. **Questionnaire Method :** This method is simpler than other methods. At present, due to the development of means of transport

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and vehicles, the study of people living in remote areas has become easy through questionnaire methods. It is more useful to study by this method when the informant is educated, comprehensive and vast. Many times people related to the subject on which they want to study are engaged in a very large area, which requires a lot of time and money to be studied by interview method and the information also cannot be collected quickly. In such a situation, the questionnaire method is used to save time, labor and money and to get information quickly. It is used to get preliminary information about the subject. Questionnaire is a list of many questions related to the topic or problem, which the researcher sends to the informants by post and the informant himself fills it out and returns it.

Application of Scientific Method to Social Science

The main goal of research is to obtain scientific conclusions and to formulate rules. To achieve this goal, it is necessary to use the scientific method. Social research is scientific in nature, so scientific methods are used in it. There are several stages in this method through which the researcher has to go through.

Social research is more complex and comprehensive than that of physicists. In social research, work is done in a definite manner from beginning to end. In this, it proceeds in a certain sequence from one stage to another and from second to third stage *i.e.* in different stages in sequence. There is some difference of opinion among different scholars regarding the stages of social research. But basically their steps are the same.

Auguste Comte observed the stages of the scientific method as follows :

1. Selection of Subject
2. Compilation of facts by observation
3. Classification of Facts
4. Testing of Facts
5. Rendering of Rules

Similarly, Mrs. P.V. Young has mentioned the following steps in the scientific method :

1. Creation of Action Hypothesis
2. Overview of facts
3. Classification of written facts into categories
4. Scientific generalizations and formulation of rules.

Note

Mention the steps in the research process to understand the process of social research in a better way.

1. Selection of problem or topic
2. Study of related literature
3. Determination of units
4. Construction of the hypothesis
5. Determination of study area
6. Selection of informants
7. Determination of sources and methods of information
8. Thorough testing of equipment and techniques
9. Observation and compilation of facts
10. Editing and classification of facts
11. Analysis and interpretation of facts
12. Generalization and formulation of rules.

1. **Selection of Problem or Topic :** This is the first stage of social research and it is very important. Not every thought that comes to the mind can be made the subject of imagination research. While selecting the topic for research, it has to be seen whether necessary facts will be available in relation to the subject or not. Whether these facts can be collected or not for using any scientific method. Keeping in view the limited resources, research works can be completed on time or not. No such subject or problem should be selected for which scientific methods are not available for study, for which it is not possible to collect authentication facts and which is not socially useful.
2. **Study of Related Literature :** After selecting the subject, the second important step is study of the related literature, There is a possibility of the entire research process being flawed in this. Therefore, it is necessary that the literature related to research should be studied in the beginning itself. In this type of study, the work of the researcher becomes somewhat simple and he gets knowledge of various methods of research and the problems faced in research work are known and important concepts are known.
3. **Determination of Units :** This step is to determine the units concerned and define those units clearly. In this, it should be kept in mind that the units are related to the purpose of study and the units must be completely clear and well defined. The units of study should be very simple and clear which can be clearly defined.

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4. **Formation of Hypothesis :** The researcher draws a conclusion on the basis of his primary knowledge of the study problem which forms the basis of his research. But this hypothesis is only an accidental conclusion. Hypothesis is a social generalization whose validity remains to be tested. This hypothesis is tested by research. Hypothesis is such a general conclusion that cannot be assumed to be true. It is confirmed on the basis of actual facts i.e. it is ascertained whether it is true or false.

   Hypothesis is that imaginary and permanent conclusion related to the study subject from which only the reality of truth can be revealed. The hypothesis provides direction to the researcher's work and clarifies the area of research. With its help, the researcher is saved from wandering here and there in the dark.

5. **Determination of Study Area :** The determination of the study area depends on the nature of the research topic so that the goals can be aggregated objectively. In doing so, the attention and effort of the investigations engaged in field work will be limited to that area subject. The study area should neither be too small nor too large. It is a very difficult task to draw useful conclusions on the basis of small area study and similarly it is very difficult to complete the research on the basis of large area study.

6. **Selection of Informants :** It is difficult for the researcher to collect the facts by contacting all the units of the study area, yet the study area is very limited, so the information is collected in each unit of the area. This is called the organization method. But by this method, a lot of labor time, resources and money is used in the study, so the sampling method is selected based on the guidance for the study. By this method, researchers do not arbitrarily choose some units representing time, but use fixed methods of guidance or sampling. Here it is to be decided how many units out of the whole should be selected as a model. The belief is that the conclusions that will be drawn on the basis of the facts obtained from the people selected in these models are applicable to the whole.

7. **Determination of Sources and Methods of Information :** It is necessary to compile facts or information to verify the hypothesis and ascertain its veracity. For this the researcher has to find out what are the reliable sources of information and from where the information can be obtained. There are mainly two types of sources of information—Primary and Secondary Area. The information which the researcher receives in the first time is called primary information

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and under secondary information comes that information which is already collected by other people. After locating the sources of information, keeping in mind the research problem informers and regional nature, tools and methods have to be selected with the help of which authentic facts can be collected. It will also have to be clarified here that how the tools and techniques will be used for collecting the facts?

8. **Thorough Testing of Equipments and Methods :** Before starting the actual research work, it is necessary for the researcher that the instruments and techniques selected for research should be examined on a small scale and their shortcomings and defects should be detected. So that they can be removed in the beginning, this is called complete testing.

   In this, the instruments and techniques used in the study are checked and in this the deficiencies are removed at the initial stage of research by making amendments as required.

9. **Observation and Assessment of Facts :** After the complete plan of research work is prepared, field work starts and now observation and other tools and methods of study are resorted to for collection of facts. At this stage of the research process, contact with the informants is established for collecting the facts. In fact collection, care has to be taken that the facts are collected completely without any bias. It is necessary for the researchers engaged in the task of collecting facts that the facts in their true form should be free from all kinds of prejudice.

10. **Editing and Classification of Facts :** After the compilation of facts, the work of their analysis starts. A skilled researcher obtains the collected facts in such a way that it appears to be alive. First of all the researcher edits the facts. The collected facts are checked by various methods. Deficiencies are removed and inconsistencies are removed and facts are clarified. At this stage unnecessary information is removed and the remaining information is stored in a sequential order.

    On the basis of classification, different events or states are compared and their correlation is ascertained.

11. **Analysis and Interpretation of Facts :** At this stage, with the help of various techniques, the collected facts are analyzed and discussed. Let us make sense of the facts gathered here and an attempt is made to find out the truth and falsity of the hypothesis. Correlation is

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found between facts, events and different situations. It is discussed which factors are responsible for which particular condition, result or event? This helps in drawing scientific conclusions.

12. **Generalization and Formulation of Rules :** This step of research is important. Here the rules and principles are rendered by reaching on scientific subjects. On the basis of analysis and analysis of facts, scientific conclusions are drawn which are very brief.

The formulation of a rule or formulation of a theory is the essence of scientific research. With the change of circumstances, it becomes necessary to re-examine old rules and formulate new rules. The researcher presents the report as the final stage of the research. In the first part of this report, the study methods adopted for research are mentioned and the nature of the concept is explained. In the second part, various facts related to the study subject are presented and the causal relationship found between the facts is mentioned. In the third part general conclusions are drawn and rules are laid out. It is clear that social research is a long process. In order to reach scientific conclusions and to formulate rules, it is necessary that various types of work related to each stage of research should be done fairly and carefully and at the same time it is also necessary to maintain contact with scientific point of view. In addition to the above three main methods of research, the main study of the following methods is also important :

1.2.3 Sampling Method

By sampling, it means a small part of a group which represents the whole. The process or method of selection of this sample is called sampling method. In this method, the researcher does not have to take every unit of the whole under study but only a part of it has to be studied. In this way, the same results can be obtained by studying the sample, which can be obtained by studying the whole.

1.2.4 Observation Method

Observation refers to systematically observing the events related to a subject and understanding the working relationship of events on the basis of their skill. From this point of view observation is also explained by words like observance or observation.

1.2.5 Statistical Method

Statistics help a lot in research in the analysis of facts. By qualitative methods after compiling the facts, finding out their mutual relationship is an important sequence of research. Interpretation and generalisation is possible on the basis of this relation only.

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1.2.6 Comparative Method

It is the method that compares two similar subjects and explains the similarities and differences of these phenomena. With this, by comparing different societies or different groups of the same society, it is found out whether there is similarity or not and if there is, then what?

When this method is used in the field of science, then in a logical manner the facts are collected and comparative study is done for a particular purpose.

1.2.7 Survey Method

The natural nature of uncontrolled phenomena is studied in the survey method. In the survey method, the subject-matter acts openly according to its nature and the researcher observes this natural form of the study object by going to his own field. It is mainly used to understand general and complex problems or to make a descriptive study of a community or group.

1.2.8 Experimental Method

It is such a scientific method under which we can present a solution to a subtle problem. In the experimental method, the study subject is kept under necessary controlled conditions and after that the study is done and conclusions are drawn on the basis of the obtained facts. In this method, the researcher can make changes in different aspects of his study method by keeping it under complete control.

1.2.9 Logical Method

There are mainly two methods under the logical method, Deductive and Inductive.

Deduction is the method of obtaining a particular conclusion on the basis of certain facts of the method. The order of arguments in this method is from general to specific. In this method, conclusions are drawn on the basis of fundamental assumptions and the logic of these conclusions is very important. Under the inductive method, replacement of the specific to the general, the subtle to the general truth is done. The order of arguments in this method is from specific to general.

The whole world of knowledge can be divided into three parts :

1. Natural Science, 2. Social Science and 3. Humanities,

Natural science came into existence first due to its early emergence, whereas social science is the product of technological revolution and social change, hence the emergence of this social science has taken place only in the last 200 years.

Note

1.3 Social Science : Meaning and Definitions

1. According to the Encyclopedia of Sociology, those mental and cultural sciences that deal with an individual as a part of society.
2. According to the Encyclopedia of Education Research, social science is that group of diverse materials that are related to human relationships, they are the production of research ideas or experiences.
3. According to the Grolier Universal Encyclopaedia: "Sociology is the interconnected study that deals with human relationships. They produce research experience."
4. According to Peter Lewis, "Social science is concerned with the laws which govern the society and social development of man.
5. According to N. Mackenzie, "Sociology is the educational stage of society" which deals with man and his social perspective. Sociology is the study of the structure and characteristics of human groups, how individual interact with others and their environment.

Features of Social Science

(i) Social science is the study of human activities.

(ii) Man is studied as a unit of society *i.e.* part of activities of only those human beings who are part of society.

(iii) Social science is the study of social facts of human beings.

(iv) Social science is a new dimension.

Development of Social Science : Social sciences are passing in their infancy and there has been less development of important theories and knowledge about them as compared to physical and biology, yet man has taken great interest in understanding of human nature and society since very ancient times. which we can clearly see in the historical documents.

Main Features of Development

1. The urge to acquire knowledge in social science is based on authority and imagination and not on experimental research.
2. By the end of the 17th century there was a lot of confusion between social science and social philosophy. Social philosophy remained in vogue and remained an obscure subject. Physical and philosophical flows have always had a great influence on the field of science. The study was done on what should be the social organization and not on valid and ethical grounds. Yet in ancient times, the viewpoint of many writers has been quite strong.

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3. At a very ancient level, the ideas related to the relationship between man and his human beings were created in the form of principles and there is no need for reformation and interpretation on them because those principles were associated with individuals who did not possess the power of society and all things were laid out as if they were all carrying some righteousness.
4. At the beginning of the 18th century, scientific thought started to dominate the field of social sciences and in the 20th century social sciences were replaced by social sciences and social sciences were recognized as academically accepted professional activities.
5. It is also a difficult task to find any universally accepted theory related to the development of each part of the dimensions of social sciences. There has been a difference of opinion among the scholars of the subject regarding various sources, reasons and chronology.
6. Recent trends and studies reveal that the state of isolation in social science is ending and the phase of comparative integration is beginning. Nowadays interdisciplinary research is going on, so research works in social science related to social policies can be clearly seen.
7. The subject of social science is to a large extent a reflection of the cultural and literary conditions and whatever work is done is done at the national level.

1.3.1 Historical Development of Social Science

On the basis of the main points of historical development, it can be divided into the following categories by the levels of the century :

1. **Development of Scholars from the Archaic Period to the 17th Century :** The concept of social sciences was not clear during this period and it was known as social philosophy. Social philosophy was generally based on moral and religious principles. This was the main feature of this period. Social philosophy was mostly rigid and undisputed, yet there were some writers in this era who looked deeply and minutely at the then conditions of society, among them Aristotle, Machiavelli etc. Most of the foreign writers who have written about social science say that they have their origin in the books of Aristotle and Plato, so they can be called followers of social science. He has described the cultural, economic and political conditions, ignoring the ancient Indian literature. Rigveda, the oldest book of Aryans, was also written three thousand years ago. It is a philosophy, it is the work of Indian social philosophy of the Vedic age. Manusmriti

Note

which was composed 200 years before Christ. This is also a main book on philosophy. But moral and religious principles are abundant in these books.

Plato was originally a philosopher, yet economic and social facts have been arranged in his book Republic. They gave more importance to the population related economic conditions of social life. The principles of class struggle are also found in it. These philosophical ideas were based on practical research.

In the Middle Ages, moral principles particularly influenced social philosophy. The practical side was suppressed by the moral side in this age. Scientific facts were rarely used in social research.

In the era of reform and innovation, the experimental ideology was raised. During the travel of the people during this time, information about new countries and societies came. The Prince, written in 1513 by Machiavelli, and The Republic by Bodin (1577) presented a real picture of society. Yet in this era philosophical ideology was generally above scientific ideology but not when Christianity was the basis of sociology. The principles of natural rights and juridical social philosophy appeared in the second half of the 16th century to the 17th century. In this time, new ideas about society were being separated from religion. All social problems were discussed on the basis of practicality and secularism. Philosophers of this time placed more importance on practical approaches.

2. **Development of Scholarship in the 18th and 19th Centuries :** The following facts were becoming visible in the 18th century :
   (i) Rigorously separation of science and philosophy.
   (ii) Social situations have a continuous nature and are more influenced by natural laws, but not in the same way as the physical world.
   (iii) The tendency to study social facts from a philosophical point of view was still prominent.
   (iv) The idea of social justice and the concept of independent social science were still not generally accepted.
   (v) The authors had neither explained the scope of social science to them nor explained the importance in clear words.
   (vi) At the end of the 18th century, machines were used and mathematics, physics, chemistry were showing new principles to society.

Note

(vii) On the basis of scientific nature many books were written on science. In the 19th century, the following things became clearly visible :

(a) The idea of social justice and the concept of independent social science became generally accepted.

(b) Comparative and ideological nature began to be seen in the conditions necessary for social organization and took scientific basis from it.

(c) The scope of social science became very wide and its objectives were fixed. The contribution of August Comte (1798–1853) was very important in this era. He produced sociology. At first he favored the social material position. But this term had already been used. Therefore, Comte gave prominence to sociology and first presented the purpose and definition of sociology. He laid down the principles for the society in which he believed that the individual and the society pass through the same stages of development. That step is the following :

(i) Religious stage, (ii) The Middle Physicist,

(iii) Positive phase.

Karl Marx (1813–1833) in his book **Das Capital** did not quickly accept scientists because they were looking at all things from a political perspective, yet they contributed to the development of science :

(i) He placed the social sciences as ideal.

(ii) He laid more emphasis on the elementary nature of social facts. According to him, the nature of man is the result of history and its development does not happen at a direct pace. Social strata, legal system, art, morality, religiosity, customs etc. are related to social economics, which are always changing, two ideals are presented in the interpretation of history made by them :

(a) Development of society like a machine Exploration of the motion theory of capitalist society

(b) Society passes through all stages of development.

(iii) Marx gave the first general theory to social science. It was the first complete method in itself. He laid great emphasis on the unity of social science. His sociology is interdependent on social situations and cannot be seen in isolation.

Note

3. **The Era of Expansion of the 20th Century :** Following are the main features of this era of expansion or development of scholarship in the 20th century :
   (i) Social science has now changed into social sciences.
   (ii) The number of specialized subjects in social science began to increase. The enormity of social facts necessitated specificity. Many other methods for their study also arose because general principles did not exist in the fields of social sciences :
   (iii) Efforts for unity of social science which were made by full-time writers began to fail and social dimensions began to expand rapidly in number and knowledge of different methods of these dimensions also started. Three methods can be used to determine the unity of the social sciences.
      (a) This method was developed by Auguste Comte that the training of specialists should be done in the same way for general knowledge.
      (b) The principles of social science should be determined which can be applicable to all the dimensions.
      (c) Experts of all dimensions should be engaged in common research work in collaboration with each other. Interdisciplinary research and regular contact with researchers from different fields should be made necessary.

20th century

In the 20th century, the following institutions provided their support in research work :

1. Physical Research Laboratory, Ahmedabad Council of Scientific and Industrial Research.
2. Space Applications Center, Ahmedabad.
3. Indian Space Research Organization.
4. Atomic Energy Commission, 1948.
5. National Research Development Corporation of India.
6. National Committee on Environmental Planning and Coordination, 1972.
7. Central Electronics Limited.
8. National Information System for Science & Technology, 1977.

Note

9. National Remote Sensing Agency, 1979.
10. Ocean Science and Technology Agency, 1976.
11. Department of Science & Technology, 1973.
12. National Committee on Science & Technology, 1973.

In the 20th century, research work on the following subjects was done very rapidly :

1. Anthropology
2. Telecommunication
3. Meteorology
4. Geology
5. Defence Research
6. Microbiology and Related Studies
7. Medical Research
8. Agricultural Research
9. Fibre Technology
10. Information Science
11. Engineering Science
12. Biological Science
13. Chemical Science

1.3.4 Scope of Social Science

Delimiting the fields of social sciences is a very difficult task. Which subjects should be included in the field of social science, it is a matter of thought. In general, the following subjects are included in the field of social sciences :

1. **History :** In the subject of history, the story of man is studied, that is, the study of an ancient civilization or culture is done in this area, but some historians do not include history in social science. They say that this is a human story, so it should come in the field of humanities.
2. **Geography :** Geographers also call themselves natural scientists, that is, they say that the subject of geography is the subject of natural science. Under this subject man studies his environment. According to geographers, only human geography is the subject of social science.
3. **Political Science :** Political Science is a special part of society because without politics human cannot keep himself organized i.e. cannot control so that a clean society cannot be established.
4. **Economics :** Since in social science every human being as a member of his various activities is studied, a human needs money to live his life.
5. **Sociology :** The relationship of each member of the society with other people and its related to various social problems is studied in sociology. The most important subject of social sciences is called sociology.

Note

6. **Psychology :** Like geographers, psychologists also believe that psycho. Science is the subject of natural science and the subject of social sciences only of social psychology. In the subject of psychology, the study of thinking, understanding and learning new dimensions of a social animal is done.
7. **Anthropology:** According to some scientists, cultural anthropology is the only subject of social sciences. In the subject of anthropology, the study of the behavior of the people living in the society is done.
8. **Criminology :** Under this subject, the study related to the evils prevailing in the society and their solution is done. Therefore, this subject has been included under social science so that the society can become healthy and ideal and the people living in it can progress.
9. **Education :** The importance of education for human beings has been there since ancient times. Therefore, it has been considered necessary to include education in social science and human society is incomplete without education in the modern era which is called the age of science. In this subject, human learning and instruction practices are studied and new research is done.

1.4 Encouragement to Research Activities

In the 20th century, social scientists focused their attention on the problems arising out of scientific progress and the Industrial Revolution. After the Second World War, communist ideologies had an impact on the subjects related to social science. The attention of sociologists also turned towards contemporary problems. Population growth, rural development, family planning, illiteracy, poverty alleviation and the problems of the tribal people emerged prominently.

The field of social science has become very wide and in order to encourage research work, as far as the University Grants Commission provides and provides necessary facilities, on the other hand many government and non-government are also providing full cooperation in this direction. The role of the Indian Council of Social Science Research in this is noteworthy. This institution encourages research work and has become a major center of discussion for social scientists of the country. Its National Social Science Documentation Center (NASSDOC) is also doing commendable work in the direction of text control in the field of social science. Similarly many other organizations. Some of these organizations are also working in their respective fields :

- Tata Institute of Social Marketing (Bombay),
- Gokhale Institute of Politics and Economics (Pune),
- Indian Institute of Public Administration (New Delhi)
- Kajri (Jodhpur).

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All these organizations organize meetings and conferences on contemporary topics from time to time. The publication works to provide all possible support through training, documentation and establishing liaison with local and regional organizations with similar objectives.

Similarly, in the 20th century, social scientists started using data collection and their interpretation to study social problems and human behavior. Among these, advertising promotion, public relations, psychological activities, interviews, surveys etc. are prominent.

Thus, in the 20th century, more and more attention of social scientists was towards contemporary problems and started using new methods for their study.

1.4.1 Research Trends in Humanities

The humanities are those academic disciplines in which the human condition is studied using mainly analytical, critical or hypothetical methods as opposed to mainly empirical approaches in the natural and social sciences. Ancient and modern languages, literature, law, history, philosophy, religion, and the visual and performing arts are examples of human relationships. Additional disciplines sometimes included in the humanities are technology anthropological field studies, communication studies, cultural studies and linguistics although these are often treated as social sciences. Scholars working on the humanities are sometimes referred to as humanists. However, the term also describes the philosophical position of humanism which is rejected by some 'anti-humanist scholars' of the humanities.

1.4.2 Scope of Humanities

Classics (Excellent Literature) References to the Classics in the Western Teaching Tradition Traditional Ancient Culture. Ti is exclusively from ancient Greek and Roman cultures. The study of the classics is considered one of the cornerstones of the humanities, although its popularity declined during the 20th century. Yet the influence of traditional thought remains strong in many humanities disciplines, such as philosophy and literature.

In addition to its traditional and pedagogical meaning, the 'classics' is understood to be the inclusion of original writings from other major cultures. Other traditions refer to the classics as the Hammurabi Code of Mesoporamia and various books related to the epic of Gilgamesh.

1.4.3 History

History is the systematically collected information about the past. When applied in a field of study, history refers to the study and interpretation of data relating to humans, societies, institutions and any subject that changes over time. Knowledge of history often includes both knowledge of past events and abilities for historical thought. The study of history has

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traditionally been considered a part of the humanities. History is sometimes classified as a social science in modern education systems.

1.4.4 Law

In common parlance, law means a rule that can be enforced through institutions. The study of law crosses the boundaries between the social sciences and the humanities depending on the perspective of an individual's research into its aims and implications. Law is not always enforceable especially in the context of international relations. It is defined as an explanatory concept to achieve justice in the form of a system of rules.

1.4.5 Literature

Literature is a very clear word. In its broad form it is clear that a sequence of words has been preserved for communication in one form or another (including verbal communication), more precisely it is often used for naming fictional works such as stories, poems and plays. It is used more precisely as a sign of respect and applies only to compositions that are considered to be of special merit.

1.4.6 Religion

According to most historians, religious belief began in the Neolithic era. Most religious beliefs during the Christian period included the worship of a mother goddess, a heavenly father, and the sun and moon as gods. New philosophies and religions emerged in both the East and the West, especially around the 6th century BCE. With the changing times, many types of religions have developed in the world, in which Hinduism, Jainism, Buddhism are included in the main beliefs in India. Three ideologies formerly dominated Chinese beliefs until modern times. Abrahamic religions are those religions that arose from a common ancient tradition and which were traced by the followers of Ibrahim. Ibrahim was a religious teacher whose life is described in the Old Testament. It forms a large group of largely dialectical religions, which usually includes Judaism, Christianity, and Islam, which account for more than half of the world's religious adherents.

1.4.7 Art (Fine Art)

The foundations of the great traditions of art lie in the art of ancient Japan, Greece and any of the ancient civilizations such as Rome, China, India, Mesopotamia and Mesoamerica. Ancient Greek art saw a reverence in the physical appearance and equivalent abilities of humans to show musculature, confidence, beauty and anatomically correct proportions. Ancient Roman art depicted gods as idealized human beings who were depicted with distinct characteristic features. The dominance of the Church in Byzantine and Goic art of the Middle Ages emphasized biblical expressions, not worldly truths. The Renaissance saw a return to the value of the earthly world, and

Note

this change was reflected in forms of art that reflected the materiality of the human body and the three-dimensional reality of the natural scene. Eastern art has generally worked in a style similar to that of Western medieval art, in which the surface shape and local color includes focus. A characteristic of this style is that the local color is often used as defined by the framework.

Conclusion

In this chapter we have studied various methods of research as well as studied its development and scope. It also studied how research trends are promoted. Apart from this, historical development was also studied.

Important Terms

(i) Research work is to find out about the past, future and present of any event by scientific method.

(ii) Research includes scientific method, historical method, descriptive method, logical method, survey method, observation method, demonstration method etc.

(iii) Scientific method is used for both research and survey.

(iv) In the historical method, the causes of current events are discovered by tracing the historical events.

(v) In the descriptive method, real facts are collected in relation to the problem in research and on the basis of this, a description is presented.

Exercises

Very Short Answer Type Questions

1. What are the different methods of research?
2. What do you understand about the scientific method?
3. What do you understand about humanities?

Short Answer Type Questions

1. Briefly describe the historical method.
2. Briefly describe the descriptive method.
3. Briefly describe the contribution of humanities to literature.

Long Answer Type Questions

1. Explain in detail why research trends should be promoted while describing various methods of research.
2. Into how many parts can we divide the world of knowledge? Describe in detail.
3. Defining humanities, explain its contribution in various fields.

Note

UNIT 2

User Studies and Information Seeking Behaviour

2.1 Introduction

In this chapter we will study why information is needed. We will also study the process of information search and will also study the search behavior related to information. Also users will learn about study methods. In addition users will also learn about the techniques of study. The users will also study the evaluation of the study.

2.2 Information Needs and Information Seeking Related Behavior

The present age is the age of information. Every person wants information according to his need, because information enables a person to lead a better life. Information is an essential element for the social and economic development of any nation. Countries that generate, use and disseminate information are recognized as developed nations. In fact, information is like the backbone of any nation's body. Not only today, since ancient times, human civilization has made its growth, development and improvement using this information. Today, if we want to be ahead in the Ganges of development, then we cannot ignore the information.

Today information is an integral part of human activity. It can be said that any activity information cannot be accomplished without.

2.2.1 Meaning, Nature and Characteristic of Information

Meaning of Information : Different scholars have expressed the meaning of information in their own way. G. Devarajan, the meaning of information is the transmission of knowledge about the events of a given situation,

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that is, the dissemination of knowledge obtained from observation, study, experience or instructions. On the other hand H.N. Prasad says that information means the knowledge acquired, recorded or communicated by humans through experiences, observations and experiments. It is expressed by these meanings of information. That information is actually the knowledge that a person receives or transmits through study, experience, observation, experiment, instruction, etc.

Scholars have defined the word information in different ways as follows :

1. Shannon and Weaver have tried to define the term information in such a way that information is a stimulus that reduces uncertainty.
2. The Concise Oxford English Dictionary defines information as anything presented or conveyed by a specific sequence of symbols, impulses, etc. Other definitions of fact or knowledge thus learned as the result of research or study.
3. Debons is of the opinion that information in the form of symbols and data represents the state of living beings after sensing energy from the environment. The transformation that takes place between the data and the result state, which is a part of the functions of all living beings, is achieved through the activities of the central nervous system to the highest level known in all human beings.

Information is a human thought and man is a social animal. Being a social animal, he is engaged in many social activities. When a human feels, new imaginations are born from it, then some ideas are born which are also called information. Today information is an integral part of every human activity. It can be said that no activity can be done without information.

2.2.2 Nature of information

Information is a flow, a process, a structure. It is not a physical substance. We can say that information is nothing. In fact, information is a path. It is a continuously flowing system. DeVons has said that this knowledge is an element of reflection. Here data information, knowledge and erudition are seen as a continuous process. It is a process in which one after the other automatically joins and there are no clear demarcation lines between them.

Today information is accepted as power. Here information refers to the wealth created by the human mind. This wealth can be in the form of facts and figures also. Information reveals the potential of the individual and the society. Beg and Neveling have given six types of approaches to information, which are helpful in understanding the nature of information.

Note

(i) **The Structural Approach :** This approach has been used by philosophers. This information is seen as the framework of the world.

(ii) **The Knowledge Approach :** This approach records knowledge, which is formed on the basis of direct knowledge of the structure of the world. According to this approach, knowledge is based on experience.

(iii) **The Message Approach :** This approach is related to the symbols of exchange represented in the form of messages. It has been used in the mathematical theory of communication.

(iv) **The Meaning Approach :** In this approach the semantic content of the message has been accepted as information. The meaning is that the meaning assigned with symbols or figures is information.

(v) **The Effect Approach :** This approach assumes that information occurs as a specific effect of a process. It can also be said in this way that a specific process is reported to have a particular effect.

(vi) **The Process Approach :** This approach is related to the fact that information processing takes place in the human brain when problem and useful data are present together. This approach has often been accepted by information activists.

2.2.3 Properties of Information

If we look at this information as a substance, it is a miracle substance. It is not governed by regulations made for other economic goods and services. It is such a substance, which we too can keep completely and equally others also do it equally to both the receiver and the giver. It is a substance that we can fully use ourselves and at the same time give completely to other people. Its properties are described as follows :

1. It has no existence in itself.
2. Some medium must be needed to transmit and store it.
3. It can travel at the speed of light.
4. Revision and development in this keeps happening continuously. With the passage of time it becomes old or even unusable. Which is replaced by new ideas. So we can say that it is alive and it has a life cycle too.
5. The development and generation of information is an endless process. Human intelligence, resources, equipment and time availability has its limits.

Note

6. It can be expanded, summarized through the medium being conveyed. For example a three-hour long Mahabharata film can be expanded to 300 hours. A single sutra can be explained in several hundred pages.
7. Its nature is transmissible.
8. It assumes the size of its medium.
9. It is a substance as well as a resource which can be bought and sold in a market controlled by the economic principles of demand-supply.
10. It saves time and labor and increases the working efficiency of the information machine, which gives us versatile output.
11. When information flows, things, money and people also flow.

2.2.4 Types of Information

Types of information can be grouped on the basis of its different characteristics, because information is generated on the basis of different properties. Shera has given six types of information :

1. **Conceptual Information :** Contains volatile areas of a problem. Ideas, notions, principles and concepts etc.
2. **Empirical Information :** This type of information includes information obtained from experience or experiment, such as facts or data obtained from one's own experiences for laboratory-generated literary discovery or research.
3. **Procedural Information :** Under this type of information, data are used in normal practice, they are tested. It is kind of a process method. In this, all the information is obtained with a scientific attitude :
4. **Stimulatory Information :** The two elements that affect the human the most are (1) he himself and (2) the information received by the environment there has been found to be more effective. Hence this information is called persuasive information.
5. **Policy Information :** In this type of information comes information related to the process of decision making.
6. **Directive Information :** Without instruction, group activities do not proceed effectively. In fact, it is the guide information that helps and harmonizes the collective efforts.

2.2.5 Scope of Informatio

Information has use and value only when it is communicated. Communication and information is related. They cannot be separated from each other. Today information is the vehicle of revolutionary change. It is this element

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which is capable of taking the society forward. The fundamental feature of a developed economy today is the information economy. Alvin Tofler has rightly said that information is probably the fastest growing and major industry in the world. In advanced societies, information is being produced, transferred and used in an advanced manner. Today the main occupation of people in developed countries is production of information products, services, packaging, repackaging, communication, marketing etc. Pro. M. P. Satija has described the names of the fields indicating the wide area of information as follows :

Office Manager	Computer data processing professional
Information Technology Executive	Telecommunication specialist
System Analyst	Records Manager
Archivists	Knowledge Manager
Librarian and Information	Industry Policy Makers
Advisor	Personal Manager
Information Boxer	Educationalist
Publisher	Editor
Teacher	Research Development Staff
Writer/Poet	Artist, Painter, Actor/Entertainer
Advertiser	Media Person
News Medium	Detective, Detective, Crime Fighter
Corporation Information Manager	Public Relation Person

The application of information and communication technology is increasing continuously in every sphere of life, due to which new fields are emerging. Therefore the field of information would be constantly expanding.

The ideas of the Five Sutras of Library Science, propounded by Erangnath, are of complete philosophies. According to these five sources of library science, Po Bhattacharya has given five principles :-

1. For information use.
2. Every information user is required to report the same.
3. Every piece of information should be available to its user.
4. Information should save the time of the user.
5. The world of information is constantly expanding.

Thus the main business of library services is to collect information properly,

Note

to transmit it to the users and to help in the reconstruction of information.

2.25 Information Channels

The present era is the era of information explosion. Multiple information channels to generate and disseminate information are engaged in. In fact, it takes birth through several communication channels.

Important among these channels are printed media like books, magazines, newspapers etc. and electronic media like television, computer and internet.

If we talk about the printed medium, then its growth is increasing continuously. In the field of science and technology, literature doubles in a span of five to eight years, similarly in social sciences it doubles within 10 to 13 years. India ranks sixth in the world in terms of production of books. It is the largest producer of books in third world countries. Today due to this information explosion information workers like researchers, scientists etc. are facing many problems in retrieval of information.

From the initial stage of development of knowledge and information till date, knowledge and information stored in various channels and forms has been collected and preserved. Here channel means medium. The medium in which knowledge and information is presented. In fact, like energy, information is also manifested or published in many forms. Today information is coming before us in new channels or forms due to information technology.

2.2.6 nformation Need

The term information has been defined in the past. Information is an element which is required for every activity. On the other hand it is important to understand its need.

Information Requirement and Related Words : Information is an important source. Without it the progress of the nation and the world is not possible. In the present era information is the era of explosion and all the people always need some information or the other. Many words related to need Library and information. Used in centers like Demand Requirement, War etc. If we look at their meanings, then they represent Need (need, need, purpose), Demand (demand demand), Requirement (demand, need, expectation) Want (not to be, lack need). The above words are used as synonyms of each other. But if you look closely, there is a difference in the meaning of these words.

Human Need : The Concise Oxford English Dictionary has defined need as :

1. Circumstances in which something is necessary.
2. A thing that is wanted or desired.
3. Basic needs like lack of food.

Note

That's how B. T. Lalu puts it :

1. What a person wants to achieve.
2. Circumstances in which something is lacking so some way is needed.
3. The one without whom one cannot do anything.
4. That which is necessary for the health and well-being of an organism.

If we talk about human needs, psychologists have divided human needs into three parts.

Physical Cognitive Psychologist Maslab (Densu) has divided human needs into these types :

(a) **Self Actualizing Needs :** In this, formal education, recreational activities, teachings, values etc.

(b) **Esteem Needs :** Multicultural awareness, emotional awareness, social system knowledge (legal, economics etc.), sex education, academics, values etc.

(c) **Love and Belonging Needs :** Multicultural awareness, Emotional need, Interpersonal entertainment activities, Efficiency, Acharya Shastras and values, Sex education etc.

(d) **Safety Needs :** Crime prevention, traffic rules, emergency procedures, basic literacy, sex education etc.

(e) **Physiological Needs :** Personal Health Sciences, Nutrition, General General Issues. AIDS prevention, tobacco and drug abuse, child abuse, sex education.

Meaning and Nature of Information

Need It is difficult to define the information requirement. MB Line has said that the need for information arises when a person seeks to rectify an irregularity and seeks difference in the state of his/her determined knowledge. Next Line defines information as what a person wants to get for his work, his research, his spiritual growth, his entertainment etc. Liberian Thesaurus defines the information needed as "the need that library services or materials are intended for satisfaction. Chan and Hernan have emphasized that an information need is more than a question asked of an information provider." It happens when people find themselves in a situation that requires some form of knowledge to solve.

Information and need are terms that are intertwined with each other. In fact, information and need are linked in such a way that they cannot be seen in isolation, because where there is need or interest, knowledge is born. Necessity is the mother of knowledge and information. NS . Writes

Note

that- "It is being realized today that information need is a composite idea of different types of demands and access to information.

Melvin Vaigt has stated in his study that some people communicate with information systems in different ways depending on their objectives in relation to their general interest at work level, amount of information already available to them etc. Can do. White has identified three types of information demands. Later a fourth type was also added to it. Their details are as follows :

1. Current Approach
2. Every day Approach
3. Exhaustive Approach
4. Catching up Approach

We have studied about them in detail :

In order to satisfy his information needs, he can use any strategy and follow the process. In fact, each user needs the information they want. I want to fulfill. It takes several steps to meet this information requirement.

T.D. Wilson (TD Wilson) has defined the term information behavior as "the activities in which a person, while recognizing his information need, is engaged in searching for information by any means and using or transferring that information".

Ching-Chan Chan defined information search as 'Information: Search patterns are the pathways that are sought by an individual in an attempt to satisfy a need'.

According to Girija Kumar : Information-seeking behavior is primarily related to the type of information the ear wants, how the information was obtained, evaluated and used for what reason.

In fact, information-seeking behavior reflects the subjective knowledge and attitude of the user. This attitude and subjective knowledge varies from person to person. So here subjective knowledge needs interpretation. As of now there is no such technique or technique which determines the information-seeking behavior of an individual as a whole.

2.3 Information Seeking Processes

There are many models to describe the process of finding information. These models describe the information discovery process in their own way. Some of these models are very effective. Some of these information-seeking behavior patterns are described as follows:

Note

James Krikelj developed a model in 1983. This model was originally related to the study of information-seeking behavior of the general population. This model has four phases, which are as follows :

1. Feeling the need
2. Finding yourself
3. Receiving information
4. Using Information

In the end either the user will be satisfied or dissatisfied.

Subsequently, Karol C. Kuhlthau developed a model. Kuhl Thau developed this model based on a study of the information-seeking behavior of students. He has described this pattern in six steps.

1. Orientation information - identification of arrivals
2. Selection - common case recognition
3. Investigation - Searching for information on general matters

2.3.1 Methods of Determining Information Need

Super believes that the community analysis method has been used by librarians to identify the characteristics of the target population. They have also used community analysis as a method to determine what library services and information would be most suitable for them. The following techniques are used for community analysis. Observation of environmental characteristics, demographic studies, observation of library usage patterns and interviews of key information users.

Roger Geer and Martha Halle have also cited community analysis as a basis for determining the role of a library. Are these things included in his method? Data collection and analysis of four scenarios Demographics Community Organizations Service and Product Providing Agencies 3 and Life Philosophy.

Robert Grover addressed the information needed in the context of a school library media program presented a conceptual model for : He has proposed a two-tier process. He did systematic analysis: face-to-face interaction with the school and community consumer when he or she decided to search for information. Example reference interview. He states that context interviews can be used to diagnose information needs through knowledge of information psychology, how individuals find, acquire, organize, process, use and store information.

2.3.2 Information Seeking Related Behaviour

In fact, information search behavior is a multidisciplinary term that has its

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roots in many disciplines. This term has been studied since (1950).

Behavior has been defined in different ways. Some definitions of behavior are as follows :

1. Concise Oxford English Dictionary defines behavior as "the manner in which one behaves or the manner in which a person responds to a situation or stimulus".
2. Krishna Kumar has defined behavior in another way as "behavior, is related to method of selection of information resources, process of searching for information, aspects that govern its access (motivation, motives, time spent, time of action, delegation etc.).
3. T.D. Wilson has defined information behavior as "the activities of a person he engaged in when he recognizes his own information needs, seeks such information in any manner, and uses or transfers that information."
4. In 1931, Watson founded Behaviorism at Johns Hopkins University. Behavioral theory was developed by B. F. T. Skinner. The concept of positive and negative reinforcement was used in this theory to control behavior. Skinner identified several forms of verbal behavior such as autoclitic, echoic and textual behaviour. Richard S. According to Price and others, the psychodynamic method suggests that human behavior is the result of complex interactions of psychological processes, both conscious and subconscious. Arun Kumar Singh describes behavior from a psychological point of view as follows :
   (a) Behavior is made up of glandular secretion and muscle movement. So it's something physical. Chemical is variable according to somatic chemical processes.
   (b) Behavior is made up of reaction. It can be analyzed by proper scientific method.
   (c) Every effective stimulus produces immediate processes. So in practice cause-effect determinism is clear.

Information-seeking behavior refers to a need that is felt to do something. People feel the need and want to satisfy that need. James Krikelj says that the search for information begins when a person feels. That the current level of knowledge about an issue (or problem) is below what is required. This process ends when awareness is no more. This is actually a linear model. Krikelj developed this first model for the study of information-seeking behavior. After this, Carol C. Kuhlthau developed a model based on actual research. Their models included cognitive issues, cognition, delusions, doubts, beliefs, etc.

Note

Krishna Kumar has also defined information search in this way – Information search refers to the process of collecting and obtaining information through various means. Published or unpublished material as means, communication with peers, communication with peers, communication of librarians etc. are included.

Similarly, he has defined behavior in this way – "Behavior design, method of selection of resources, process to find information, aspects that affect its access (motivation, objectives, time spent, time assignment, etc.) This definition reflects the informational side of behavior.

Similarly Bika T Lalu says that a person feels that he wants information. She knows all the possibilities that the information itself will not reach him.

2.4 User Studies : Methods, Techniques, Evaluation

Today everything i.e. market, services and products are user centric. In this era of globalization and privatization, the market is thriving and flourishing, which has its grip on the needs and satisfaction of the users. In this phase of development, the user is the focal point. His need is paramount. The right fulfillment of his need should be the goal of the organization. The basic rules of this user-based system of market apply to libraries and information centers as well. Therefore, under user study, the information needs of the user, information-seeking behavior and the way of using it are studied in a scientific and logical sequence. Libraries and Information Centers provide their diverse range of users with their diverse information and electronic sources and literature in the humanities. They provide a variety of user services to meet their needs. It is absolutely necessary to conduct user studies for the fruitful and successful organization of these user services. This user study not only suggests improvements in the services and products provided by the libraries and information centers but also paves the way for their better use.

2.4.1 Definition of User Studies

User study refers to the study of the behavioral characteristics of the users. The highest and ultimate goal of libraries and information centers is user satisfaction. Therefore, user learning is directly related to the performance and effectiveness of the services provided by the libraries and information centres. In user study, not only the users of the library are studied, but through research, an attempt is made to find that there is a complementarity between the needs of the users and the available products and services. That is, whether they complement each other or not. Also, what are the areas of improvement in the information transfer system, it is known. Today such studies are being done in abundance in the field of library and information

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science. In these studies, user studies and the level of satisfaction and dissatisfaction with existing products and services are found. Also, it is very important to conduct user studies to organize suitable and correct reader services. H N. Prasad writes that user studies are similar to market research surveys in correlating products with demand and satisfaction." User studies have been defined differently by different scholars as :

1. According to Bowden, user study refers to systematic examination of the characteristics and behavior of users (and if possible non-users) of systems and services.
2. According to A. Wysoki, user study or use study may be concerned with the study of information processing activities of users.
3. J. M. Britain (J.M. Britain) - "Experience proven use of information demand or need" study is often called user study.
4. G. According to Devarajan (G. Devarajan) - In fact, a study that focuses on understanding the information needs of the readers, using behavior or usage patterns, directly or indirectly, is often called user study.

Thus, in order to know about the users, the way they use the library and information services, information gathering methods etc. The library should have the information which can be gathered through user studies.

2.4.2 Genesis and Development of User Studies

International level

If we look at the early efforts in the field of user studies, they appear in the 1930s and 1940s. In 1938, Louis R. Wilson (Louis R. Wilson) made an early attempt at user study called "The Geography of Reading". In this he studied the level and distribution of libraries in the United States. Considering its origin, the beginning. Two international conferences on user studies were held in the year 1948. First, the Conference on Scientific Information of the Real Society was held in London in 1948 and the second was the Washington Conference in 1958. Another major study was conducted by Ralph R. Shaw Pilot Study on an important study named Use of Scientific Literature by Scientists was done in the field of user studies.

In 1964, Davis and Bailey compiled A Comprehensive Bibliography on User Studies. This bibliography is a compilation of 438 studies. Crawford said in a report that by 1977 over 1000 major studies had been done on user studies. Apart from this, Price, Shinebourne, Taylor etc. worked on topics like user requirement, its relation to library etc. In 1965 WJ. Paisley (W..J. Paisley) reviewed the research literature on the flow of applied science information.

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In his study, he studied the related literature in the information gathering and dissemination behavior of scientists.

Subsequently, in 1979, Hensley and Nelson focused their review on the elements related to reader success in educational processes. It emerged in this study that the researchers were of the opinion that the available information is not being fully utilized. In 1981, B. Cronin (B. Cronin) in his article "Assessing User NeeD" said that in the last five years the emphasis is shifting from systems or service oriented research to user oriented research.

Indian effort

Considering the Indian scenario, there have been studies in the field of user studies in India since 1962. A title named User and Library and Information Service was included in the Second IASLIC Seminar held in 1962. In 1968, Krishna Kumar made an important effort in this direction. He presented a study called The User Survey Concerning Teacher and Research Scholar in the Field of Chemistry. After this Dr. S. R. Ranganathan did a study in 1970 under the name Annotation of User Survey. This was a critical evaluation of the authors' surveys. After 1970, many studies have been done in this direction. The main studies in which are :

1. In 1988 R. Lahiri studied university library users.
2. B Guha published an article in Iaslic Bulletin in 1995 titled Ranganathan's Fourth Law and Contemporary User Study.
3. In 1998 H.N. Prasad Information Seeking Behavior of | Wrote an article named Physical Scientists and Social Scientists.
4. In 2003, P. Sethi Kumaran and V. Vadivel wrote an article titled Use Pattern Information Channels by the Scientists and Engineers: A Case Study, which was published in the SRELS Journal of Information Management.

The Indian Library Association titled its 49th All India Library Conference titled : Responding to Users Need in Changing Information Landscapes. This conference was completely related to user studies. Similarly the 21st National Seminar titled "Information Support for Rural Development" at ISLIC Kolkata held in 2004-05. In this, many articles were published on the information needs and information-related behavior of rural people of different regions of India. An important study was done by Dr. Arvind Kumar Sharma with the financial support of Indian Council of Social Research, New Delhi under the name "Information Seeking Behavior of Rural People". Today in India, studies are being done on various areas of user studies such as evaluation of specific services and systems, the medium of communication used, information and flow of information, user information needs and behavior etc.

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2.4.3 Need and Objectives of User Studies

User study is needed because of the following reasons :

1. To understand the psychology of users to find information.
2. There is a need to know the user attitude for the creation of library and information products and services.
3. Users not only think in different ways, but their way of working is also different. Knowing this the services can be scheduled accordingly.
4. To know the level of users.
5. To improve the quality of existing services and products.
6. To develop user oriented information systems and services.
7. To satisfy the first four sources of library science.

A major component of the library and information system is the user. In the past, the focus was on document oriented services rather than on the development of user-oriented or product-oriented services and products. More attention given. Greater attention was paid to bibliographic organization and control. Today libraries and information services are becoming user oriented. Dr. S. R. Ranganathan not only recognized the importance of the user long ago but also propounded his first four sutras keeping the user at the center. Sangameshwaran and Gopinath describe the objectives of user study as follows :

1. Identification of potential users and their categories.
2. Identification of information needs.
3. Evaluation of existing resources and services.
4. To develop and design various systems and user oriented information systems and services.
5. Reducing the time spent on information gathering.

The following areas of study have been included under user studies :

1. Information Requirements
2. Study Trends of Users
3. Information Seeking Behavior of Users
4. Evaluation of systems and services
5. Information Dispersion Studies
6. Elements hindering information dissemination
7. Channnels of communication or media of communication

Note

2.4.4 User Studies Methods

In today's information age the user is the focal point. It is very important to assess his information needs. Based on this assessment, libraries and information centers can organize products and services accordingly. The information needs, study tendencies, habits, personal characteristics of the readers are different in different subjects. The information demand of the readers is different in every subject and situation. Secondly, in user studies we are concerned with the study of human beings. Human emotions cannot be controlled and it is not possible to exercise them under controlled conditions. At the same time, social, psychological, economic, etc. aspects are also involved in user study, so following any one method or technique will not be helpful in fulfilling the objective. In society too, from one society to another, from one culture to another, from one group from another, the way of work and behavior is different. Therefore scholars have insisted on adopting a mixed method. Wood favors mixed methods for user studies. Clemens, Kathleen, Parkhi, Raghavendra Sab etc. have used questionnaire methods for assessment of user information requirements.

The following methods can be used for user study :

1. **Survey Method :** Survey method is used to collect data in social and behavioral sciences. This method is used for user studies. By using survey methods, user information needs, information seeking behavior, user study trends, communication media systems and services can be assessed. In this, many techniques are used to collect primary information. These are questionnaire, interview, observation, schedule and diary maintenance. One or several of these techniques may be used for the purpose.
2. **Citation Analysis :** Quote analysis is an indirect method for evaluating the information needs of users. Bensman has reviewed the available literature on bibliography formulas and citation analysis and their validity for user studies.
3. **Bibliometrics Study :** In bibliography, the numerical or numerical study of various aspects of a subject or literature is done. It was used to identify the pattern of authorship citation publications and secondary journals. goes. Also it can be used in any field. It is also used in the field of user studies.

   Magyar considered bibliographic analysis as an important tool for the study of literature. He says that the annual analysis shows the growth of research and scientific activities.
4. **Computer Content Analysis :** Computer content method can be used by the readers to analyze the literature using the internet and

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computer and by using this method the information requirement of the readers can be determined.

5. **Analysis of Library Record :** Library records analysis refers to the statistical analysis of records of libraries and information centers such as circulation data, statistics of reference departments, etc.

2.4.5 Techniques of User Studies

The same techniques are used to collect primary data for user studies as are used in other areas of the social sciences. Krishna Kumar has described the techniques used for data collection as follows :

1. Questionnaire and Interview
2. Observations
3. Measurement

Guha divided the techniques used for user studies into three major headings :

(a) **Common or traditional methods :** Common or traditional methods include questionnaires, interviews, observations etc.

(b) **Indirect Methods :** Indirect method includes analysis of library records and citation analysis. The main records of the library are circulation statistics, inter-exchange records, records of the reference department, etc. These records provide the details of the user's requirement. Additionally citation analysis can be used as a user study statement.

(c) **Specialized and Non-conventional Methods :** Specialized and non-conventional methods include computer feedback. Today computers are being used extensively in libraries for information retrieval. The analysis of information searched by the reader on the Internet and in databases is helpful in determining user information needs.

Today, questionnaire, interview and observation techniques are being used extensively for user studies. Their details are as follows :

2.4.5.1 Questionnaire

Questionnaire technique is used to collect information based on the information needs of the users, method of information search, information seeking behavior, reader satisfaction, dissemination of library products and services etc. In questionnaire technique, facts are collected by asking questions from the users. There are many types of questionnaire techniques, structured questionnaires and unstructured questionnaires based on the nature of questions can be divided into limited, open, graphical, mixed questionnaires.

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Mc-Cornum has divided questionnaires into mail, group administered and personal contact.

(a) **Construction of Questionnaire :** The following points should be kept in mind while preparing the questionnaire :

1. Before preparing the questionnaire, other tests should be studied and the advice of peers and scholars should be consulted.
2. Build the questionnaire according to the research objectives. Enumerate all the questions necessary to fulfill the objectives.
3. The questionnaire should be as short as possible.
4. The combination of questions in the questionnaire should be in a logical order. That is, if the subject is wide. And if the number of questions is more, then after dividing the topic into sections and subsections, the questions should be arranged in a logical order according to the title of the respective section.
5. Emotional or controversial questions should be avoided in the questionnaire. Such questions should also not be put which the respondent cannot understand.
6. Avoid the use of double meaning and vague meaning words.
7. While framing the questions, the nature of the question should be decided whether to give a limited or open option for the answer.
8. Respondents should not be compelled to answer such questions which are not socially and psychologically appropriate to answer.
9. The questions in the questionnaire should be objective. They should not show any inclination or love towards anyone.

(b) **Pre-test :** Before finalizing the questionnaire, it is necessary to conduct a pretest or pilot survey. There are many benefits to doing this pretest or pilot study. Through these, the researcher can remove the mistakes made in the questionnaire, unwanted levels, shortcomings etc., as well as the important suggestions given by the respondents while filling the questionnaire can be included in the final questionnaire. It also helps the researcher in testing the validity and reliability of the statistical techniques adopted for data processing and analysis. Lack of pre-test or pilot study can be done away with unrelated terms, double meaning words etc. The questionnaire must be pre-tested. Because with this necessary amendments and corrections can be done in the questionnaire.

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(c) **Cover Page :** After the questionnaire is finally prepared, it should be sent to the respondents. A cover page or letter must be attached with the respondent while sending it. This letter should contain the title of the research, purpose and assurance of confidentiality of the answers and thank you for the cooperation.

Along with this self-addressed envelope (on which stamp is affixed) also along with the questionnaire should be sent. If the respondent is working in any organization, organization etc., then he should send the questionnaire through the president or administrative officer of that organization, institute etc.

(d) **Distribution of Questionnaire :** Questionnaires can be distributed in person, by post or by email. Their detailed description is as follows :

(i) **Personally :** The researcher can personally answer the questionnaire to the respondents. In this, the researcher goes to the respondent wherever available and gives the questionnaire to be filled. For example, if a research scholar has to fill the questionnaire with the staff or users of the library, then he can go to the library and personally give the questionnaire to the users or employees. For this the researcher has to go again.

(ii) **By Post :** The questionnaire may be sent to the selected respondents by post. In this, it must be kept in mind that along with the questionnaire, a self-addressed stamped or pre-paid envelope must be kept. So that the respondent can fill the answer and send the questionnaire. It must include a cover letter or page stating the title of the research, purpose, polite request for cooperation from the respondent, assurance of confidentiality of the answers and the full address of the researcher.

(iii) **By Email :** Questionnaires by e-mail are also sent to the respondents . For this, it is very important for the respondent to have equipment like a computer etc.

(iv) **Response Rate :** The return rate of questionnaires, especially those sent by post, is very low. This rate is further compounded by the low interest of the respondents. Therefore, even after four to six weeks, the researcher does not get the questionnaire returned. If so, a reminder letter should be sent again. Sending reminders increases the response rate.

Note

Interview

Interviews have been considered as a primary data gathering technique. Interviewing has also been considered a tool of user study or a technique for collecting research data. This technique is used in social sciences. Through interview techniques, the researcher collects facts, information by interacting with the user. Many social science data are collected using this technique.

Following are the steps to be followed during the process of interview:

(a) **Planning :** In this stage the researcher or interviewer plans the interview. Under this, he decides the date, time and place of the interview. The cost and travel time are also ensured. If more respondents are to be interviewed, then research assistants should be appointed for this and they should also be trained. Whatever instructions are to be given, they should be prepared.

(b) **Construction of the Interview :** Schedule is a list or sequence of questions to be asked to the respondent. On this interview schedule the interviewer records the questions asked to the respondent. The interview schedule should be prepared in time. While preparing the interview schedule, keep certain things in mind. As

1. The sequence of questions in the interview schedule should be in a systematic order i.e. question subject sequence as well as they should be consistent among themselves. Otherwise the respondent may get annoyed.
2. While preparing the interview schedule, the research objectives, scope and limitations should be clear in the mind of the researcher.
3. While formulating the questions, care should be taken of the ability of the respondent and his/her emotions.
4. In the interview schedule, questions of protected and unprotected, open or closed type should be made.
5. The Schedule should assure the Respondent of the confidentiality of the information received from him.

(c) **Pilot Test of Interview Schedule :** Before the actual interview, the researcher should conduct a pilot test of his interview schedule. For this, a small group can be selected and questions can be asked and the suggestions, shortcomings and observations obtained from this test should be incorporated in the final interview schedule. It should be noted that this is an important function.

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(d) **Conduct of Interview :** While conducting the interview, the questioner or the researcher should be very careful. Asking questions, clarifying questions, encouraging counter-questioning, not getting angry, avoiding criticism, behaving in a timely manner, asking emotional questions, etc. are such things which should be kept in mind during the interview. Interviewing is truly an art. Gradually, mastery comes in this art, so the interviewer should not only understand its process before taking the interview, but should also acquire proficiency in it.

Word selection, tone, facial expressions, ascending, demeanor, body language, politeness, linguistic knowledge, etc., are factors that can greatly influence the research results while conducting an interview. A successful interview can be done only on the basis of balance in all these things. The interviewer should talk less and listen more. As far as possible, the respondent should get full opportunity to express his point of view because conclusions will be drawn only on the answers received from him. Take special care of the following things :

- **Word Selection :** Interviewers should pay special attention to the words in the conversation. Linguistic words should be adapted to the circumstances. The language should be such that it suits the level and understanding of the respondent.
- **Vowel :** In communication, tone is more important than words. The same type of words when spoken in different tones leave different effects. Hence the researcher or the interviewer should pay special attention to tone while interviewing with the respondent. The tone should be effective, but it should not reflect an impulse of anger or annoyance.
- **Facial Expressions :** While doing the interview, there should be due control over the facial expressions. Successful interviewers easily reveal many things with their face. It is important in the interview. Your facial expression may encourage or even discourage the respondent. Your facial expressions communicate more than words.
- **Body Gestures :** In the interview, the operation of the body parts i.e. the movement of the hands, walking, getting up, sitting etc. are such things on which it is necessary to pay attention. The researcher should keep this in mind while doing the interview.
- **Knowledge of the Subject :** The researcher or the interviewer is doing structured or unstructured interview on any subject or

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topic, he needs specific knowledge of the related subject or topic. Otherwise the respondent may create a subject matter. There should be a general introduction about whatever statement or facts are being asked.

(e) **Data Collection :** Whenever the interview is to be conducted with the respondent, the date, time, place should be determined in advance. The interviewer should create a pleasant atmosphere while doing the interview. The interview process should take place in a smooth and easy environment. At the time of interview, permission for recording of the interview should be taken from the person being interviewed. That is, if the voice recording or video recording of the interview is to be done, then its information and prior permission should be taken from the respondent. In case the recording is not being done, the probable answers in the Structured Interview Schedule should be ticked off immediately. Similarly, if the researcher is using an effective interview schedule, the respondents' statements should be recorded as they are at the time of interview or immediately after. The respondent avoids answering many personal, family or other questions correctly if it is being recorded while conducting the interview. Therefore, the researcher should decide the nature of the questions according to the situation of the self-respondents.

(f) **Analysis of Data :** Analysis of data using appropriate statistical techniques should be done.

(g) **Report Writing:** The final task of the researcher is writing the report.

2.4.5.2 Observation

Observation is a technique of data collection in user study, in which the researcher observes a research situation. Whenever observing the behavior of a group or individual. If yes then this method is useful. Libraries and information centers in different situations such as libraries. Subjects such as using inventory, finding books on funds, behavior of students in the study room, etc. can be observed. Reliability facts and data can be collected with the help of this technique.

Observation is done with the help of eyes. Eyes have their limits but this human can be overcome with the help of modern equipment. In science, the help of microscopes and telescopes are taken to observe the subtle and very distant things. In the laboratory, the scientist observes the events happening by observing the finer things with the help of a microscope. Similarly,

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observation of events and children is done with the help of binoculars. Along with this, the help of devices like tape recorder, thermometer, camera, video camera, stopwatch etc. is taken. With the help of these devices, the truth and reliability of the incident can be tested again. For the success and reliability of observation, the researcher should keep in mind the following suggestions :

1. Personal influences and subjectivity should be avoided while observing.
2. While observing, observe the event closely so that no important fact is missed.
3. While observing, the observer should use audio-visual devices such as tape recorder, camera, video camera. With the use of these devices, the user will not be completely dependent on his memory power.
4. The observer should be free from all prejudices while observing.
5. The groups or individuals to be observed in observation are from a heterogeneous background maximum should be taken.
6. The observer should take minimum time in observing and recording it.

Classification and Planning of User Studies

Pro. Herbert Mazley has broadly divided user studies into three categories, these are :

1. Behavioral Studies
2. Usage Studies
3. Information Flow Studies

The study, which is done to find out the way of total interaction with the communication system of the user community, without any context of the event, is called information behavior study. The studies which are done to find the use of any communication medium like primary journals, secondary journals etc. are called use studies. Whereas,

Information flow studies are those studies which are done to find out the patterns of flow of information in the communication system. Mazley made another classification of user studies in his 1966 article 'Information needs and uses in science and technology', which is as follows :

1. Channel Studies
2. Critical Context Studies
3. Diffusion Studies

Note

Has classified the users under three headings, these are :

1. Behavior Studies
2. User Studies
3. Information Flow Studies

Suracevic and Wood have a plan in the context of user study as follows :

1. To survey prior studies and literature in general and to learn about all aspects of user study.
2. Statement of the Objectives of the Study,
3. Determining the model to be adopted around the area being studied.
4. Selecting a sample from the time being studied.
5. Determining the method of doing both the problem.
6. Determining the method of observations and data analysis.
7. Determining the way results are presented and used, including dissemination.

Here it needs to be kept in mind that the information requirement of the users is not constant but like a continuously flowing stream, that is, it is constantly changing. Therefore, whatever method is adopted, it will have to be amended and changed continuously according to the need. The following steps should be followed by the researcher while planning the user study :

1. **Data Analysis and Interpretation :** In this phase the data will be analyzed manually or with the help of a computer. Appropriate statistical methods for data analysis should be mentioned. With the help of these techniques, the researcher can present a logical and correct interpretation of the data and can draw authentic conclusions.

2. **Data Collection :** In data collection, how the facts and data will be collected to be mentioned. Structured questionnaire if questionnaire technique is to be adopted or unstructured questionnaire, limited or open interview, protected interview, unstructured, clinical etc. Observation techniques include participatory non-participatory structural, nonstructural, controlled, uncontrolled observation, i.e. whatever technique or techniques are to be used for the combined data collection, must be clearly mentioned. Also, the procedure to be followed for data collection should be clearly mentioned.

3. **Sample Selection :** In this step the sample is selected from the whole. Care should be taken that the size of the sample and the

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method of selection should be based on certain criteria. Sampling, which is representative or objective, should be done keeping in mind the quality, nature, time, resources etc. of the desired information.

4. **Literature Survey :** A survey of the available literature related to the subject being done in this should be done. This survey will not only clarify all the aspects about that topic. But it will also facilitate future studies.
5. **Determining the Objectives of the Study :** The first task is to set clear objectives. These objectives should clearly state what kind of information is desired and the goals to be achieved. Setting clear objectives will provide the foundation for future studies.
6. **Report Writing :** The final stage of user study is report writing. In this, the researcher presents the work done by him in a scientific and logical order.

2.4.5.3 Measurement

The above research work is being done continuously. These research work is being done in various areas of user studies like information need, information search behaviour, information channel, barriers to information dissemination etc. These studies have been commented on in detail by P N G Kumar in his book "Library and Users Earth". The details of which are as follows :

1. **Feelings Users Need :** User studies are lacking in the fact that they have not focused on deeply experiencing the user's needs. The needs of the reader are constantly changing.
2. **Better Understanding of Information Behavior of Users :** If a comprehensive study of the information usage attitudes of users is done, it will come to the fore how far the user psychologists go along with the process of information source use. subtly suited. The study done in this direction will throw light on the better understanding of the readers regarding the information behavior.
3. **Factors that Influence User Behavior :** Wersing and Wendell (1985) state that economic and cultural aspects and status, respect, group in the humanities also affects behavior. He proposed a complex model of information processing that includes individual, group and process methods, individual situations and psychological elements such as characteristics, values, motivations, attitudes, etc., and group dynamics such as the level of work, organizational needs, etc.

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4. **Need for Examination of Information Traits of Users:** Today there is an urgent need to test the acquired information characteristics of users.

5. **Psychology of Information Use :** Sarah Fine (1984) in her review titled "Research and the Psychology of Information Use" expressed the observation that this much larger question pertains to the way in which people access information as well as the environmental and psychological conditions in which they affect each other.

6. **Role of Environmental and Sit untional Constraints :** Mick et al. (1980) examined, for example, information used by scientists versus individual characteristics, work environment characteristics, assigned job characteristics, and concluded It pointed out that environmental and situational constraints play an important role in determining information behaviour.

7. **Need for Research in Cognitive Style :** Atherton (1975) has pointed out that cognitive style and other personality factors of information seekers such as amount of motivation, mood, eagerness, swivel, reassurance and There is a need for research into the need for rewards, task orientation and situational contexts such as time pressure, motivation to obtain information, etc.

8. **Priorities to User that Researches :** Britain (1975) has stated that the questions in the study should reflect the user preferences rather than the researcher. They should be asked questions the user can answer. Today there is a collection of such a large number of data on the users that they are touching the level of saturation. What is needed today is that studies support user preferences, not information need preferences themselves.

9. **Studies Should be Behavioural Oriented :** The reviewers are of the view that user research needs to be applied science oriented. Parker and Paisley (1966) pointed out the shortcomings of user studies nearly two decades ago. He said that the scientists propounded the need for psychological research for the achievement of the mission of providing effective flow of information. In fact, psychological research is needed. Psychological research is necessary to test the practical presumptions of system makers.

10. **User Studies are not User Oriented :** For the last three decades, research work is being done in the areas of User Studies. Even after

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this, no universally accepted theory has been developed today. J. M. Britain (1982) states that user studies have neglected potential users. The information needs that were assessed. They are general in nature and only a few user studies have been related to the need for information and data in a way. In fact the research being done in this area has been library and document oriented. Whereas they should have been user oriented. Along with this, they have not paid much attention to the process of generation and use of information.

Conclusion

In this chapter, why information is needed is studied. Studied about the processes of information search and also studied the search behavior related to information. In addition, user study methods were also studied. Apart from this, the techniques of user study were also studied. Evaluation of user studies was also studied.

Important Terms

- Information means the information, recorded or communicated by human beings through experiences, observations and experiments.
- Types of information have been grouped on the basis of its various characteristics.
- There are many patterns to describe the process of finding information. This model has four phases.
- User study refers to the study of the behavioral characteristics of the users.
- To collect data in social and applied sciences, a survey method is used.
- Techniques used to collect primary data for user studies are used in other areas of the social sciences.

Note

Exercises

Very Short Answer Type Questions

1. What is meant by the word information?
2. Briefly describe the properties of information?
3. Why is information needed?

Short Answer Type Questions

1. Briefly describe the information search procedures.
2. Briefly describe the origin and development of user studies.
3. Briefly describe the need and purpose of user study.

Long Answer Type Questions

1. Defining user Studies Need and Objectives and describe the user study methods in detail.
2. Describing in detail the classification and planning of user studies, describe in detail the evaluation of user studies?

UNIT 3

Note

Information Sources and Evaluation

3.1 Introduction

In this chapter, we will study information sources. You will also learn about the types of information sources. Documentary and non-documentary sources will also be studied. Apart from this, we will also study the primary, secondary and tertiary sources..

3.2 Sources of Information

Any subject has its own literature. Through this information about human achievements can be obtained. Generally the nature of literature is varied and multilingual. In modern times literature is being published in more than 80 languages. Therefore, the nature of this explosion of knowledge is becoming interdisciplinary in nature. This sharp intelligence can be experienced in such a way that in the field of science literature doubles in years and in the field of social science this growth takes place between 8-10 years.

Documents are various sources of information and important means of information dissemination and communication. By collecting and retrieval of information through sources, the nascent subtle thoughts get real quick service. Therefore, information sources mean such documents, presenting data and information in a sophisticated manner to meet the various creative needs of the users.

3.2.1 Types of Documents

There are many sources of knowledge and information sources. In the development of script, paper and printing arts, the original sources of knowledge and information were fundamental and the means of Shruti were prominent. Many scholars have classified or categorized information sources in many ways :

Note

1. **According to Dr. Ranganathan,** documents can be divided into the following four categories on the basis of physical appearance, nature of presentation, and characteristics, behavior etc.
   (a) **Conventional Document :** Under this, books, periodicals, maps, cartography etc. are included.
   (b) **Neo-conventional document :** standards, verifiable facts etc.
   (c) **Non-conventional Document :** Audio-visual material etc.
   (d) **Meta Documents:** They are direct documents, in which the arrangement of humans doesn't happen.
2. **According to Grogan,**
   (a) **Primary source :** journals, research reports, conference proceedings, lecture, standards, professional literature research dissertations etc.
   (b) **Secondary sources :** abstracting and indexing magazines, progress reviews, reference books (encyclopedias, handbooks, tables, formulas etc.), management, essays, text-books etc.
   (c) **Tertiary sources :** glossaries, directories, bibliographic literature guides, lists of progress in research, guides of libraries and other organizations.
3. **According to Hutchinson :** Engaged in search of information for any purpose inside the library. Reference work is also called the personal service given to the persons involved and the various activities done for the purpose of making the information easily accessible.
4. **In the context of the modern era,** there is a need to categorize these information sources again because today new and latest types of sources are emerging in the sources of information. Therefore, these latest information sources can be divided into the following two categories :
   (a) **Documentary Sources :** These are the printed forms of documents. These are documents that are a means of exchanging ideas in print form. Traditional documents include books, periodicals, newspapers, etc., which are considered to be original documents. In the modern era, there is a continuous change and increase in the types and nature of the sources of information, on the basis of which the documentary sources can be divided into the following three parts.
      (i) Primary Sources,

Note

(ii) Secondary Sources,

(iii) Tertiary Sources

(i) Primary Sources : The major examples of this source are as follows : Magazines, Research Report Conference Procedure Standards, Patents, Research Dissertation, Specification, Business Literature, Unpublished Literature etc.

(ii) Secondary Sources : The main sources of secondary sources are as follows: periodical publications, indexing and abstracting magazines, reference books, text books, monographs, tables, handbook progress reviews etc.

(iii) Tertiary Sources : Under tertiary sources, directories, research progress list, list of bibliographies, annuities etc. are included.

(b) Non-documentary Sources : Non-documentary sources are those sources which are usually not in print or published form. These forms are in obscure forms and these sources are not easily accessible. Much important information is contained in these non-documentary sources. These sources form an important part of communication, especially in the field of science and technology. These sources can be divided into two parts :

(i) Formal Sources,

(ii) Informal Sources

(i) Formal Sources : In formal sources, research institutions, academic institutions, industrial institutions, state departments, university consultants etc. are included. Information is obtained by these organizations in the form of pamphlets, newspaper clippings, plans and charts, manuscripts, dissertation retrieval and print copies.

(ii) Informal Sources : Informal sources are living sources. Formal sources include conversations with classmates, meeting with individuals, attending business conferences, telephone messages, work progress, etc.

Non-documentary sources are more convenient because direct explanation cannot be obtained from documentary sources whereas information requirements can be clarified by direct explanation in non-documentary sources.

Note

3.3 Classification of Information Sources

According to Dani Grogan, three-class division of documents can be done as follows:

Different types and examples of information sources

Information Source				
Documented			Undocumented	
Primary	Secondary	Tertiary	Formal	Informal
Current publications	Secondary Periodical Publications	List of Reference Bibliographies	Research Institutions	Conversations with classmates
Research Report	Indexing Journals	Directories	Delinquent entities	Membership of Conferences and Committees
Conference Papers	Abstract Magazines	Annuities	Industrial Organizations	Meetings with Individuals
Thesis	References	Literary Guides	University	Technical Gatekeeper
Validator	Text Book	Research Progress Lists	State Department	Telephone messages
Standard	Disruption			
Business Literature	Reviews			
Unpublished literature	Bibliographic Reference List			
Research Dissertation				

3.3.1 Primary Sources

Any information/knowledge that is published first is the primary source. That is, the documents in which the information related to the use of original research findings and findings in the field of industry and technology are published for the first time, those documents are called primary sources.

In this way, original research, development of a new method or new interpretation of old ideas, etc., include the first published document in the category of primary source.

Note

Latest information is stored in these sources. A researcher gets the latest information with the help of source. These sources are widely scattered, discrete and unorganized. The information contained in them is not adjusted with the main stream of scientific and technical knowledge. Although such sources are very important. But finding and using them is very difficult. Secondary source helps in utilizing these.

The primary source is the most important of the information sources. At present, the original reports of science, technical and social science research form the main part of the primary source. Some of these are in the form of records of observation and some are descriptive. Thus, with the help of these sources, the researcher benefits by getting up-to-date information. With its help, the researcher avoids duplication.

1. **Periodicals :** Among the primary sources, periodicals are the most important. Periodical magazines are published in weekly, fortnightly, monthly, quarterly, half-yearly or annual forms. A large proportion of primary sources are published in the form of periodicals. Generally, research results are first published in current publications. The articles in these publications are the main communication medium for the exchange of scientific information. Current publications have different subject information and objectives. On the basis of information characteristics, there are different types of periodical publications, such as specialized research journals, technical, business, popular and institution journals. The information contained in periodical publications is more updated than in texts. The main feature of primary periodicals is that they can be used in two different forms. Its new issues meet the contemporary needs of the readers of the particular area, as well as the old issues are also important means of providing specific information, so the current publications work to provide both new and inspirational information. for example :
   (i) Indian Journal of Pure and Applied Physics
   (ii) Nature,
   (iii) Journal of Documentation,
   (iv) Journal of Librarianship,
   (v) Journal of Electronics Engineering.
2. **Research Reports :** At present, research reports are being used more than journals. According to one study, in the first decade, this type of report accounted for more than 10% of all the documents taken. Thus research report is a powerful medium of scientific communication. After the Second World War, the search report appeared. The main

Note

reasons for the emergence of these types of documents have been the lack of paper, limited editions and more time taken in publishing magazines, etc. Therefore, it was thought to develop such a medium which could be distributed rapidly and in limited copies on less paper and these documents were very useful. The information contained in research reports is original. Sometimes these reports are available only in typed copies. Some reports contain disorganized preliminary information about a work, while others contain authentic and detailed information about a work, which is difficult to get from any other source. Most of the literature on subjects like Acronaut and Applied Atomic Energy is available every year. In social science, government reports that appear within a project fall into this category. Reports published in the field of education and economics come under this.

NASSDOC has a large collection of such research reports. The institution encourages research work by being the financial assistant of the individual and the institution. ICS publishes regular reports on research work. for example :

(i) Scientific and Technical Acrospace Reports, National Acronaut and Space Administration (NASA),

(ii) Government Reports, Announcement and Index (GRA & I).

(iii) Physics Reports, Amsterdom.

3. **Conference Proceedings :** The articles in various national and international level conferences, seminars, study seminars, study seminars are the primary sources of information. It is not right for every person or researcher to be present in these events himself. Therefore, the proceedings of these conferences are published which the researcher can use in his research work.

   The articles presented in such conferences bring the latest inventions, discoveries to light first. Apart from this, questions and answers related to the article are included in the proceedings. In addition to the conference proceedings, the presidential speech of the seminar, the list of participants and the suggestions of the conference, etc. are included. for example :

   (i) Proceeding of Science Conference,

   (ii) Communication : A Conference Proceeding Report,

   (iii) ICCP : A Confermce Proceeding.

4. **Patents :** This is a certificate of agreement between the authentic government and the investigator. Through this, he gets a monopoly

Note

for a certain period to make, sell and use the patent process, machine creation, production. Scholar and activist. The government provides this type of certificate to encourage new inventions, latest work or production. It is a document and government currency is also attached on it. It is published by government and semi-government organizations from time to time.

Authenticators are the result of the latest research, so they are an important form of primary source. Certified chemists are very useful for engineers and physicians. Patent papers are awarded in India by the Indian Patent Office and are published in the same way. Indexing and abstracting services are also regularly included in Authenticator.

World Patent Index

5. **Standard :** Standardization is a simple means of maintaining uniformity. This uniformity should be there in each area and in each side of the functions. This maintains uniformity and equality in the form of activity and object, there is a definite and continuous increase in production and there is a direct vision of efficiency. Therefore, the macro body, government or authorized body fixes the standard of each work or thing and the thing manufactured according to it is called standard commodity. Consumers trust such standard goods. The result is that the goods which do not follow the standard are eliminated from the market.

   Standards are such official standards, which are prepared by an industrialist, businessman or specialist to test the size, type, importance etc. of a particular item. Their development takes place after extensive research programme. Generally a standard is a booklet of few pages in which definition, method, properties, measurement etc. are included. They are also depicted with tables and pictures. These can be classified as follows :

   (i) Dimensional Standard,

   (ii) Quality Standard,

   (iii) Standard Test Methods,

   (iv) Standard Terminology,

   (v) Code of Practice,

   (vi) Physical and Scientific Standards.

   These records are very important for research work. National level institutions have been established in different countries only for standardization. Such as British Standards Institution (BSI), - Indian

Note

Standards Institution (ISI). This organization provides 300 standards annually, International Standard Organization (ISO).

6. **Industrial and Trade Literature :** Business literature is an important source in getting information about a particular product. When no material is to be found, specialized trade literature is useful as a primary source.

   The main purpose of trade literature is to provide detailed information about its production (equipment, goods, system). The main reason for this is that in order to increase the sales of its production, it has to accumulate credit in the market before production. This information is given by the producers or dealers. These literatures are available in the form of technical bulletins, price lists, data sheets, bibliographies, manuals, guides, institution journals etc.

   Generally booksellers do not reduce this type of literature. Because of this, such literature could not get proper place in the library. But this is the only literature through which a complete description of the description, principle and procedure of a highly sophisticated device is obtained. Sometimes this type of information is not published in any other source. Institution journals are the main source of such documents. Among such magazines are Shell, Magazine, Atom News (Ukaea), Shri Ram Patrika etc.

7. **Newspaper Clippings :** Newspaper clippings are a major primary source. The clippings of specific, intended information or specific articles or passages published in dailies and magazines are collected and adjusted in view of various library needs and utilities. Many information which is published in daily newspapers can prove useful in future for research work and other work. Therefore, from this point of view, their informational importance is more.

   And may prove useful in future for other works. Therefore, from this point of view, their informational importance is more.

   Example : Universal Press Service, Chennai—This organization is regularly publishing such clippings.

8. **Dissertation or Thesis :** Generally, the university gets the dissertation written for the degree of doctor, which is prepared under the direction of a scholar. It is considered. That it contains information about the original work done in a particular subject. Its main purpose is to test the proficiency of the researcher in that subject and research method.

Note

A new technical method or principle is invented from the findings in these thesis. It is difficult to get information about them due to their lack of public publication. Various measures are being taken to overcome this difficulty. NASSDOC is very supportive of this type of dissertation.

Making a big collection. About 2,000 theses have been collected by NASSDOC. ICSSR, New Delhi has prepared a classified list of this type of literature. Similarly, 'Dissertation Abstract International' is being published by Microfilm University of America. The importance of research dissertations has increased significantly in such services.

9. **Correspondence File :** Correspondence file also has an important utility of its own in various industrial organizations. It is related to technical issues, sometimes information on old subjects is obtained through them.

10. **Maps, Atlas and Charts :** The depiction of the surface of the earth on any square object is a map and their collection is called cartography. They are needed for carrying out various types of research work about tourism, excursion, civilization and culture. These sources provide geographic information.

11. **Manuscripts and Unpublished Material :** Many primary sources are also unpublished, these sources are used for historical interest. In social science, 40% of the total literature is unpublished and handwritten. Under these sources, handwritten texts, manuscripts, unprinted texts, personal diaries, inscriptions, old coins, etc.

3.3.2 Secondary Sources

The material that is collected from primary sources and stored for reference to primary sources is called secondary source. This material is arranged according to a definite plan. In these sources the basic information is selected for a certain information or user. Secondary sources are easier to obtain than primary sources. It not only provides a compendium, but also serves as a bibliographical key for the primary source, which facilitates access to the primary source, which facilitates access to the primary source. Secondary sources are divided in to the following categories. It also acts as a bibliographical key, which facilitates access to the primary source. Secondary sources are divided into the following categories :

1. **Periodicals :** There are many periodical publications which do not provide original information. These publications are specialized in interpreting and providing feedback on developments recorded in primary information sources.

Note

2. **Indexing Periodicals :** Indexing periodicals are important secondary sources. In this type of journals, reports of articles published in primary journals are regularly compiled. Under these, stories of new texts, pamphlets, etc., are also included.

   A large part of the primary sources are not accessible to the readers. Therefore, this new method of information transmission between information generation and information user has been presented. Example :

   (i) Library Literature,

   (ii) Reader's guide to Periodical Literature.

3. **Abstracting Periodicals :** This is the best method to save invaluable time of scholars and users. In this type of journals, abstracts of articles published in primary sources are provided. Its main purpose is to provide information to such readers who cannot read or access the original document due to busyness or any reason. Under abstract journals, important articles of primary journals, new dissertations, proofs, reports and other publications of the field are compiled. Abstract magazine acts as an index to get information on a specific topic and through this it also helps in solving the language barrier to an extent. Example :

   (i) Chemical Abstract,

   (ii) Biological Abstract,

   (iii) Library and Information Science Abstract,

   (iv) Physics Abstract,

   (v) Engineering Abstract.

4. **Reviews of Progress :** Progress review, different from book review, is a critical summary, which is an account of the progress and development made by a scholar of a particular subject in this subject. The importance of this type of literature is increasing significantly and reviews are being used more for literary search in many fields than indexes and abstracts.

   Ranganathan called these reviews descriptive bibliographies. In these, the information is analyzed and evaluated, it is arranged in the appropriate context. In this, only important information is conveyed to the readers along with bibliographic details in a large part of primary literature. This literature is published in many titles. Like- Annual Review, Year Progress or Work, Advances, Progress in Development of and Survey of.

Note

5. **Book Review :** Under this, critical details have been given in the published books. Therefore, they are also called book critical social journals. The opinion of scholars about newly published books is published in these journals. Example :
   (i) Prakhar, Delhi (Navbharat Prakashan, Monthly),
   (ii) Book Introduction, Delhi (Rajkamal Prakashan, Monthly)

6. **Reference Books :** These sources of information present the information published from the primary sources in a highly organized order. These are also kept in the category of secondary sources.

   Definition : A reference book is a book that can be used by the researcher when the need arises. Does in simple language, it can be said that clarification or confirmation of any subject or fact. A book which is immediately helpful in doing this is called a reference book.

   According to Dr. Ranganathan, "The reference book compiles and organizes knowledge information in such a way that the intended information comes to the fore immediately and in a specific form." Reference books can be classified into the following categories :

   (a) Dictionary, (b) Encyclopaedia
   (c) HandBook Manual, (d) Tables etc.

   (a) Dictionary : This is an important secondary source, these dictionaries are needed to know the meaning and usage of any general or specific word. These dictionaries can also be related to specific subjects. Example :
   (i) McGraw Hill Dictionary of Scientific and Technical Terms.
   (ii) Dictionary of English Language.

   (b) Encyclopaedia : The synthesis of all knowledge in encyclopedias is presented in an organized and systematic form. Encyclopedias are storehouses of knowledge. Generally used to find information related to background and history. In this type of reference texts, long articles on subjects and sub-topics are presented. They are arranged alphabetically. Encyclopedias are of both general and specific types. Under the general encyclopedia, knowledge of all subjects and subject areas is presented. A specific encyclopedia is organized by collecting information related to a topic or subject group. Example :
   (i) British Encyclopaedia,
   (ii) Encyclopaedia Americana.

Note

(iii) Encyclopaedia of Library and Information Science

(iv) Encyclopaedia of Physics.

(c) HandBook Manual : This is a short book, in which the depth of the subtle to the subtle subjects of knowledge is revealed briefly. Most commonly used by scientists and technicians. Handbooks contain factual information, data, tables and formulas. There are two types of handbooks :

(i) Genera Handbook

(ii) Hand book on the subject.

The booklets in which the facts are presented in the form of tables are called tables. Example :

(i) Table of Logs

(ii) Table of Atomic Weights

(iii) Table of Melting and Boiling Points

(iv) Steme Tables

3.3.3 Tertiary Sources

The sources of information, which help the reader to use primary and secondary sources, are called tertiary sources. Such sources do not provide much of the subject knowledge but provide additional information. The main function of these sources is to help the researcher and experts in obtaining and searching the desired information for the use of primary and secondary sources. These sources are :

(i) List of Bibliography of Bibliography,
(ii) Directories,
(iii) List of Research in Progress,
(iv) Guides.

(i) List of Bibliography of Bibliography : When bibliography indexes secondary sources, it is used as a tertiary source. This is called a list of bibliographic lists. Eg - A World Bibliography of Bibliographies by Besterman, T.

(ii) Directories : Directories are the list of names and addresses of individuals, organizations, institutions, producers and current publications. The arrangement of information in this reference source is done alphabetically or classified as per the requirement of the consumer. Directories also provide information other than names and addresses.

(a) Information about the various products of a company,

Note

(b) information about the activities of employees of national and international organizations,

(c) Educational qualification, designation etc. of scientists etc.

The directories are of the following types :

(a) Industrial and business directories,

(b) Directories of Scientific and Technical Organizations,

(c) Directories of Industrial and Technical Organizations.

Example

(a) Ulrich International Periodical Directory,

(b) World of Learning.

(iii) List of Research in Progress : It is necessary for the researchers to know about the progress of research work, so that overlapping and duplication can be reduced in research work. Such sources are published for this purpose. Many organizations that provide grants for research work often publish such lists on a regular basis, such as the US Public Health Service Annual Research Grant Index. Current Research Project in CSIR Laboratories, 1972 and 1978. Directory of Scientific Research in Indian Univesities, 1974, two lists published by INSDOC in India.

(iv) Guides : The main purpose of the Guide to Literature is the presentation of the bibliographical structure. Guides are also helpful in evaluating literature. Generally, they present a detailed description of the textual equipment of the subject and the basic literature etc. Example :

(a) Guide to Periodical Literature,

(b) A Guide to Literature of Chemistry by E.J. Game,

(c) Source of Information in Social Science by Carl White.

Therefore, it is necessary to have all three types of reference sources in the libraries because the information source is the information.

Conclusion

In this chapter, we have studied about information sources as well as different types of information sources also go about Documentary and non-documentary sources were also studied. Primary sources, secondary sources and tertiary sources were also studied in detail.

Note

Important Terms

- Information source refers to such documents that separate the data and information presented by the source to meet the different types of comparative needs of the users.
- Documentary sources are sources that exchange ideas in print form.
- Non-documentary sources are those sources which are not both in printed or published form.
- Any information and knowledge that is published in the first form is the primary source.
- Secondary source is the material collected from the primary source and stored to refer to the primary sources.
- The sources of information, which help the reader to use primary and secondary sources, are called tertiary sources.

Exercises

Very Short Answer Type Questions

1. What do you understand by information source?
2. What do you understand by documentary information source?
3. What is a non-documentary information source?

Short Answer Type Questions:

1. Explain documentary and non-documentary information sources with examples.
2. What are documentary sources and into how many parts can they be divided? Briefly describe.

Long Answer Type Questions

1. Explaining the different types of information sources, describe in detail the usefulness of information sources in the library.
2. What are tertiary sources? How many types are these? Describe in detail.

UNIT 4

Note

Databases and Internet Services

4.1 Introduction

In this chapter, we will study what databases are and what are their types. Along with this, we will also study about what a consortia is and know what the Internet is and what services it has or what services it provides.

4.2 Database : Types and Uses

Database

Modern libraries and information centers provide information services to their users in a variety of ways. With the development of various services and products, the help of database based service is taken, for which the new developments in the database industry are kept in mind. Generally, a database is an archived form of records of a subject, which is constantly kept updated and used at the national and regional level as per the need.

Definition and Characteristics : Any type of information (bibliographic, numerical and graphic) organized in a computer-readable format, but generally a group of information (bibliographic, numerical and graphic) from which a variety of services and products are available in print, electronic, etc. Database can be defined in two ways with reference to different subjects like library and in the context of information science the collection of documents which is referred for bibliographic details is called database. Database management system (DBMS) in computer science is considered as a logical record, the structure of this record is fixed. Databases are being developed by various agencies. These agencies are primary publications, publishers of secondary information, consultants etc. These agencies can also be government and non-government departments. Their job is to

Note

collect information from various sources and create a database from this information.

Thus it has the following characteristics :

(i) It is an organized form of data and information in a computer readable format.

(ii) Information about various services and products is obtained from it.

(iii) Its production can be made available in print, electronic, etc. formats.

4.3 Types of Uses of Database

Databases are classified or divided according to subject area, geographical and chronological extent, accessed by content, on the basis of its various characteristics. The types of databases can be represented in the following diagram :

Database

Reference Database
- Bibliographic Numeric
- Referral

Source database
- Numeric — Textual
- Full Text
- Image — Full text + image
- Software
- Audio visual

1. Reference Databases

Reference is given only by not giving complete information in the reference database. So the user is directed to the source where the relevant information is available in which source. These sources can be documents, organizations or individuals. The reference database is divided into the following parts :

(i) Bibliographic Database : Databases provide bibliographic information about a document, sometimes the print of the document, its publisher and its address, etc. These documents can be books, journals, reports, patents, dissertations, conference proceedings, etc. Some databases also include abstracts and citations. In libraries and information centers, these databases are used for various types of literature search, compilation of bibliographies, book selection, current awareness service (CAS) and providing selective information dissemination service.

(ii) Referral Database : This database provides references to unpublished sources but sometimes also descriptive information. This type of source organization can be personal, audio-visual material, research project etc. It helps in telling the user the exact

Note

location of the source of the information. So these sources bring the user in contact with such sources. who give them the most up to date information. For example :

(i) Chemical abstract Service, Source Index (CASSI),

(ii) Common Wealth Scientific and Industrial Research Organisation (CSIRO),

(iii) Research in Progress etc. are the major referral databases.

2. **Source Databases :** Compared to previous databases, the source data contains full text of the original source for publication or content for electronic distribution. The source database is maintained by a variety of organizations, including government organizations. And the responsibility of those organizations is to disseminate the collected information. Some producers collect data or information from various sources, process it and make it available for communication. The source databases are of the following types :

(i) Numeric Database : These types of databases are in numerical form which are obtained from various sources. Scientific data is obtained through research and testing, statistical data through surveys etc. This type of database is used in the field of decision making, research work etc.

(ii) Full Text Database : This database records the complete text of all the aspects of the information. This includes magazine articles, newspapers, etc. Full text databases are used by more and more users. This is because any user or researcher wants to avoid the difficulty of finding the original source document. And on the basis of this database gets maximum information in less time. The prime examples of this database are :

(a) Chemical Journals On-line,

(b) Census Information Service (USA),

(c) Business Computer etc.

(iii) Textual Numeric Database : This database is a combination of full text database and numerical database, under this database, the numerical form of the data and the descriptive information about the textual form. It is also called as factual database. This database gives explanation about numerical data.

(iv) Software Database : This database contains computer programs, which can be accessed for local use.

Note

(v) **Image Database :** This database is a collection of graphic material which includes photographs, charts, figures, designs, maps, etc. This database is available in the field of engineering and medicine etc.

(vi) **Full-text Image Database :** It is the database itself which contains full text images, art, figures, photographs, sketches, etc.

(vii) **Other Types:** At present 450 databases are available on-line. As a result of the development of optical storage technology, another type of database storage has been developed by compact discs. This development is based on storage media. With this technology, a large amount of information can be stored in a small space. CD-ROM technology (technology in CS-ROM) provides huge storage capacity for the collection of bibliographic records. The data available on a CD-ROM can be searched by CD-ROM players and personal computers.

Development Search System : The search is the interaction between the user and the system. In the search system, the searcher has to create a set of documents. On the basis of this search strategies are created. The retrieval of information is dependent on the information stored in the database. The following three processes are followed for information collection and retrieval :

(a) To analyze the subject matter of the document by the indexer.

(b) The concept of the subject being analyzed in the indexing language of the system

(c) To organize the files contained in the database.

Formulation of Search Strategies : Under computer retrieval, if the textual citation is available in necessary and special terms, then the search title can be clarified by it. Following methods can be used for search device.

Must have clear knowledge of the title to be searched Concept of the terms to be searched should be divided logically into groups.

The strategy should be started on the basis of the information received from the review of the search output.

4.4 Types of Search Strategies

The formulation of search devices is based on the query made by the user on the basis of the demand of the user and the textual information contained in the database. The following are the types of search devices :

Note

(a) Weighted Approach,
(b) Boolean Search,
(c) Cluster based Retrieval
(d) Matching Function

In the above search tips, Boolean search is used to the maximum. Boolean search is based on the words available in the document. Based on the queries of the users, all profiles are generated. Boolean logic is used between the combinators of the questions described in this search profile. (and, not, or). Based on this each word can be searched individually.

Although the information in the database can be structural. Therefore, the search can be related to a particular field, such as the name of the author, the description of the document, key words, etc.

The search representation varies in both fulltext databases and reference databases.

In the process of on-line search system, when the search is done by a person, then he types the message with the help of computer terminal. When the return key is pressed, the message is sent from the terminal to the modem and from the modem to the computer through a special telecommunication network. The computer responds to each message and the searcher has to process it for each message.

Use gateways between on-line systems to increase the availability of the database to the user. By which switching from one host computer to another host computer can be done. Host computers are connected for packet switching telecommunications. Whose database can be accessed online from anywhere in the world.

4.5 Use of Database in India

The use of databases in India is a result of applications of computer technology in library and information activities. Initially NISCAIR (formerly INSDOC) and DR. Computer is used by the DRTC for the collection and retrieval of information. NISCAIR (INSDOC) used computer for publication and compilation of Union List of Scientific Research Journals available in Indian libraries. This project resulted in the development of a computer readable database by NISCAIR. Computer readable database in nuclear science was also prepared by BARC. In addition, ICAR and BARC Indian databases provide input to AGRIS and INIS.

On this basis Innis and Agris also provide their database to India. ICAR and BARC users to analyze in database magnetic tapes related to INIS and AGRIS . Most of the organizations store important data in computer

Note

readable database. This data depends on the demand of the user. The "Directory of Science and Technical Information System" in India comprises 90 databases which are maintained by 58 organizations.

The database is also maintained by NISCAIR. Which is accessed through networks which are as follows :

(i) Polymer Science Database,

(ii) Material Science Bibliographic Database etc.

The following details are given in each database:

Name of the database, organization creating the subject area - related to research or trade industry, related, geographic region, language of the database, language of communication, speed of updating, number of records, annual growth, type of indexed documents, code of classification method, search method etc.

NISSAT also provides databases in various fields through National Informatics Centers. The networks established by various other organizations provide database at local, regional, national level. Such as- INDONET, NICNET, INFLIBNET, DELNET, CALIBNET etc.

Following are the things to keep in mind while developing a database :

(a) Training should be given for database services.

(b) Proper standards, formats, software, thesaurus etc. should be used in the creation of the database.

(c) The database should be established on national and international network.

4.6 Online Information Systems and Information Network

Online search has been developed as a major tool for libraries and information centres. On-line information system and network provides access to various databases like statistical, bibliographic etc. It is not necessary to have a fixed location with it. Therefore, by this various information databases can be distributed around the world.

Development of On-line Information Retrieval System : In the fifties, computers were used in batch process method for textual search. The batch search service using MEDLARS was introduced by the National Library of Medicine (USA) in the 1960s. This indexing and Indexing and Abstracting is a computerized form of services. Which is known as Index Medicus, which includes published world literature on medicine and related subjects.

The first large-scale online information retrieval system was NASA's Remote Console System (RECON). A software for this system was

Note

developed by Lockheed Missile and Space Company. The NASA database is available through the European Space Agency for online search in Europe.

4.6.1 Internet and Its Services

You must have heard a lot about the Internet. If you glance at a newspaper from a major city, you can find references to the Internet in every section of it. In its main section, for example, you will see the news of a political lecture in which a politician talks about the importance of the Internet. On the other hand if you turn to the commerce section, you will find a topic where a media company has announced new measures regarding the utilities of the Internet. In other pages, you'll find specially featured articles in which a user describes their experience of achieving an innovative method of using the Internet.

4.6.2 What is Internet?

There are many ways to answer this question. The type of answer you want to answer depends on how you use the Internet. For some it is a means of entertainment, for others it is a research tool, for others it is a golden mine of opportunities to earn money. In the general answers mentioned so far it is considered as a 'network of networks'. If you don't know what a network is, then this description won't be of much use to you. However, we will describe this in a more formal manner in later sections. So the internet is what you want from it. If you want to get information about different systems of education or educational models of the world. Let the Internet be what you want for you. Similarly, if you are a legal expert and have been researching all the judgments of the Supreme Court of India, then the Internet is what is reflected in the resources available on the Internet and the services it provides, search engines, and observations that users can access. Enables the U.S. to meet its needs and access resources, such as Bulliton boards for libraries, and other relevant parties related to library and information professionals, within the Internet. The subject matter of this unit has been tailored keeping in mind the needs of the students appearing for the undergraduate degree program of IGNOU. It is believed that this effort will enable them to understand the nature of the Internet so that they can be in a position to use this resource in their professional work when the need arises.

4.6.3 Origin And Development Of Internet

In the year 1970, a network called ARPANET developed by the Advanced Research Projects Agency (ARPA: Advanced Research Projects Agency). You. s. It was first used for the transfer of information under the U.S. Department of Defense. But later it was adopted by the educational

Note

community in building educational networks for information exchange. In the late 1980s, access to the net became accessible to the general public. Because network technology used Ethernet for the client server infrastructure and local area networks, it became easier for target users to access the networks.

The Internet was established in the mid-1990s by merging 60,000 networks. The basic description of the Internet is described as a network of networks that work as a co-operative with supervision. Participating network in this are agreed on protocols and rules and there is no authorized in-charge or controller.

4.6.4 Internet

Most of the people are now aware of the existence of the Internet. But many of these people are probably confused about what the Internet really is. In this context it may be mentioned that a brief and complete description of the Internet comes from an article published on page 547 of the Library Association Superhighway, London, 1995, which reads The Internet is a world-class network structure made up of multiple computer networks. It is highly open, open and free, and allows users to be institutional and personal for work and entertainment purposes. Allows reasons to communicate with each other. Because the Internet is so vast and without any rules or hierarchies, it is an available treasure trove of information from multiple sources. It has resources on all subjects; It is possible to feed letters to all participants; Documents can be forwarded or distributed anywhere in the world, and there are a plethora of directories and magazines on it. The development of the World Wide Web, coupled with the friendliness of the user interface, has made the information retrieval capabilities extremely powerful. Electronic mail is one of the most important services provided by the Internet. Everyone can communicate with any other user located in the world with their personal mail address within seconds (page 547). In other words, it can be seen that the Internet has two related distinct parts :

1. **Communication Networks :** Which are the vast web of interconnecting local area and wide area networks, telephone lines, cables, fiber optics and satellite links that provide a medium for the transfer of information over the Internet.
2. **Computers and Computing Areas :** which actually receive and process the data which is available for transmission over the network. It can be said that it keeps the components of the communication network well connected with each other. Almost every part of it operates transparently to the users but the same cannot be said about the data used in the business.

Note

It can also be said that communication network is mainly a combination of physical networks which is a means of sending signals from one place to another. It is used as a general set of protocols or standardized "conversational methods". In other words, these protocols allow data to be rationally and easily transmitted from one place to another over a network. CP/IP Transmission Control/Protocol Internet Protocol (TCP/IP: Transmission Control Protocol/Internet Protocol) forms the heart of Internet communication. TCP/IP is commonly known as Language and general rules for communication can be understood as a means in which all parts of the Internet can share and be understood. All computer systems connected to the Internet must be in such a state that they can connect to T.C. communicate in P/IP language or make some arrangement to interpret and translate TCP/IP instructions.A target user needs to know That's not how TCP/IP works. Users can communicate or communicate through their local operating system, such as Windows, DOS, Unix, etc., and the program translates it as per the needs of the users, however the user should remember that TCP / IP is not a normal language deals with only one thing, that is communication. It facilitates a device to establish contact with another device so that data can be transmitted from one place to another. It has nothing to do with the control, specification or standardization of the contents of the data being transmitted. Hence 'What is the Internet?' In answer to this question we can say that Internet is a collection of interconnection of computer networks and a network of networks. At present the Internet is connected to one million different types of computers and the rate of increase in its usage and the number of new paid members is increasing day by day. T.C.P./I. The Internet provides connectivity globally through a network of networks based on the P. and Open Systems Interconnection (OSI: Open Systems Interconnection) protocols. Historically, the Internet was essentially an educational network, but today its commercial use is increasing. So the Internet was essentially an educational network, but today its commercial use is increasing. Therefore, the Internet is no longer just a network of specific classes for communication between research centers, but also the college professionals and libraries of the world can access it. In other words, the Internet provides a gateway to numerous online databases, library catalogs and collections, and software and document archives in addition to e-mail.

In technical parlance, "the Internet is a large, search-enabled, dynamic widely available, distributed multi-platform information system that has many common capabilities. Objectively, most books on looking at the Internet. Scholars feel that this has raised hopes for a wide range of resources (including linear sound and text materials) previously unavailable

Note

to the average library or individual searcher, it is assumed that the searcher has a suitable There is a device, software and Internet connection. In some cases the retrieval process may be slow, or in a particular situation it may be impossible to obtain the desired information because of the high traffic on the system. In other cases, the searcher can quickly retrieve the content of his interest. The Internet can therefore be a very useful system for disseminating library data. It is. But this circumstance cannot automatically solve the problems of the users nor meet their needs.

4.6.5 How Does the Internet Functions

In this section, we will use to know some technical things related to the working of the Internet. It can be said that the way the Internet works is related to a new type of switching mechanism, which is called 'packet switching'. In packet switching technology, a structural approach is used to separate individual messages or information into separate packages.

Each of these packages is communicated independently through the network. In other words, the Internet works by dividing all the information transmitted into packets. These packets not only contain communicable data but also information that indicates where it is to be sent, where it came from and how it is related to the data in other packets. Because these packets are in standard format, and standard methods are used to address them. These can be forwarded from any known Internet address on the network to the next known address until they reach their desired location. Since the Internet has to work with small standard size packets in predetermined ways, the above type of technology proves beneficial in achieving the fastest transmission rates. At the same time, the network is able to make its own decisions to give directions to anyone and can change them dynamically when there is a change in the traffic conditions. Also, there is no direct harmful effect on the target user. The transmission is made efficient and robust over the Internet by splitting the communication into standard data packets.

4.6.6 Client/erver Concept

It can be said here that the key concept in Internet information provisioning is that of client/server architecture. Most of the net-based devices often depend on the underlying source to enable them to function efficiently. It is very important for us to understand how it works, because it directly affects how we search and how we get results. The Client/Server Model is a simple tool. As its name implies, it is structured into two parts, two programs, a client and a server, for each application. The client software is used on a local device, PC (Computer). Server software is run on another device, possibly a mainframe, the parent computer or the server from which

Note

we want to retrieve information. Both the parts of the software working as a co-operative do the application together. Clients in the absence of a server, or servers without a client, may not be able to do any useful work. The software tools for the client/server system always work as a couple and share the workload of computer related tasks.

The server program is responsible for holding the data that may be available and for receiving and returning the data when requested by the client. In other words, it is responsible for the creation of indexes, searches and sometimes for data collection and management. Most importantly, the server provides a means to allow universal access to the data it holds. It waits for the client software to send a request to perform some action and in response to those requests it transmits the replies received by its efforts to it. Thus, the client program is responsible for dealing with the users. It is used locally and acts as an interface between the user and the system, providing information as per the needs of the user. Collects them in a packet and transmits them to the relevant computer server, represented in an agreed language for communication between the client and the server. When the server, with some data | responds, the client then opens the coded content and converts it to be stored as a file for suitable display on the user's computer.

The most important utility of the client/server architecture is that there is no need for continuous communication between the client and the server. They can communicate one by one. There is no need to establish a connection between the client and the server. Using a client server architecture, it is easier for different systems to communicate. In other words, for each task the clients/servers use a common language to communicate with each other the tasks they want to do, as well as to communicate requests and send responses back and forth use iternet protocols.

4.6.7 Internet Connection

It is important to know that connecting to the Internet can be done in a variety of ways. These practices determine how we will be able to act on it. In the second, the manner in which a user is connected to the Internet greatly affects its usefulness.

TCP/I on a LAN server. P. Connection of local area network with internet can be achieved by installing networking software. The Internet can be accessed by a variety of computers connected to a LAN. This includes personal computers based on DOS and Windows, and Unix work stations, etc.

There are basically two modes of connection—full connection or terminal connection. In the case of full connection there is permanent

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telecommunication connectivity and the computer concerned is given a registered Internet name and address. The second type of combination is known as a dial-up combination. In this, the related computer is connected with the original computer with full access to the Internet through a temporary telecommunications link. The third type of connection is called a gateway connection, in which the connection is provided by another network or service provider, such as Compu Serve.

Connections can also be established directly, as done by universities or community bodies, where a computer or network of computers is permanently connected to the Internet by dedicated lines and has its own address or by serial line Internet Protocol (Serial Line) Internet Protocol. Connected directly to a remote computer via (SLIP: Serial Line Internet Protocol) or Point-to-Point Protocol (PPP: Point to Point Protocol). The utility of full connectivity is that you can install any client software on your computer as per your requirement and use all the facilities of the Internet.

On the other hand, if your local computer is connected to the original computer with full connectivity, then in that case your computer only acts as a terminal for the original computer. You only have to log on to the original computer, after that you can access the Internet through the original computer. In this situation, you can take advantage of limited amount of Internet facilities depending on the type of communication between your computer and the original computer. It is a standard today for providing Serial Line Internet Protocol/Point-to-Point Protocol (SLIP/PPP) for commercial basic computers. But in those areas where telecommunication facilities are not sufficiently available and the Internet is still developing, the situation is not like this.

4.6.8 Resources and Services Available by Internet

It can be said that the Internet is a vast, searchable, dynamic, expansive, multi-platform information system filled with a wealth of potential resources. The resources available on the Internet are constantly changing. Therefore, any list without being updated can be undesirable. However, in this section, a brief overview of the types of databases and services is given so that you can become familiar with the resources and services of the Internet. There are different types of uses of the Internet. Some of these are given below :

E-mail : Allowing users to send messages to each other.

News : Informing users about available information :

Remote Login : To allow remote login users to login to remote locations;

FTP (FTP: File Transfer Protocol) : It allows users to access and retrieve files from remote locations.

Note

Services provided at remote locations includes :

1. List serves and discussion communities on a wide variety of topics. Participants get the opportunity to exchange current information and conduct conversations. Some list servers are also of special interest to information professionals;
2. Subjective databases of educational institutions specially specializing in various disciplines;
3. **Community Information :** Various communities are often providing access to information, such as library catalogs, demographic and tourism information, etc., through their public libraries;
4. **Government Resources :** All national and local governments are providing information through their websites;
5. **Library Catalogs :** Majority of the libraries are making their catalogs available through the Internet;
6. Commercial resource commercial information database;
7. **Bulletin Board :** This is the electronic equivalent of newspapers;
8. **Shopping and other commercial transactions :** Many important shopping centers on the Internet.
9. **Document Distribution :** Many large libraries and document distribution services are providing the services of document search and distribution through the Internet.

Many such services provide access to database records or documents.

On the basis of the following characteristics, these types of documents are divided into different categories or collections.

- Collection location
- Format
- Size or length
- Depth of Subjectivity
- Language
- Audience or consumer
- Data type
- Transfer Method
- Subject matter or topic
- Frequency and innovation of updates
- Issuer or exponent

It may be mentioned here that there are many directories of Internet resources available. One of the most valuable directories is the Bulletin Board for Libraries or BUBL. Bubbles is an information service designed to empower library and information science professionals. A wide range of services include directory of resources, user and contemporary content lists and texts of library and information science journals.

Note

4.6.9 Search On Internet

A wide range of databases and services are available on the Internet. It is essential that interfaces are designed to help users find information resources and services available on the Internet, as the process of retrieval on the Internet is a complex and significant problem. This is because the databases created on the net are in a variety of different formats and various search retrieval software packages are installed on different computers to provide access to a subset of databases through different interfaces.

Devices used to search the Internet are often operated in Client / Server Mode - Server Software, which enables the user to search the database installed on multiple computers on the Internet using an intuition arrow be able to obtain. The user's local computer runs the equivalent client software that communicates with the server software and provides concurrent interfaces to the data. In other words, the user does not need to know where the data is stored or how the file storage structure of the server system is organized.

4.7 WWW.

(WWW or W3: World Wide Web) is the multimedia part of the Internet that displays a hypertext type of structure and search facilities. It was first introduced in 1989 at the European Particle Physics Laboratory (CERN) in Switzerland. European Particle Physics Laboratory was developed for document sharing between molecular physicists at the CERN (European Particle Physics Laboratory) laboratory, but the first commercial web software was developed in 1991, which Popularized this form of access to the Internet. The main features of the organization and structure of WWW are :

The set of rules that give tags and formats to documents is called Hyper Text Markup Language (HTML). These are used to organize documents into information blocks (pages).

Each individual document or page is assigned a unique address called a Uniform Resource Locator (URL) (URL: Uniform Resource Locator).

Each URL is connected to other types of hypertext. URL and information sections can also be combined with other URLs with each document.

These documents are searchable by interactive interface programs that allow users to view and navigate through documents. These programs are called web browsers.

Communication between web browsers and web servers is handled by a common language that contains a standardized set of rules called Hyper Text Transfer Protocol (HTTP). is used. H. T. T. P. H. T. M. L. Under

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each web page. symbols to be interpreted to enable proper page display and transfer of files. The client program or web browser provides controls for the user to enable the recovery process and connections.

It should be kept in mind that individuals and organizations present their information or services on the Internet by creating a home page. A collection of home pages located on a single server is called a website. These pages are accessed through the Uniform Resource Locator (URL) (URL: Uniform Resource Locator), using the browser. Some examples of browsers are Linux, Netscape, Explorer etc. These addresses link users to the original computer and their personal files. These files are then displayed on the user's terminal (workspace). with the help of appropriate software, users can read documents, view pictures, listen to sound and retrieve information.

The hypertext structure of the web refers to the retrieval between different web pages through browsing and navigation. In index positions, W.W. W. But the hyperlinks that form the basis for browsing in the network are uncontrolled. Each hyperlink is individually assigned to the H.T.M.L. Coded by the creators of It may be mentioned here that although browsing is not a suitable approach to identify any specific information, the invention of various types of search tools has helped people to search the information from the vast collection of documents in the world done for. These search tools can be divided into two main categories - topic directories and search engines.

4.7.1 Subject Directories

Subject directories are also known as subject guides. Through these, the information of the people under the subject is allowed to be observed. These are hierarchically arranged indexes of different topics which are linked with different websites on each topic. The searcher can browse through the index in search of related topics and click on the specified places representing the related websites. You can get information by entering it. Subject directories are created by indexers. In addition to general topic directories, there are two other directories - specific subject directories and information distribution centers. Storage, which includes providing links to websites in their search directories or links to Web sites for these specific directories. This feature facilitates the placement of specific information on the Internet.

4.7.2 Search Engine

Search engines are designed to help users find relevant terms of information on the Internet. These are based on allowing users to enter a database by selecting key words. These differ from topic directories, in which indexers are used to create an index. Search engines use software programs that

Note

automatically create their own databases that include lists of web pages. Search engines are made up of three different components – (i) a program or robot or crawler called a spider, (ii) a database with indexes, and (iii) a search software spider, moving around the web. travel, slowly crawling from site to site following links between pages. Different types of search engines use different types of spiders while some inspect each possible site, some based on more selective principles. And only inspect popular sites. The first type of spider can search through a large store of information in a short time, while the second type of spider presents only a few pages as a product, possibly with more relevant information. Each page retrieved by Spyder is collected in a database and its contents are indexed automatically from web pages and alphabetically using some of the same principles used as Inverted File, The rows are arranged in descending order from the top. The index, therefore, is a list of each word (except the discarded words) containing a pointer to the location of these words in the database.

Different search engines follow different principles. For example, some index every word on every web page, while other search engines index only the title and top-level phrase on the website. The third component or component of a search engine is. - Search software. It is a program that compares the user's search query (which is typed by keyboard) with the index, finds and finds similar words and sorts them in the order of correspondence. The criteria for determining conformance varies according to the search engines.

The different approaches used by search engines result in completely different results (products) as a result of crawling the web, searching for new pages, and indexing them. Therefore, when a similar topic is searched by different search engines, there are variations in the results obtained. In the way search engines operate, search engines are more oriented to find large volumes of specific information than subject directories. This is because their search is based on web pages and they automatically index editors from sites (instead of a pre-defined index) as subject directories do.

4.7.3 Examples of search engines include

(Alta Vista (http:\ \altavista.digital.com \)]

[Excite (http: \ \ www.excite.com\)]

[Hot Bot (http:\\www.hotbot.com\)]

[Infoseek (http:\\www.infoseek.com\)]

Lycos (http: \\ www.lycos.com\)]

Note

Since different search engines have different capabilities, new search tools have been invented a while back, which enable people to search different databases of search engines simultaneously using the same interface. These tools are called Multi Threaded Search Engine. Although, like individual search engines, not all searches have flexibility, but they are very fast and can search even from a large amount of information. The following are some examples of multi-thread or meta search engines.

(a) Dogpile (http:\\ www.dogpile.com)]

(b) Metacrawler (http:\\ www.metacrawler.com)]

4.7.4 Valuation of Internet Resources

Conducting business (which is providing library service or any other job description) efficiently and effectively through the use of the Internet should be considered as one of its main objectives. What is Internet Information? What facilities and services are required by the employees for their work within an organization and how the Internet can be helpful in their scientific, technical, as well as commercial communication and cooperation, it is very important to evaluate all these.

It has been observed that libraries use Internet resources as users' representative to answer questions, or provide users with exactly the same type of services that direct them to use specific Internet resources. Therefore, it is necessary to evaluate the resources of the Internet.

Although no specific criteria are available for this task, the traditional criteria used to evaluate print work may be useful, to some extent, for evaluating Internet resources. Answers to the following questions may be useful in the process of resource evaluation :

(i) Who is the concerned user? Does he belong to the academic community or to the general public?

(ii) What is the frequency of updates? Is there information about the update?

(iii) To which institution is he affiliated?

(iv) What is the area of expertise of the resource developer? Is there a passage that describes the author/creator of the source?

(v) What is the relationship between resources and other resources on a similar issue? Is there any such link or reference for these related resources?

(vi) Is there any review or evaluation of the site available? What do they tell?

Note

(vii) Whether any permission is required for access, and whether there is any fee for access is taken?

The basic information obtained from the answers to the above questions shows the accessibility of these resources in libraries and their suitability.

4.7.5 Use of Internet Approach in Libraries

Libraries with Internet access can provide the following services to their users :

The users of the library can directly send their messages by e-mail to the basic information related to the functions of the library through the Internet.

New information services, such as linking a home page with electronic text, databases, and other Internet resources.

Access to library facilities in new ways like remote access of catalogs. Interactive home page that provides various features, such as reservation of library materials and inter-library loan and reference queries.

Connecting remote information and establishing links with information sources globally.

Setting up websites on the World Wide Web does not require expensive or sophisticated equipment. The basic components for its configuration may be a computer operating on any operating system used as a server. Computer systems powered by DOS, Windows, and UNIX can be used as servers for the creation of World Wide Web documents. It is not necessary to mention that different types of software are required for this purpose. Some of these are given below :

1. Server software to operate the Server to allow the Client to interact with your Server information;
2. H. T. M. L. Word Processing Software for the Job;
3. Gopher Software for creating images and icons; and
4. Scripting and programming software that allows the extension of the interaction between the client and the server.

The best approach for selecting a library would be to make certain high quality sources easily available to the users through their high potential interest and interface. Exploring Internet resources and conducting workshops for users to develop their skills to identify, evaluate and select resources relevant to their interest.

4.8 Consortia Meaning, Definition & Development

Information has been communicated from one person to another from the earliest stages of human civilization. Considered an important resource

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for dissemination. It is the basis of education and an important element for new ideas. Information exchange or information sharing is the way of cooperation. The mode of collaboration has changed from print based environment to digital environment with the spread of new information technology. Collaboration between resources to share their library resources has been practiced for decades.

4.8.1 Concept of Consortia

The concept of federation probably evolved from the concept of co-operation, co-ordination and co-operation. The word consortia is derived from the Latin word 'concor' where congress together denotes the meaning and 'dissociation denotes association or society'. Published literature suggests that the concept is not new and refers to collaboration, coordination and collaboration between libraries for the purpose of sharing information resources. A federation can be described as those organizations that come together to fulfill a common objective, which requires co-operation or sharing of resources. The consortia consists of a wide, limited structure, full time staff and executive director web pages, policies, etc. They began to include other types of organizations as well as libraries, museums, hospitals, research groups, and historical societies. Huh. Working in consortia and subscribing to multiple resources also implies the ability to upgrade and adapt to new equipment and technology.

The exact date of the introduction of the word consortia is unclear but the meaning of consortia as being a federation or partnership has long been a doctrine of librarianship. A library consortium is a grouping of two or more libraries that have agreed together to collaborate with each other to meet some common needs. It is not about sharing resources, but also improving access to information. A consortium is a community that has formally agreed to co-ordinate or consolidate certain functions of a cooperative to achieve its objectives.

4.8.2 Functions of Consortia

1. Acts as the nodal agency for promoting collaboration among the participating institutions.
2. It coordinates all activities related to subscription to e-resources.
3. To review the progress of the Consortium at various stages and undertakes to review the progress on other issues.
4. The Union organizes annual meetings of the members.
5. Provides access to electronic resources and integrates them into the library program.

Note

6. Bridging the gap between resource-rich and information resource-deficient libraries.

Conclusion

In this chapter, we have learned the meaning of database and also know how many types of databases are there. In addition, we also studied consortia in depth. Also know about the Internet and also studied the services provided by the Internet in depth.

Important Terms

- In the context of library and information science, a collection of documents which are referred for bibliographic details is called a database.
- Internet is originated from a network called EarthNet developed by the Advanced Research Projects Agency in 1970.
- Internet e-mail, news, remote-login f. It also provides services like TP etc.
- Consortia consists of broad limited structure, full time staff, executive director Deb Page, policies etc.

Exercises

Very Short Answer Type Questions

1. What is a database?
2. Define Internet.
3. Define consortia.

Short Answer Type Questions

1. How many types of databases are there? Briefly describe.
2. Briefly describe the evaluation of Internet resources.

Long Answer Type Questions

1. What is Internet Describing the services of Internet, describe in detail the use of Internet in the library.
2. Defining database, describe different types of databases and their uses.

UNIT 5

Note

Activities of Research Institution

In this chapter, we will study the functioning of research institutions as well as the role of library and information research science in India and how it was developing in India.

5.1 Introduction

During recent times, considerable research activities have been carried out in universities and research institutes in different parts of the world. Due to the establishment and active support of University Grants Commission, AICTE and other similar bodies in India many students are taking care of it.

During the pre-independence period, there were only a few doctoral degree holders, but after independence there was a huge increase in research output in every field. There are about 125 universities and research institutes in India offering PhD programs in library and information science. To analyze the research productivity of various universities in India keeping in view the available data.

5.2 LIS Education in India

Library and Information Science (LIS) education in India began in 1911 with the introduction of a training course in the erstwhile state of Baroda. The real beginning of system education at LIS was initiated by Dr. S.R. Ranganathan during the period 1926-1931 in the Library of Madras University with the Madras Library Association. The summer school led to the Certificate in Library Science, which the University of Madras continued until 1937 under the leadership of Dr. SR Ranganathan. Later Andhra University, Banaras Hindu University, Bombay University, Calcutta University and Delhi University started postgraduate diploma courses in library.

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During 1947, a total of 27 universities offered diploma courses in library science.

In 1957, for the first time in the country, Aligarh Muslim University started BLSC. Courses offered at different levels like Certificate, Diploma, Bachelor PGs, PG Diploma, Master's and Research degree programs i.e. M Phil and Phd under different mode (regular / on campus or distance / on campus or under some) Is performed. Both timing and plans. (annual or semester). The development of universities was ensured after independent India.

Improving the quality of teaching. It is because of the importance of libraries in various institutions, research centers and government departments, the demand for libraries has also increased. It really gave a boost to library science education in India.

5.3 Research in Library and Information Science

In the past research into LIS was primarily considered to provide a theoretical basis for professional practice. The roots of research in the LIS profession are not very deep. Library science research during the twentieth century can be traced to the Library School of the University of Chicago in the mid-1920s on the grounds of the LIS. The visionary efforts of the Chicago School bore fruit in abundance and provided leadership to the world in library science research (Shera 1976, 145). Due to social pressure, as well as motivation, the pace of library research is increasing everywhere today. Programs in our profession, it is insisted that if librarianship aspires to become a profession, it must rely on research to develop its knowledge base and its theoretical framework.

The credit for formal institution of doctoral degree program in library science in India does not go to Dr. SR Ranganathan (1892–1972). In 1951 he did library science at the University of Delhi. which led to many hardships and personal ridicule. The Delhi University gave the book to D B Krishna Rao in 1957. Awarded the first P.hD degree in Rhythmology, who worked on articulated classifications for agriculture. In 1955 and 1965, when Ranganathan shook the soil of Delhi with his feet, the scope of doctoral research continued. In the 1960s and 1970s, some doctorates on library-related subjects were earned by library professionals under the guidance and supervision of the respective faculties in subjects such as sociology. History, Law, Economics, Management and the like. The mantra of reviving and advancing doctoral research facilities was assumed by JS Sharma (1924–1993), the then University Librarian and Head of the Department of Library Science, Panjab University, Chandigarh. Under his guidance the second lawful Ph.D. Library Science | Awarded in 1977 after a gap of two

Note

full decades. After that, looked back. Many universities followed, mostly with individual effort and enthusiasm. Doctorol Mudkar Nahi Research received a fillip in the 1980s and facilities in India gradually improved to maintain its third world leadership in library research and library literature. PHD. Thereafter programs were organized even after lack of facilities or adherence to standards (Mushroom MP 1999).

5.4 Research Strategies in LIS

Surveys of Research Methods

LIS is a very broad discipline which uses a wide range of contantly evoluing research strategies and techniques. Various classification schems have been developed to analyze methods employed in LIS research. In 1996 kim synthesized previous categories, definitions and introduced a list of research strategies including data collection and analysis methods. The listing four journal strategies are—(i) theoretical/philosophical inequirey (ii) bibliographic research (iii) Development of storage and retrieval systems (iv) action research. Strategies are divided into quantitative and qualitative driven. Quantitative driven strategies are included descriptive studies, predictive studies, bibliometric studies, content analysis and operation research studies. Quantitative driven strategies are considered the following : Case study, bibliographical method, historical method, grounded theory etc.

Systematic studies of research methods in LIS started in the 1980s and several reviews literature have been conducted over the past years to analyze to pics, methodlogies and quality of research. One of the earliest studies was done by Peritz who carried out a bibliometric analysis of the articles publised in 39 core LIS journals between 1950 and 1975. She examined the methodlogies used the type of library and information service activities, a wide spread use of the survey methodology, a considerable increase in theoretical studies after 1965.

So, the literature shows a continued interest in the analysis of published LIS research. Approaches include focusing on particular publication years, geographic areas journal titles, aspects of LIS and specific characteristic such as subjects, authorship and research methods. Despite the abundance of content analysis of LIS literature, the findings are not easily comparable due to differences in the number and titles of journals examined, in the types of papers selected for analysis, in the periods covered and in classification schemes developed by the authors to categarize article topic and research strategies. Despite the differences, some findings are consistent among all studies :

Note

1. Data analysis is usually limited to descriptive statistics, including frequencies, means and standard diviations.
2. Over the years, there has been a considerable increase in the array of research approaches used to explore library issues.
3. Descriptive research methodologies based on surveys and questionaires predominate
4. Information seeking information retrieval, library and information service activities are among the most common subjects studied.

5.5 Data Collection and Analysis

Articles which had been published in the year 2011 were obtained from the following journals : Journal of Academic librarianship, information processing and management journal of Documentation, college and research libraries, library and information science research. These titles had been selected as data sources because they had the highest 5-years impact factor of the journals classified in which's serials. Directary under the "library and information science." subject heading. Only full length articles were collected from the journals. Each article was classified as either research or theoretical. Articles which employed specific research methodology and presented specific findings of original studies performed by the author were considered research articles. Articles reporting research in system design or evoluation in the information systems field were also regarded as research articles. Each article was classified into a topical category according to its main subject. The articles classified as research were then further explored and analyzed to identify (i) research approach (ii) research methodology (iii) method of data analysis.

The final list of the analysis codes was extracted inductively from the data itself. Research approaches are plans and procedures for research. Research approaches grouped as qualitative and mixed method studies.

Research methodologies or strategies of inquiry are types of research models which provide specific direction for procedures in a research design and inform the decisions concering data collection and analysis. The methodology classification included 12 categories. Each article was classified into one category for the variable research methodology. Methods of data analysis refer to the techniques used by the researchers to explore the original data and answer their research problems or questions. The array of data analysis methods included. The array of data analysis methods included the following categories :

1. Experimetnal Evoluation

Note

2. Qualitative Data Analysis
3. Inferential Statistics
4. Descriptive Statistics
5. Other Methods.

The experimental evolution was used for system and software analysis and design studies which assesses the newly developed algorithm tool, method etc. by performing experiments on selected datesheets. Descriptive statistics are used to describe the basic features of data in a study. Infurential statistics investigate questions, models and hypotheses. Qualitative data analysis is the range of processes and procedures used for the exploration of qualitative data from coding and descriptive analysis to identification of patterns and themes.

5.6 Research Approach and Methodology

Research articles were coded as quantitative, qualitative or mixed methods studies. An overwhelming majority of the empirical research articles employed a quantitative research approach.

Table 1 prsents the distribution of research approaches over the five most famous topics. The quantitative approach clearly previals in all topics. However, qualitative design seem to gain acceptance in all topic, while in information behaviour research, quantative and qualitative approaches are most evenly distributed.

Topics	Mixed methods	Quantitative	Quantitative
Information retrieval	0.0%	0.0%	100%
Library Services	3.6%	39.3%	57.1%
Information Behaviour	14.0%	40.4%	45.6%
Organization and Management	4.8%	23.8%	71.4%
Information Behaviour	14.0%	40.4%	45.6%

The most frequently used research strategy was survey, accounting for almsot 37.1 of all research articles followed by system and software analysis and design. This result is influenced by the fact that information processing and management addresses issues at the intersection between LIS and computer science and the majority of its articles presents the development of new tools, algorithms, method and systems and their experimental evaluation.

Note

Research Methodology

1.	Survey	37.0%
2.	System and software analysis	26.8%
3.	Content analysis	9.6%
4.	Bibliometrics	6.4%
5.	Case study	4.4%
6.	Experiment	4.4%
7.	Secondary data analysis	4.4%
8.	Grounded theory	2.6%
9.	Phenomenological	2.0%
10.	Ethnography	1.5%
11.	Action research	0.6%
12.	Mathematical method	0.3%
	Total	100.0%

So, LIS researches employ a large number and wide variety of research methodologies. Each research approach, strategy and method has its advantages and limitations. If the aim of the study is to confirm hypotheses about measure and analyze the casual relationship between variables, then quantitative methods might be used. Mixed methods used in LIS research papers could be analyzed in future studies in order to identify in which stages of a study data collection, data analysis and data interepretation the mixed was applied and to reveal the types of mixing.

Exercises

Very Short Answer Type Questions

1. What do you understand by Library and Information Research Science in India?
2. Describe the purpose of study in information research science.

Short Answer Type Questions

1. Briefly describe the methodology of research in library and information science?
2. Briefly describe data analysis and interpretation.

Long Answer Type Questions

1. Write a detailed note on Library and Information Science Research in India.