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Print and Electronic Sources and Literature in Natural Sciences

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Dr. Deepmala

DIRECTORATE OF DISTANCE AND ONLINE EDUCATION

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CONTENT

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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

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

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.

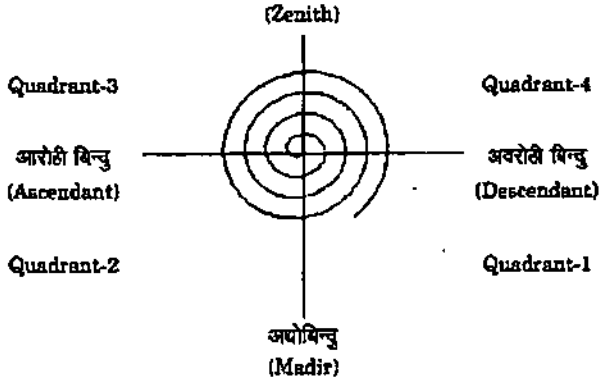
After collecting the facts in this way, their editing, classification, categorization and notation. They are then tabulated and then analyzed and interpreted.

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

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.

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

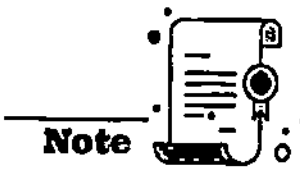
There are mainly two methods under the logical method, Deductive and Inductive.

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.



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.

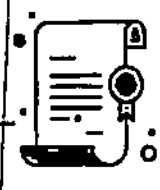
Note

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).

Note

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

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

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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.

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.

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(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

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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:

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.

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 :

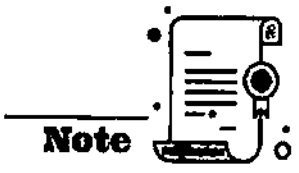
1. To understand the psychology of users to find information.
2. There is a need to know the user attitude for the creation of library and information products and services.
3. Users not only think in different ways, but their way of working is also different. Knowing this the services can be scheduled 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



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.