

LESSON 1

Meaning of Research

Objectives

- To know the meaning of research.
- To understand the purpose of research.

Structure

Meaning of Research.

Purpose of Research.

1.3. Meaning of Research

Scientific Research is systematic and objective attempt to provide answers to certain questions. Research in common parlance refers to a search for knowledge. One can also define research as a scientific and systematic search for pertinent information on a specific topic. In fact, research is an art of scientific investigation. The Advanced Learner's Dictionary of Current English lays down the meaning of research as "a careful investigation or inquiry specially through search for new facts in any branch of knowledge." Redman and Mory define research as a "systematized effort to gain new knowledge." Some people consider research as a movement, a movement from the known to the unknown. It is actually a voyage of discovery. We all possess the vital instinct of inquisitiveness for, when the unknown confronts us, we wonder and our inquisitiveness makes us probe and attain full and fuller understanding of the unknown. This inquisitiveness is the mother of all knowledge

and the method, which humans employ for obtaining the knowledge of whatever the unknown, can be termed as research.

Research is an academic activity and as such the term should be used in a technical sense. According to Clifford Woody research comprises defining and redefining problems, formulating hypothesis or suggested solutions; collecting, organizing and evaluating data; making deductions and reaching conclusions; and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis. D. Slesinger and M. Stephenson in the Encyclopaedia of Social Sciences define research as “the manipulation of things, concepts or symbols for the purpose of generalizing to extend, correct or verify knowledge, whether that knowledge aids in construction of theory or in the practice of an art.” Research is, thus, an original contribution to the existing stock of knowledge making for its advancement. It is the pursuit of truth with the help of study, observation, comparison and experiment. In short, the search for knowledge through objective and systematic method of finding a solution to a problem is research. The systematic approach concerning generalization and the formulation of a theory is also research. As such the term ‘research’ refers to the systematic method consisting of enunciating the problem, formulating a hypothesis, collecting the facts or data, analyzing the facts and reaching certain conclusions either in the form of solution(s) towards the concerned problem or in certain generalizations for some theoretical formulation.

1.4. Purpose of Research

The purpose of scientific research is to discover and develop an organized body of knowledge. Therefore, scientific research may be defined as the systematic and empirical analysis

and recording of controlled observation, which may lead to the development of theories, concepts, generalizations and principles, resulting in prediction and control of those activities that may have some cause-effect relationship. The purpose of research is therefore, to discover answers to questions through the application of scientific procedures. The main aim of research is to find out the truth, which is hidden and which has not been discovered as yet. Though each research study has its own specific purpose, we may think of research objectives as falling into a number of following broad groupings.

- To gain familiarity with a phenomenon or to achieve new insights into it (studies with this object in view are termed as exploratory or formulative research studies);
- To portray accurately the characteristics of a particular individual, situation or a group (studies with this object in view are known as descriptive research studies);
- To test a hypothesis of a causal relationship between variables (such studies are known as hypothesis-testing research studies).

In order to elaborate the above view, some of the characteristics of systematic research are presented below:

- Research is always directed towards the solution of a problem. In other words, in research, the researcher always tries to answer a question or to relate two or more variables under study.
- Research is always based upon empirical or observable evidence. The researcher rejects those principles or revelations, which are subjective and accepts only those revelations, or principles, which can be objectively observed.
- Research involves precise observation and accurate description. The researcher selects reliable and valid instruments to be used in the collection of data and uses some statistical measures for accurate description of the results obtained.

- Research gives emphasis to the development of theories, principles and generalizations, which are very helpful in accurate prediction regarding the variables under study. On the basis of the sample observed and studied, the researcher tries to make sound generalizations regarding the whole population. Thus, research goes beyond immediate situations, objects or groups being investigated by formulating a generalization or theory about these factors.
- Research is characterized by systematic, objective and logical procedures. The researcher tries to eliminate his bias and makes every possible effort to ensure objectivity in the methods employed, data collected and conclusions reached. He frames an objective and scientific design for the smooth conduct of his research. He also makes a logical examination of the procedures employed in conducting his research work so that he may be able to check the validity of the conclusions drawn.
- Research is marked by patience, courage and unhurried activities. Whenever the researcher is confronted with difficult questions, he must not answer them hurriedly. He must have patience and courage to think over the problem and find out the correct solution.
- Research requires that the researcher has full expertise of the problem being studied. He must know all the relevant facts regarding the problem and must review the important literature associated with the problem. He must also be aware of sophisticated statistical methods of analyzing the obtained data.
- Research is replicable. The designs, procedures and results of scientific research should be replicable so that any person other than the researcher himself may assess their validity. Thus, one researcher may use or transit the results obtained by another researcher. Thus, the procedures and results of the research are replicable as well as transmittable.

- Finally, research requires skill of writing and reproducing the report. The researcher must know how to write the report of his research. He must write the problem in unambiguous terms; he must define complex terminology, if any; he must formulate a clear-cut design and procedures for conducting research; he must present the tabulation of the result in an objective manner so also the summary and conclusion with scholarly caution.

1.5. Summary

One can define research as a scientific and systematic search for pertinent information on a specific topic. The term ‘research’ refers to the systematic method consisting of enunciating the problem, formulating a hypothesis, collecting the facts or data, analyzing the facts and reaching certain conclusions either in the form of solution(s) towards the concerned problem or in certain generalizations for some theoretical formulation. The purpose of scientific research is to discover and develop an organized body of knowledge. To gain familiarity with a phenomenon, to portray accurately the characteristics of a particular individual, situation or a group, to test a hypothesis of a causal relationship between variables are the main aims of research.

1.6. Technical Terms

Descriptive research – is research to portray accurately the characteristics of a particular individual, situation or a group.

Exploratory research – is research to gain familiarity with a phenomenon.

Hypothesis-testing research – is research to test a causal relationship between variables.

Research – is a systematic search for scientific knowledge.

1.7. References

Kothari, C.R. (1985). Research Methodology: Methods and Techniques. New Delhi: New Age International.

Singh, A.K. (1997). Tests, Measurements and Research Methods in Behavioural Sciences. Patna: Bharati Bhawan.

1.8. Model Questions

- 1.8.1. What do you understand by the term Research?
- 1.8.2. What are the aims of research?
- 1.8.3. Describe the purposes of research.

2. Types of Research

2.1. Objectives

To know about the various types of research – basic, applied and action research.

To understand the significance of research.

To be aware of the criteria of good research.

2.2. Structure

2.2.1. Types of research – Basic, Applied and Action Research.

2.2.2. Significance of research.

2.2.3. Criteria of good research.

2.3. Types of Research

2.3.1. Basic Research

Scientists in all fields distinguish between basic and applied research. Basic research is mainly concerned with generalizations and with the formulation of a theory. Gathering knowledge for knowledge's sake is termed pure or basic research. Research concerning some natural phenomenon or relating to pure mathematics are examples of basic research. Similarly, research studies, concerning human behaviour carried on with a view to make generalizations about human behaviour, are also examples of basic research. Basic research is directed towards finding information that has a broad base of application and thus, adds to the already existing organized body of scientific knowledge.

Basic research thereby refers to study and research on pure science that is meant to increase our scientific knowledge base. This type of research is often purely theoretical with the intent of increasing our understanding of certain phenomena or behavior but does not seek to solve or treat these problems. Basic research in psychology tends to focus on fundamental questions about people and their thoughts, feelings, and behaviors. Where does an individual's personality come from? What causes us to fall in love, hate our neighbor, or join with others to clean our neighborhoods? How are the psychologies of being male and female similar, how are they different, and why? How does culture shape who we become and how we interact with one another? Questions such as these aim at the very heart of human nature.

2.3.2. Applied Research

Applied research refers to scientific study and research that seeks to solve practical problems. Applied research aims at finding a solution for an immediate problem facing a society or an industrial/business organization. Applied research is used to find solutions to everyday problems, cure illness, and develop innovative technologies. Psychologists working in human factors or industrial/organizational fields often do this type of research.

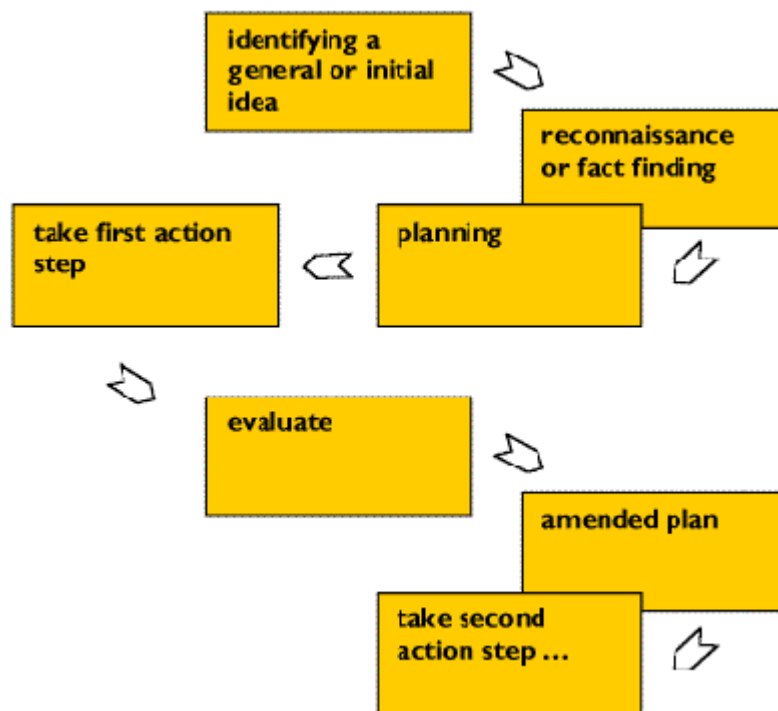
Applied research in psychology focuses on more narrow arenas of human life, such as health, business, and law. By employing the lessons learned from basic research, and by searching for insights specific to particular domains, applied research often seeks to enhance the quality of our everyday lives. Personality and social psychologists contribute to areas as diverse as health, business, law, the environment, education, and

politics. Research to identify social, economic, or political trends that may affect a particular institution or the market research or evaluation research are examples of applied research. Thus, the central aim of applied research is to discover a solution for some pressing practical problem. For example, personality and social psychologists have designed, implemented, and evaluated programs to help employers hire and train better workers; to make it easier for people with cancer to cope successfully with their challenge; to increase the likelihood that people will reduce pollution by relying on public transportation; to reduce prejudices and intergroup conflict in the classroom and in international negotiations; to make computers and other technologies more user-friendly; and to make many other societal contributions as well. Of course, the distinction between basic and applied research is often a fuzzy one. One can certainly perform basic research in applied domains, and the findings from each type of research enrich the other.

2.3.3. Action Research

Action research can be described as a family of research methodologies, which pursue action (or change) and research (or understanding) at the same time. In most of its forms it does this by using a cyclic or spiral process, which alternates between action and critical reflection and in the later cycles, continuously refining methods, data and interpretation in the light of the understanding developed in the earlier cycles. It is thus an emergent process, which takes shape as understanding increases; it is an iterative process, which converges towards a better understanding of what happens. In most of its forms it is also participative (among other reasons, change is usually easier to achieve when those affected by the change are involved) and qualitative.

Kurt Lewin is credited as the person who coined the term action research. His approach involves a spiral of steps, 'each of which is composed of a circle of planning, action and fact-finding about the result of the action. The basic cycle involves the following:



The first step then is to examine the idea carefully in the light of the means available. Frequently more fact-finding about the situation is required. If this first period of planning is successful, two items emerge: namely, "an overall plan" of how to reach the objective and secondly, a decision in regard to the first step of action. Usually this planning has also somewhat modified the original idea. The next step is 'composed of a circle of planning, executing, and reconnaissance or fact finding for the purpose of evaluating the results of the second step, and preparing the rational basis for planning the third step, and for perhaps modifying again the overall plan. What we can see here is an approach to research that is oriented to problem solving in social and organizational settings.

2.4. Significance of Research

Research is important for social scientists in studying social relationships and in seeking answers to various social problems. It provides the intellectual satisfaction of knowing a few things just for the sake of knowledge and also has practical utility for the social scientists to know for the sake of being able to do something better or in a more efficient manner. Research in social sciences is concerned both with knowledge for its own sake and with knowledge for what it can contribute to practical concerns. This double emphasis is perhaps especially appropriate in the case of social science. On the one hand, its responsibility as a science is to develop a body of principles that make possible the understanding and prediction of the whole range of human interactions. On the other hand, because of its social orientation, it is increasingly being looked to for practical guidance in solving immediate problems of human relations.

In addition, the significance of research can also be understood keeping in view the following points:

- To those students who are to write a master's or a Ph.D. thesis, research may mean careerism or a way to attain a high position in the social structure.
- To professionals in research methodology, research may mean a source of livelihood.
- To philosophers and thinkers, research may mean the outlet for new ideas and insights.
- To literary men and women, research may mean development of new styles and creative work.

- To analysts and intellectuals, research may mean the generalizations of new theories.

Thus, research is the fountain of knowledge for the sake of knowledge and an important source of providing guidelines for solving different social problems. It is a sort of formal training, which enables one to understand the new developments in one's field in a better way.

2.5. Criteria of Good Research

Whatever may be the type of research, one thing that is important is that they all meet on the common ground of scientific method. One expects scientific research to satisfy the following criteria:

- The purpose of the research should be clearly defined and common concepts be used.
- The research procedure used should be described in sufficient detail to permit another researcher to repeat the research for further advancement, keeping the continuity of what has already been attained.
- The procedural design of the research should be carefully planned to yield results that are as objective as possible.
- The researcher should report with complete frankness, flaws in procedural design and estimate their effects upon the findings.
- The analysis of data should be sufficiently adequate to reveal its significance and the methods of analysis used should be appropriate. The validity and reliability of the data should be checked carefully.

- Conclusions should be confined to those justified by the data of the research and limited to those for which the data provide an adequate basis.
- Greater confidence in research is warranted if the researcher is experienced has a good reputation in research and is a person of integrity.

In other words, we can state the qualities of a good research as under:

Good research is systematic – It means that research is structured with specified steps to be taken in a specified sequence in accordance with the well-defined set of rules. Systematic characteristic of the research does not rule out creative thinking but it certainly does reject the use of guessing and intuition in arriving at conclusions.

Good research is logical – This implies that research is guided by the rules of logical reasoning and the logical process of induction and deduction are of great value in carrying out research. Induction is the process of reasoning from a part to the whole whereas deduction is the process of reasoning from some premise to a conclusion, which follows from that very premise. In fact, logical reasoning makes research more meaningful in the context of decision-making.

Good research is empirical – It implies that research is related basically to one or more aspects of a real situation and deals with concrete data that provides a basis for external validity to research results.

Good research is replicable – This characteristic allows research results to be verified by replicating the study and thereby building a sound basis for decisions.

2.6. Summary

Scientists in all fields distinguish between basic and applied research. Basic research is mainly concerned with generalizations and with the formulation of a theory. Applied research refers to scientific study and research that seeks to solve practical problems. There is also action research, which can be described as a family of research methodologies, which pursue action (or change) and research (or understanding) at the same time. Research is important for social scientists in studying social relationships and in seeking answers to various social problems. Whatever may be the type of research, one thing that is important is that they all meet on the common ground of scientific method. One expects scientific research to satisfy certain criteria. Good research should be systematic, logical, empirical and replicable.

2.7. Technical Terms

Action research can be described as a family of research methodologies, which pursue action (or change) and research (or understanding) at the same time.

Applied research refers to scientific study and research that seeks to solve practical problems.

Basic research - refers to study and research on pure science that is meant to increase our scientific knowledge base.

2.8. References

Kothari, C.R. (1985). *Research Methodology. Methods & Techniques*. New Delhi: New Age.

2.9. Model Questions

2.9.1. Distinguish between Basic and Applied Research.

2.9.2. How is action research different from basic and applied research?

2.9.3. How is research significant in advancing knowledge?

2.9.4. What are the criteria of good research?

LESSON 3

Steps in the Research Process

3.1. Objectives

- To become aware of the steps involved in the research process.
- To understand problem formulation.
- To know the method of setting research objectives.
- To understand the formulation of hypotheses.

3.2. Structure

3.2.1. Problem formulation

3.2.2. Setting research objectives

3.2.3. Formulating Hypotheses

3.3. Problem Formulation

The first step in conducting research is to identify the problem. The researcher must discover a suitable problem and define it operationally. A problem is defined as that interrogative statement, which shows a relationship between two or more variables in an unambiguous manner.

A problem has several other characteristics, which become the relevant considerations in choosing a scientific problem. For identifying a good solvable problem, the investigator undertakes the review of the literature. A body of prior work related to a research problem is referred to as literature. Scientific research includes a review of the relevant literature. When a researcher reviews the previous researches in related fields, he becomes familiar with several knowns and unknowns. Therefore, one obvious advantage of review of the literature is that it

helps to eliminate duplication of what has already been done and provides fertile guidance and suggestions for further research.

The purpose of review of literature is fourfold. First, it gives an idea about the variables, which have been found to be conceptually and practically important or unimportant in the related field. Thus, the review of literature helps in discovering and selecting variables relevant for the given study. Second, the review of literature provides an estimate of the previous work done. This has a twofold advantage – it avoids unnecessary duplication of previous work and provides an opportunity for the meaningful extension of the previous work. As we know, many researches in the social science are concluded with a suggestion for further exploration. Only after the review of literature this fact can be known. Third, a review of literature helps the researcher in synthesizing the expanding and growing body of knowledge. This facilitates in drawing useful conclusions regarding the variables under study and provides a meaningful way for their subsequent applications. Fourth, a review of literature also helps in redefining the variables and determining the meanings and relationships among them so that the researcher can build up a case as well as a context for further investigation that has merit and applicability.

There are several important characteristics of a problem statement:

- A problem statement is written clearly and unambiguously, usually in a question form.
- A problem statement expresses the relationship between two or more than two variables. This kind of problem, which expresses the relationship between two or more variables, permits the investigator to manipulate one of these variables and to examine its effect upon the other variable. Such a problem is completely different from a problem in a descriptive study, where the investigator cannot manipulate a variable rather he simply observes or counts the occurrence of a particular variable.
- A problem statement should be testable by empirical methods. In other words, a problem statement should be such that it should be tested through the collection of data. A

problem statement, in which the stated relationship between variables cannot be tested, is not a scientific problem.

- A problem statement should avoid moral or ethical judgments simply because such statements are very difficult to study.
- The problem should be of sufficient importance. In other words, the problem should not be too trivial, or too expensive in terms of time, money and effort otherwise the investigator will not be able to furnish any answer immediately or even in the near future.
- Problems can be general or specific. Scientifically, a too general or broad problem is quite useless because it cannot be tested. Therefore, the problem must be reduced to a workable size or it must be specific. But a problem should not be too specific. A too specific problem is a trivial problem.

3.4. Setting research objectives

After formulating the research problem and an extensive review of literature, the researcher should state in clear terms the objectives of research. The manner in which research objectives are developed is particularly important since they provide the focal point for research. They also affect the manner in which tests must be conducted in the analysis of data and indirectly the quality of data, which is required for the analysis. In most types of research, the setting of objectives plays an important role. Objectives should be very specific and limited to the piece of research in hand. The role of research objectives is to guide the researcher by delimiting the area of research and to keep the researcher on the right track. Objectives sharpen the researcher's thinking and focuses attention on the more important facets of the problem. They also indicate the type of data required and the type of methods of data analysis that need to be used.

Researchers can use the following approaches in setting research objectives.

- Discussions with colleagues and experts about the problem, its origin and the objectives in seeking a solution.
- Examination of data and records, if available, concerning the problem for possible trends, peculiarities and other clues
- Review of similar studies in the area or of the studies on similar problems and
- Exploratory personal investigation, which involves original field interviews on a limited scale with interested parties and individuals with a view to secure greater insight into the practical aspects of the problem.

Thus, objectives arise as a result of a-priori thinking about the subject, examination of the available data and material including related studies and the counsel of experts and interested parties. Working hypotheses are more useful when stated in precise and clearly defined terms.

3.5. Formulation of Hypothesis

It is difficult to tell precisely how a scientist formulates a hypothesis because the process of formulation itself is vague and idiosyncratic. Goode & Hatt (1952) have pointed out three major possible difficulties in formulation of a good research hypothesis. First, the absence of knowledge of a theoretical framework is a major difficulty in formulating a good research hypothesis. If detailed theoretical evidences are not available or if the investigator is not aware of the availability of those theoretical evidences, a research hypothesis cannot be formulated. Second, when the investigator lacks the ability to utilize the knowledge of the theoretical framework, a hypothesis cannot be formulated. Third, when the investigator is not aware of the important scientific research techniques, he will not be able to frame a good research hypothesis.

Despite these difficulties, the investigator attempts in his research to formulate a hypothesis. Usually the hypothesis is derived from the problem statement. The hypothesis should be formulated in a positive and substantive form before data are collected. In some cases

additional hypothesis may be formulated after data have been collected, but they should be tested on a new set of data and not on the old set which has suggested it. The formulation of a hypothesis is a creative task and involves a lot of thinking, imagination and the like. Reichenbach (1938) has made a distinction between the two processes found commonly in any hypothesis formulation task. One is the context of discovery and another is the context of justification. The manner or the process through which a scientist arrives at a hypothesis illustrates the context of discovery and the presentation of evidence or proof in support of the truth of the hypothesis illustrates the context of justification.

A scientist is concerned more with the context of justification in the development of a hypothesis. He never puts his ideas or thoughts as they nakedly occur in the formulation of a hypothesis. Rather, he logically reconstructs his ideas and thoughts and draws some justifiable inferences from those ideas and thoughts. He never cares to relate how he actually arrived at a hypothesis. He usually arrives at a hypothesis by the rational reconstruction of thoughts. When a scientist reconstructs his thoughts and communicates them in the form of a hypothesis to others, he uses the context of justification. When he arrives at a hypothesis, he extensively as well as intensively surveys a mass of data, abstracts them, tries to find out similarities among the abstracted data and finally makes a generalization or deduces a proposition in the form of a hypothesis.

3.6. Summary

The first step in conducting research is to identify the problem. For identifying a good solvable problem, the investigator undertakes the review of the literature. After formulating the research problem and an extensive review of literature, the researcher should state in clear terms the objectives of research. Hypotheses are then formulated. Usually the hypothesis is derived from the problem statement. The hypothesis should be formulated in a positive and

substantive form before data are collected. In some cases additional hypothesis may be formulated after data have been collected, but they should be tested on a new set of data and not on the old set which has suggested it. When the researcher arrives at a hypothesis, he extensively as well as intensively surveys a mass of data, abstracts them, tries to find out similarities among the abstracted data and finally makes a generalization or deduces a proposition in the form of a hypothesis.

3.7. Technical Terms

Hypothesis – It is a tentative, testable solution to the research problem at hand, which can be proved or disproved.

Literature - A body of prior work related to a research problem.

Objectives – are statements, which guide the researcher by delimiting the area of research

Problem – It is that interrogative statement, which shows a relationship between two or more variables in an unambiguous manner.

3.8. References

Kothari, C.R. (1985). Research Methodology. Methods & Techniques. New Delhi: New Age.

3.9. Model Questions

3.9.1. How are research problems identified and formulated by the researchers?

3.9.2. How important is setting of research objectives?

3.9.3. What is a hypothesis? How are hypotheses formulated in research?

LESSON 4

Research Design

4.1. Objectives

- To know the methods of research design
- To have an idea of the historical method
- To understand the normative method
- To also know about the exploratory method
- To have an idea of the descriptive method
- To understand the experimental method

4.2. Structure

4.2.1. Historical method

4.2.2. Normative method

4.2.3. Exploratory method

4.2.4. Descriptive method

4.2.5. Experimental method

4.3. Historical Method

This is the systematic collection and evaluation of data to describe, explain and thereby understand actions or events that occurred sometimes in the past. The uniqueness of the method is that its focus is strictly on the past. This is accomplished by perusing documents on some aspect of that period, by examining relics or by interviewing individuals who lived during that time. On the basis of that, an attempt is made to reconstruct what happened during that time as completely

and as accurately as possible. Then, an attempt is made to explain why it happened. However, this cannot be fully accomplished because the information is often incomplete.

Historical research involves four important steps: defining the problem, locating the relevant sources of historical information, summarizing and evaluating these information and presenting and interpreting this information in relation to the problem.

Like any research problem, the historical research problem should also be clearly and concisely stated as well as manageable. It should also have a defensible rationale and investigate a hypothesized relationship among variables. The search for sources begins after the problem is decided upon. Every object can be a potential source of information. Generally historical source material can be classified into four basic categories: documents, numerical records, oral statements and records and relics. Documents refer to any kind of information that exists in some type of written or printed form. Numerical records are any type of numerical data in printed form. Examples include test scores and the like. Statements made orally by people is another source. Stories, myths, tales and songs are examples of oral statements. Oral interviews also known as oral history too are conducted. Relics are also valuable sources. A relic is any object whose physical or visual characteristics can provide some information about the past.

The source can also be classified into primary and secondary sources. The former is one prepared by an individual who was a participant in or a direct witness to the event being described. Reporting the results of an experiment directly carried out by a researcher is an example of primary source. A secondary source is a document prepared by an individual who was not a direct witness to an event, but also obtained her/his description of the event from someone else. The person is one step removed from the event.

4.4. Normative Method

The target of normative research is to improve the object of study or to create a new, better object. In its simplest layout, the normative process of research and development might consist of a linear series of simple decisions, for example as follows:

- Defining the target.
- Defining which factors in the context can be modified and which not.
- Planning how to reach the target, preferably as a few alternatives.
- Selecting the best alternative (which is either the one that fulfils best the target, or the one that gives a satisfactory result with least expenses).
- Making a detailed plan of action.
- Submitting the practical proposals to the people that can decide on them which may require redoing any of the preceding stages.
- The operations in practice.

However, many normative projects deal with complex practical problems, and it is often impossible to proceed straight to the synthesis and proposal. Some usual reasons for complications are:

- The outcome is in the future and therefore its detailed formulation takes time. The future context, too, can be difficult to predict.
- Because of the great number of people involved it is difficult to agree about the final outcome, about the methods of achieving it, or about the costs.
- The proposals are made by researchers, planners and designers, i.e. by other people than the evaluators. These often reject essential parts of the proposals. The process then returns to preparing a new proposal.

- People need time for taking their viewpoint and expressing their wishes on the matter. They often want to continue the discussion later, and perhaps need clarification of some details.

Complications like these can compel redoing a part of the work, in other words *iteration*, returning to an earlier stage of the process. If there are many such backward returns the process begins to resemble more a circle than a linear succession of decisions.

4.5. Exploratory Method

Exploratory research studies are also termed as formulative research studies. The main purpose of such studies is that of formulating a problem for more precise investigation or of developing the working hypotheses from an operational point of view. The major emphasis in such studies is on the discovery of ideas and insights. As such the research design appropriate for such studies must be flexible enough to provide opportunity for considering different aspects of a problem under study. Inbuilt flexibility in research design is needed because the research problem, broadly defined initially, is transformed into one with more precise meaning in exploratory studies, which fact may necessitate changes in the research procedure for gathering relevant data. Generally, the following three methods in the context of research design for such studies are talked about: (a) the survey of concerning literature; (b) the experience survey and (c) the analysis of 'insight-stimulating' examples.

The **survey of concerning literature** happens to be the most simple and fruitful method of formulating precisely the research problem or developing hypothesis. Hypotheses stated by earlier workers may be reviewed and their usefulness be evaluated as a basis for further research. It may also be considered whether the already stated hypotheses suggest new hypothesis. In this way the researcher should review and build upon the work already done by others, but in cases where hypotheses have not yet been

formulated, his task is to review the available material for deriving the relevant hypotheses from it. Besides, the biographical survey of studies, already made in one's area of interest may as well as made by the researcher for precisely formulating the problem. One should also make an attempt to apply concepts and theories developed in different research contexts to the area in which one is working.

Experience survey means the survey of people who have had practical experience with the problem to be studied. The object of such a survey is to obtain insight into the relationships between variables and new ideas relating to the research problem. For such a survey people who are competent and can contribute new ideas may be carefully selected as respondents to ensure a representation of different types of experience. The respondents so selected may then be interviewed by the investigator. The researcher must prepare an interview schedule for the systematic questioning of informants. But the interview must ensure flexibility in the sense that the respondents should be allowed to raise issues and questions, which the investigator has not previously considered. Generally, the experience-collecting interview is likely to be long and may last for few hours. Hence, it is often considered desirable to send a copy of the questions to be discussed to the respondents well in advance. This will also give an opportunity to the respondents for doing some advance thinking over the various issues involved so that, at the time of interview, they may be able to contribute effectively. Thus an experience survey may enable the researcher to define the problem more concisely and help in the formulation of the research hypothesis. This survey may as well provide information about the practical possibilities for doing different types of research.

Analysis of insight stimulating examples is also a fruitful method for suggesting hypotheses for research. It is particularly suitable in areas where there is little experience to serve as a guide. This method consists of the intensive study of selected instances of the phenomenon in which one is interested. For this purpose the existing records if any, may be examined, the unstructured interviewing may take place, or some other approach may be adopted. Attitude of the investigator, the intensity of the study and the ability of the researcher to draw together diverse information into a unified interpretation are the main features, which make this method an appropriate procedure for evoking insights.

4.6. Descriptive Method

Descriptive research studies are those studies, which are concerned with describing the characteristics of a particular individual, or of a group. Studies concerned with specific predictions, with narration of facts and characteristics concerning individual, group or situation are all examples of descriptive research studies. Most of the social research comes under this category. The researcher must be able to define clearly, what he wants to measure and must find adequate methods for measuring it along with a clear-cut definition of population he wants to study. Since the aim is to obtain complete and accurate information in the said studies, the procedure to be used must be carefully planned. The research design must make enough provision for protection against bias and must maximize reliability, with due concern for the economical completion of the research study. The design in such studies must be rigid and not flexible and must focus attention on the following:

- Formulating the objective of the study
- Designing the methods of data collection
- Selecting the sample

- Processing and analyzing the data
- Reporting the findings

The first step is to **specify the objectives** with sufficient precision to ensure that the data collected are relevant. If this is not done carefully, the study may not provide the desired information. Then comes the question of selecting the methods by which the data are to be obtained. Several methods with their merits and limitations are available for the purpose and the researcher may use one or more of these methods. While designing **data-collection** procedure, adequate safeguards against bias and unreliability must be ensured. Whichever method is selected, questions must be well examined and be made unambiguous; interviewers must be instructed not to express their own opinion; observers must be trained so that they uniformly record a given item of behaviour. It is always desirable to pretest the data collection instruments before they are finally used for the study purposes.

The problem of **designing samples** should be tackled in such a fashion that the samples may yield accurate information with a minimum amount of research effort. Usually one or more forms of probability sampling, or what is often described as random sampling, are used.

To obtain data free from errors introduced by those responsible for collecting them, it is necessary to supervise closely the staff of field workers as they collect and record information. Checks may be set up to ensure that the data collecting staff perform their duty honestly and without prejudice. As data are collected, they should be examined for completeness, comprehensibility, consistency and reliability.

The data collected must be **processed and analyzed**. This includes steps like coding the interview replies, observations etc., tabulating the data; and performing several statistical computations. To the extent possible, the processing and analyzing procedure should be planned in detail before actual work has started. Last of all comes the question of **reporting the findings**. The layout of the report needs to be well planned so that all things relating to the research study may be well presented in simple and effective style.

4.7. Experimental Method

These are methods where the researcher tests the hypotheses of causal relationships between variables. Such studies require procedures that will not only reduce bias and increase reliability, but will permit drawing inferences about causality.

A psychological experiment starts with the formulation of a problem, which is usually best stated in the form of a question. The only requirement that the problem must meet is that it be solvable. The question that it raises must be answerable with the tools that are available to the researcher. The problem may be concerned with any aspect of behaviour, whether it is judged to be important or trivial.

The experimenter formulates a tentative solution to the problem or the hypothesis. It may be a reasoned potential solution or only a vague guess, but in either case, it is an empirical hypothesis in that it refers to observable phenomenon. Following the statement of the hypothesis, the experimenter tests it to determine whether the hypothesis is probably true or probably false. If true, it solves the problem the researcher has formulated.

One of the first steps in collection of data is to select participants, whose behaviour is to be observed. The type of participant studied will be determined by the nature of the problem. Whatever the type of participant, the experimenter typically assigns them to groups. Participants should be assigned to groups in such a way that the group will be approximately equivalent at the start of the experiment; this is accomplished through randomization. The experimenter next administers an experimental treatment to one of the groups. The experimental treatment is that which one wishes to evaluate. The other group is called control group, which usually receives a normal or standard treatment.

In the study of behaviour, the researcher generally seeks to establish an empirical relationship between aspects of the environment and aspects of behaviour. Such relationships essentially state that if a certain environmental characteristic is changed, behaviour of a certain

type also changes. The aspect of the environment that is systematically studied is called the independent variable; the resulting measure of any change in behaviour is called the dependent variable. To determine whether a given independent variable affects behaviour, the researcher administers one value of it to the experimental group and a second value of it to the control group. The value administered to the experimental group is the experimental treatment. Thus, the essential difference between the experimental and normal treatments is the specific value of the independent variable that is assigned to each group. If the dependent variable changes in value as the independent variable is manipulated, then it may be asserted that there is a relationship between the two. If the dependent variable does not change, however, it may be asserted that there is a lack of relationship between them.

It is difficult to tell whether the dependent variable values for one group are higher or lower than the values for the second group simply by looking at unorganized data. Therefore, the data must be numerically organized to yield numbers that will provide an answer. For this, statistical tests are used. If the difference between the dependent variable values of the groups is statistically reliable, the difference is very probably not due to random fluctuation; it is therefore concluded that the independent variable is effective, providing that the extraneous variables have been properly controlled.

Three principles of experimental designs are enumerated: (1) the principle of replication; (2) the principle of randomization; and (3) the principle of local control. According to the principle of **replication**, the experiment should be repeated more than once. Thus, each treatment is applied in many experimental units instead of one. By doing so the statistical accuracy of the experiments is increased. Conceptually replication does not present any difficulty, but computationally it does. For example, if an experiment requiring a two-way analysis of variance is replicated, it will then require a three-way analysis of variance since replication itself may be a source of variation in the data. However, it should be remembered that replication is introduced in

order to increase the precision of a study; that is to say, to increase the accuracy with which the main effects and interactions can be estimated.

The principle of **randomization** provides protection, when we conduct an experiment, against the effect of extraneous factors by randomization. In other words, this principle indicates that we should design or plan the experiment in such a way that the variations caused by extraneous factors can all be combined under the general heading of chance. As such, through the application of the principle of randomization, we can have a better estimate of the experimental error.

The principle of **local control** is another important principle of experimental designs. Under it, extraneous factor, the known source of variability, is made to vary deliberately over as wide a range as necessary and this needs to be done in such a way that the variability it causes can be measured and hence eliminated from the experimental error. This means that we should plan the experiment in a manner that we can perform a two-way analysis of variance, in which the total variability of the data is divided into three components attributed to treatments, the extraneous factor and experimental error.

If the experimenter decides that there will be only one group of subjects in the proposed experiment, who will be tested under different values of the independent variables, the design is a **within-groups** or **repeated treatment** design. If he decides to use separate groups for each value of the independent variable, the design is a **between-groups** design.

4.7.1. Between Groups Design

Two-randomized Groups Design involves the subjects being randomly assigned to two groups. The experimenter selects two values of the independent variable, to examine whether or not these two conditions affect the dependent variable in a differential way. Subsequently, the scores of all subjects of these two groups on the dependent variable will be recorded and subjected to statistical analysis. Usually the t test or its non-parametric substitute the Mann

Whitney U test is applied in a two-randomized groups design. If the statistical test reveals that these two groups significantly differ on the measure of the dependent variable, it is concluded that the difference in the dependent variable is due to the experimental manipulation of the independent variable.

More than two-randomized group design is also known as multi-groups design. Here there are three or more conditions of the independent variable assigned to three or more groups of subjects. The subjects are randomly assigned to three or more unbiased groups. In the multi-groups design, the two most common statistics applied are the analysis of variance and the Duncan Range Test.

Matched group design is also known as the randomized-block design where all subjects are first tested on a common task or a pretest measure, which is the matching variable, and then are formed into as many groups as needed on the basis of performance on the matching variable. The groups thus formed are said to be equivalent. Subsequently the different conditions of the independent variable are introduced to each group. If a significant difference occurs after administering the experimental treatment and controlling the relevant variables, the differences may safely be attributed to the experimental treatment.

In **factorial design** the selected values of two or more independent variables are manipulated in all possible combinations so that their independent as well as interactive effects upon the dependent variable may be studied. A generalized factorial design for two independent variables may be written as $K \times L$ in which K stands for the first independent variable and L for the second. The value of K and L indicates the number of ways in which the first and the second independent variables have been manipulated, known as levels of the independent variable. The statistic applied to factorial design is the ANOVA.

4.7.2. Within Groups Design

Within Groups Design can have two conditions and many subjects. In this case, the group is tested under two conditions. The mean difference under the two conditions may be tested through the matched t test. Within Groups Design can also have more than two conditions and many subjects.

4.7.3. Pre-Experimental Design

Although incorporating the least basic elements of an experimental design, these designs do not provide a control group and hence are inadequate and thereby called non-designs.

One-shot case study involves the treatment being given to a single group and an observation is made to assess the effects of treatment. There is information regarding the members who are given the treatment. **One-group pre-test post-test design** is where the effects of treatment are judged by making a comparison between pre-test and post-test scores. Two groups are taken in **static-group comparison**. One group experiences the experimental treatment and another group does not. Subsequently, the two groups are compared. However, subjects of the two groups are neither selected at random nor are they assigned randomly to groups.

4.7.4. True Experimental Designs

A true experiment has a complete control over manipulation of the independent variable and complete control over assignment of subjects to equivalent groups. In the **post-test only equivalent group design**, there are experimental and control groups formed on the basis of random assignment, and initially drawn randomly. Both groups are tested after the experimental group received the treatment and a t test or ANOVA is used, for refuting or accepting the hypothesis. The **pre-test – post-test control group design** makes a provision for pre-test of both the groups before experimental and control treatments are administered. However, there is no control over the gain on the post-test due to the experience on the pre-test. The **Solomon four**

group design is a combination of post-test only and pre-test – post-test designs. Four groups are randomly set by the experimenter. This design makes it possible to evaluate the main effects of testing as well as the reactive effect of testing, maturation and history, thus increasing generalizability. ANOVA is appropriate statistical test. However, the design is complex.

4.7.5. Quasi Experimental Designs

A quasi experiment is one that applies an experimental interpretation to results that do not meet all the requirements of a true experiment – when the experimenter has complete control over the manipulation of independent variables but fails to arrange for creating equivalent groups. Quasi-experimental designs are called compromise designs.

In the **time-series design**, a series of pre-tests are given to the group. Subsequently, the treatment is given and a series of post-tests are given. In the **equivalent time-samples design**, the treatment is introduced and reintroduced with some other experience, which is available in the absence of treatment. Extraneous variables are controlled. However, if the effect of treatment after administering over the time is different from the effect when it is introduced and reintroduced, it will be difficult for the experimenter to make a generalization. The repeated administrations may also lead to an adaptation. The **non-equivalent control group design** is used when re-constitution of subjects is not allowed. The experimenter cannot randomly assign them to the control and experimental groups. Except for random assignment of subjects, this design is identical to pre-test – post-test control group design. In a **counterbalanced design**, which is also called cross-over design, the experimental control is achieved by randomly applying experimental treatments. **Separate-sample pre-test – post-test design** is suited where the experimenter cannot assign treatments to all subjects at a time. The researcher is forced to select a sample and administer treatment. Then, again, another sample is taken and the same treatment is repeated. In a **patched-up design**, the experimenter starts with an inadequate design and then, adds some features so that weaknesses are overcome and strengths are increased. Every subject

gets the treatment. But, the experimenter can control when and to whom the treatment is given at a particular time.

4.8. Summary

There are several types of research designs. Historical design is the systematic collection and evaluation of data to describe, explain and thereby understand actions or events that occurred sometimes in the past. The target of normative research is to improve the object of study or to create a new, better object. The main purpose of exploratory studies is that of formulating a problem for more precise investigation or of developing the working hypotheses from an operational point of view. Descriptive research studies are those studies, which are concerned with describing the characteristics of a particular individual, or of a group. Experimental designs are methods where the researcher tests the hypotheses of causal relationships between variables. Such studies require procedures that will not only reduce bias and increase reliability, but will permit drawing inferences about causality.

4.9. Technical Terms

Descriptive research - are those studies, which are concerned with describing the characteristics of a particular individual, or of a group.

Experimental method - involves methods where the researcher tests the hypotheses of causal relationships between variables.

Exploratory method - is research involving formulation of a problem for more precise investigation.

Historical method - of research involves the systematic collection and evaluation of data to describe, explain and thereby understand actions or events that occurred sometimes in the past.

Normative method – involves research to improve the object of study or to create a new, better object.

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4.11. Model Questions

4.11.1. Describe the historical and normative methods of research.

4.11.2. What is the exploratory method of research?

4.11.3. Illustrate the descriptive method of research.

4.11.4. What is an experiment? Describe the steps involved in the experimental method.

4.11.5. What are the various types of experimental designs in research?

LESSON 5

Research Design II

5.1. Objectives

- To know about the case method
- To understand cross-section method
- To be aware of the longitudinal method
- To also know about the participatory method
- To have an idea as to how to choose the right method of research.

5.2. Structure

5.2.1. Case method

5.2.2. Cross-section method

5.2.3. Longitudinal method

5.2.4. Participatory method

5.2.5. Choosing the right method of research

5.3. Case method

The case or the case-study method is a very popular form of qualitative analysis and involves a careful and complete observation of a social unit, be that unit a person, a family, an institution, a cultural group or even the entire community. It is a method of study in depth rather than breadth. The case study places more emphasis on the full analysis of a limited number of events or conditions and their interrelations. The case study deals with the processes that take place and their interrelationship. Thus, case study is essentially an intensive investigation of the particular unit under consideration. The object of the case study method is to locate the factors

that account for the behaviour-patterns of the given unit as an integrated totality. Efforts are made to study each and every aspect of the concerning unit in minute details and then from the case data generalizations and inferences are drawn.

The important characteristics of the case study method are as under:

- Under this method, the researcher can take one single social unit or more of such units for his study purpose; he may even take a situation to study the same comprehensively.
- Here, the selected unit is studied intensively i.e., it is studied in minute details. Generally, the study extends over a long period of time to ascertain the natural history of the unit so as to obtain enough information for drawing correct inferences.
- In the context of this method, we make complete study of the social unit covering all facets. Through this method we try to understand the complex of factors that are operative within a social unit as an integrated totality.
- Under this method the approach happens to be qualitative and not quantitative. Mere quantitative information is not collected. Every possible effort is made to collect information concerning all aspects of life. As such, case study deepens our perception and gives us a clear insight into life.
- In respect of the case study method, an effort is made to know the mutual inter-relationship of causal factors.
- Under case study method the behaviour pattern of the concerning unit is studied directly and not by an indirect and abstract approach.
- Case study method results in fruitful hypotheses along with the data, which may be helpful in testing them, and thus it enables the generalized knowledge to get richer and richer. In its absence, generalized social science may get handicapped.

The case study method is based on several assumptions. The important assumptions may be listed as follows:

- The assumption of uniformity in the basic human nature in spite of the fact that human behaviour may vary according to situations.
- The assumption of studying the natural history of the unit concerned.
- The assumption of comprehensive study of the unit concerned.

Major phases involved in the case study are as follows:

- Recognition and determination of the status of the phenomenon to be investigated or the unit of attention
- Collection of data, examination and history of the given phenomenon.
- Diagnosis and identification of causal factors as a basis for remedial or developmental treatment.
- Application of remedial measures i.e. treatment and therapy.
- Follow-up programme to determine the effectiveness of the treatment applied.

5.4. Cross-section method

The cross-sectional approach enables psychologists to test or observe differences in various groups of individuals of various ages simultaneously. Each group is called a **cohort**, that is, people born in the same year or time period. In cross-sectional research, different cohorts are compared on variables. These comparisons make it possible to determine the differences that exist among cohorts, as well as to make general inferences about developmental processes across the life span. For example, suppose we wish to discover how intelligence differs across the life span. Using a cross sectional approach, we might give several different cohorts an intelligence test. Once the subjects in each cohort complete the test, we would compare the results, and then draw general conclusions from our findings.

The main advantage of the cross sectional approach is that it provides the researcher with a general overview of the developmental process being studied. It also has the advantage of being a quick and inexpensive way to conduct developmental research, since it can be carried out over a relatively brief period of time. Nonetheless, the cross-sectional approach has several drawbacks, not the least of which is that it does not provide information about developmental differences among individuals. It also does not inform us if those developmental differences are stable, that is, whether the behaviour observed at one time will remain the same when observed at a later time. The most serious short coming of the cross-sectional approach is that it cannot take into account the fact that cohorts differ in terms of the time period in which they were reared, and thus, in terms of the environmental factors that have influenced their development.

5.5. The Longitudinal Method

The Longitudinal approach involves repeated observation or testing of the same cohort over an extended time period. The exact period of time and the amount of time in between testing or observation may vary from study to study and depend on the process under investigation. For example, if we are interested only in the cognitive development in children, we might follow a cohort of children, carefully monitoring their intellectual progression from infancy to adolescence. However, if we are interested in cognitive development as it occurs over the life span, we would not end our observations there; rather, we would study the same cohort from infancy through old age.

Compared to the cross-sectional approach, the longitudinal approach has three advantages. First, because repeated measures of each subject's aspects are studied, it permits a direct comparison of processes within individuals over time. Second, longitudinal studies are helpful in identifying behaviours occurring at a later time. Third, they are useful in determining the stability of behaviour over time.

The longitudinal approach, however, also has several drawbacks. The most serious problem is the fact that it requires so much time and money to conduct. After all, following a large cohort over a long time period in which its members may have relocated to far away places requires a tremendous investment of both time and money. In very long-term longitudinal studies there is also another problem: loss of subjects due to death and change of address. Moreover, it is nearly impossible for any one investigator to collect data across the entire life span of a cohort.

5.6. Participatory Method

It is research conducted as a partnership between traditionally trained researchers and lay people in a community. It gives people in a study population a voice in determining what is being studied, and it teaches them the rudiments of research methodology so they can assume collaborative roles. It engages people in a community in all aspects of the research process -- determining research questions, developing approaches to obtain information, and most importantly, deciding what the research means and how it should be used to benefit the community.

Participatory research methods involve more than sampling a population and conducting a survey. It begins by extensive gathering of people's experiences, backgrounds, values, and needs using focus groups and other social science techniques. How the community articulates its feelings about a problem leads to a researchable question. In this early stage, researchers must be culturally competent about how a community perceives itself and those in it. A critically sensitive role for the researchers also exists in that they must demystify research methods in such a way as to build community trust so that community stakeholders will want to stay involved throughout the study and help with the development of solutions that affect them.

5.7. Choosing the right method of research

A right design is often characterized by adjectives like flexible, appropriate, efficient, economical and so on. Generally, the design, which minimizes bias and maximizes reliability of the data collected and analyzed, is considered a good and appropriate design. The design, which gives the smallest experimental error, is supposed to be the best design in many investigations. Similarly, a design, which yields maximal information and provides an opportunity for considering many different aspects of a problem, is considered most appropriate and efficient design in respect of many research problems. Thus, the question of a good design is related to the purpose or objective of the research problem and also with the nature of the problem to be studied. A design may be quite suitable in one case, but may be found wanting in one respect or the other in the context of some other research problem. One single design cannot serve the purpose of all types of research problems.

A research design appropriate for a particular research problem, usually involves the consideration of the following factors:

- The means of obtaining information
- The availability and skills of the researcher and his staff, if any
- The objective of the problem to be studied
- The nature of the problem to be studied; and
- The availability of time and money for the research work.

If the research study happens to be an exploratory or a formulative one, wherein the major emphasis is on discovery of ideas and insights, the research design most appropriate must be flexible enough to permit the consideration of many different aspects of a phenomenon. But, when the purpose of a study is accurate description of a situation or of an association between variables, accuracy becomes a major consideration and a research design, which minimizes bias and maximizes the reliability of the evidence collected, is considered a good design. Studies

involving the testing of a hypothesis of a causal relationship between variables require a design, which will permit inferences about causality in addition to the minimization of bias and maximization of reliability. But in practice it is the most difficult task to put a particular study in a particular group, for a given research may have in it elements of two or more of the functions of different studies. It is only on the basis of its primary function that a study can be categorized either as an exploratory or descriptive or hypothesis-testing study and accordingly the choice of a research design may be made in case of a particular study. Besides, the availability of time, money, skills of the research staff and the means of obtaining the information must be given due weightage while working out the relevant details of the research design such as experimental design, survey design, sample design and the like.

5.8. Summary

The case or the case-study method is a very popular form of qualitative analysis and involves a careful and complete observation of a social unit, be that unit a person, a family, an institution, a cultural group or even the entire community. The cross-sectional approach enables psychologists to test or observe differences in various groups of individuals of various ages simultaneously. The Longitudinal approach involves repeated observation or testing of the same cohort over an extended time period. Participatory research is research conducted as a partnership between traditionally trained researchers and lay people in a community. The question of a good design is related to the purpose or objective of the research problem and also with the nature of the problem to be studied.

5.9. Technical Terms

Case method - is a form of qualitative analysis and involves a careful and complete observation of a social unit, be that unit a person, a family, an institution, a cultural group or even the entire community.

Cohort - a group of people born in the same year or time period.

Cross-sectional method - enables psychologists to test or observe differences in various groups of individuals of various ages simultaneously.

Longitudinal method - involves repeated observation or testing of the same cohort over an extended time period.

Participatory method - is research conducted as a partnership between traditionally trained researchers and lay people in a community.

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5.11. Model Questions

5.11.1. Describe the case method of research.

5.11.2. Compare and contrast the cross-sectional and longitudinal methods of research.

5.11.3. What is participatory method? What is the relevance of this method in modern research?

LESSON-6

DATA COLLECTION

6.1 OBJECTIVES

- To understand the various methods of data collection
- To be able to select the appropriate method of data collection for a study

6.2 STRUCTURE OF THE LESSON

- Introduction
- Observation
- Interview
- Questionnaire
- Tests

6.3 INTRODUCTION

The task of data collection begins after a research problem has been defined and research design/plan is chalked out. While deciding about the method of data collection to be used for the study, the researcher should keep in mind two types of data - primary and secondary data. The primary data are those, which are collected afresh and for the first time. The secondary data, on the other hand, are those, which have already been collected by someone else and have been passed through the statistical process. The methods of collecting primary and secondary data differ since primary data are to be originally collected, while in case of secondary data the nature of data collection is merely that of compilation.

6.4 COLLECTION OF PRIMARY DATA

Primary data is collected during the course of doing experiments in an experimental research but in case the research is of the descriptive nature, then we can obtain primary data either through observation or through direct communication with respondents in one form or another through personal interviews. This, in other words, means that there are several methods of collecting primary data, particularly in surveys and descriptive researches. The important ones are: (i) observation method, (ii) interview method, (iii) questionnaires

6.4.1 OBSERVATION AS A TOOL OF DATA COLLECTION

Meaning and Nature: In behavioural researches questionnaires and interviews are very common and important types of data-collecting devices. But there are situations in which these devices may not be useful. For example, when the investigator wants to see the behaviour in natural situation and study the situation-based features of conduct, the questionnaires and interviews no more serve the purpose and some form of observation becomes indispensable.

Observation, as a fundamental technique of data collection, refers to watching and listening to the behaviour of other persons over time without manipulating and controlling it and record findings in ways that allow some degree of analytical interpretation and discussion. Observation, when properly and scientifically conducted, is characterized by the following features:

1. In observation there is a natural social context in which persons' behaviour is studied. Thus, observation usually occurs in natural settings although it can also be used in such contrived settings as laboratory experiments and simulations.
2. It captures those significant events or occurrences that affect the relations among persons being studied.
3. It identifies important regularities and recurrences in social life by comparing and contrasting the data obtained in a particular study with those obtained in the study of various natural settings.

6.4.1.1 PURPOSE OF OBSERVATION:

Basically, observation as a tool of data-gathering device, has the following three basic purposes:

- One major purpose of observation is to capture and study human behaviour as it actually happens.
- It provides a graphic description of real life that can't be acquired other ways.
- Another purpose of observation is exploration. When the investigator observes the human behaviour in real life setting, he gets a good chance to explore those variables, which were important but overlooked.

6.4.1.2 IMPORTANT TYPES OF OBSERVATION

On the basis of the ability of observational data to generate useful and researchable information it is divided into the following types:

(1) Systematic observation: Systematic observation is one, which is done according to some explicit procedures as well as in accordance with the logic of scientific inference. A psychologist studying the aggressive behaviour of children in their playgroup with some objective and explicit principles decided beforehand is an example of systematic observation.

(2) Unsystematic observation: Unsystematic observation is a type of casual observation made by investigator without specifying any explicit and objective inference. A Psychologist or Sociologist observing the behaviour of people on a railway platform without any explicit principles and procedures is an example of unsystematic observation.

Observation has also been classified on the basis of the role played by the investigator.

(A) PARTICIPANT OBSERVATION:

In participant observation the investigator actively participates in the activities of the group to be observed. The procedure of participant observation is often unstructured and, usually, other members of the group do not know the identity of the observer. This is called disguised participant observation. But sometimes the people who are being observed know that the observer is present for collecting information about them. This is known as undisguised participant observation.

STRENGTHS

- Since the observation is done in a natural setting, the investigator is able to record the behaviour in a realistic manner and naturally, then, the analysis yields meaningful and convincing conclusion about human behaviour.
- Usually the complete observation by the method of participant observation takes several days as a consequence whatever information is collected is very broad and meaningful for understanding human behaviour.

LIMITATIONS:

- Since it is usually unstructured, it fails to be precise about the procedures for data accumulation
- Participant observation is a time-consuming device and, therefore, not all observers become ready to proceed by the procedures of participant observation
- Since the observer participates in the activities of the group in an active manner, he sometimes starts showing human weaknesses like love, sympathy, hatred, etc., towards the members and their behaviour.

(B) NONPARTICIPANT OBSERVATION:

In Non-participant observation the investigator observes the behaviour of other persons in a natural setting but does not remain a participant in the activities being observed.

STRENGTHS

- Since non-participant observation is usually structured, the obtained data are more reliable and representative.
- In non-participant observation the observer is able to concentrate upon any specified aspect of social behaviour in a better way and, therefore, gets a better opportunity to find out the solution of the related probe.

LIMITATIONS

- The behaviour of the persons being observed and the settings do not remain a natural one. The persons develop the consciousness that their behaviours are being observed. This consciousness slightly distorts the natural flow of their behaviour.

- Non-participant observation fails to capture natural context of social settings to the extent participant observation is able to capture.

6.4.2 INTERVIEW

Interview is a face-to-face situation between the interviewer and the respondent, which intends to elicit some desired information from the latter. The respondent's answer to the questions raised by the interviewer and his other behaviour serve as important clues to the interviewer and are likely to affect the behaviour of the latter. During the course of the interview, the respondent tries to size up the interviewer and his inference about the interviewer is likely to influence his answers.

6.4.2.1 TYPES OF INTERVIEW

There are two types of interview, namely, formal interview and informal interview. A formal interview may be defined as one in which already prepared questions are asked in a set order by the interviewer and answers are recorded in a standardized form. It is also known as a structured or patterned interview. An informal interview is one where there are no pre-determined questions nor is there any preset order of the questions and it is left to the interviewer to ask some questions in a way he likes regarding a number of key points around which the interview is to be built up. As most things depend upon the interviewer, the situation remains unstructured and, therefore, such an interview is also known as an unstructured interview.

6.4.2.2 MAJOR FUNCTIONS OF INTERVIEW

Interview as a research tool is selected basically because it serves two functions, which mark it out with positive advantage from the rest of the methods of data collection. These two functions are:

- **DESCRIPTION:** Interview has been found to be particularly useful in providing insight into the interactive quality of social life. In interview people spend most of the time with one another in some form of verbal interaction. The verbal interaction enables the interviewer in understanding how people view the subject under investigation. This understanding helps him know his social life, which is otherwise abstract and merely a statistical phenomenon.
- **EXPLORATION:** Another purpose of interview is to provide insight into the unexplored dimensions of a topic or subject. A review of the work done in this area reveals that interview helps a lot in exploring some new variables for study as it also helps sharpen the conceptual clarity.

6.4.2.3 ADVANTAGES AND DISADVANTAGES OF INTERVIEW

Interview as a research tool has both advantages and disadvantages. According to Gorden (1969), its major advantages are as follows:

(1) Interview allows greater flexibility in the process of questioning. As such many types of probe questions can be put and analyzed.

- (2) It facilitates the investigator in obtaining the desired information readily and quickly.
- (3) It facilitates the investigator in being sure that interviewees have themselves interpreted and answered the questions. This increases the validity of the conclusion arrived.
- (4) In interview a desired level of control can be exercised over the situation or context within which questions are asked and answers are given.
- (5) The validity of the verbal information given by the interviewees can easily be checked on the basis of their non-verbal cues.

Still, the interview is not without limitations or problems. Its major disadvantages are mentioned below:

- (1) Interviewer's variability: It is commonly found that at times the interviewer views similar responses differently and records them differently from interview to interview. Thus he himself becomes a source of variation.
- (2) Inter-interviewer variability: Inter-interviewer variability is one of the major problems with interviewing. As the numbers of interviewers tend to increase, the problem of interviewer's variability becomes all the more compounded and affects the real purpose of the interview.
- (3) Validity and dependability of verbal responses: In interview the interviewees verbally answer the questions asked by the interviewers. Social scientists have grave doubts whether a person actually behaves the way he professes to behave. They have expressed the concern that verbal responses can't be relied upon with a considerable degree of validity and dependability.
- (4) Time: The interview takes much time in its completion because each respondent or interviewee is interviewed individually and the record of the verbal interaction of each respondent is kept individually.
- (5) Variations inherent to the interviewing context: The interviewing context does not ordinarily remain constant as interviewers move from one interview to another. Thus, the context of the interview itself becomes a variable, which must be accounted for in assessing findings from studies that utilize interview as one of the important research tools.
- (6) Recording information: Since there is no standard way of recording information, the dependability of interview becomes adversely affected in the absence of a standard criterion.

6.4.2.4 IMPORTANT SOURCES OF ERRORS IN INTERVIEW

- (1) Attitude of the interviewer: Sometimes the interviewers carry a definite attitude and bias toward the respondents or interviewees. This type of attitude or pre-conceived notions leads the interviewers to commit several errors in recording the information given by interviewees
- (2) Incomprehensibility of the questions asked: Sometimes the questions put by the interviewers are deliberately made difficult and incomprehensible. In such a situation the data obtained are not dependable and the investigator is bound to arrive at a wrong conclusion.
- (3) Lack of warmth in the situation of the interview: Gorden (1969) is of opinion that when the interviewers exhibit unfriendly and curt behaviour, the interviewees naturally don't co-operate

with the interviewers. And this becomes a major source of error in interview and consequently whatever data are thus collected lack dependability and validity.

(4) Duration of interview: Sometimes the duration of the interview is unnecessarily long causing the interviewees feel nervous and monotonous. As such the information given by them remain no longer dependable.

6.4.3 QUESTIONNAIRE

A questionnaire is used where factual information from the respondents is desired. It consists of a form containing a series of questions where the respondents themselves fill in the answer.

6.4.3.1 Wording of Questions in a Questionnaire

A vast literature on the wording of questions in a questionnaire is available. A careful review of the literature reveals that the following factors are of immense importance for any behavioral research utilizing the questionnaire as a tool of data collection.

1. Simplicity in language. The aim of the investigator in wording a questionnaire is to communicate effectively with the respondents in his own language. In choosing the language for the questions he must keep in view the population for which it is meant. If the sample is taken from a general population, technical terms and jargon should be avoided. If, on the other hand, the sample is taken from a professional population, the terms appropriate to the population may be used.

Investigators should, in general, avoid complex and long questions because such questions require greater efforts on the part of the respondents in answering them and many respondents may not be ready for them.

2. Ambiguity: The investigator must take pains to avoid ambiguous questions because such questions do not convey the same meaning to all the respondents and, therefore, different respondents may give different answers to the same question.

3. Vague words: Vague words should also be avoided because they encourage vague answers. Words like “often”, “generally”, “fairly”, “on the whole”, etc., should be avoided.

4. Embarrassing questions: When respondents are asked questions regarding matters, which they do not want to make public, they are embarrassed. For example questions relating to stealing, cheating in examinations, etc., may be embarrassing to respondents and hence, they will either refuse to answer or distort their true answers. One method to deal with the embarrassing nature of questions is not to ask such questions directly from the respondents but to ask them to express their views in others.

5. Double negatives: Double negatives tend to cancel each other, and therefore, create confusion for the respondents. For example: Do you not approve the idea that a college girl should not engage herself in domestic affairs?

6. Leading questions: A leading question is one, which by virtue of its content and structure, leads to a specific answer. For example, the word, “involved” in a question like: “Do you think that the party should get involved in...?” generally leads to an answer in the negative
7. Presuming questions: In other words, the question should not be framed in a manner which implies that the respondent possesses the knowledge regarding the theme of the question or that he has participated in those activities, which are being asked. Suppose a housewife who has never used “nutri nuggets” is asked: “Do you find nutri nuggets tasty?”
8. Hypothetical questions: Hypothetical questions are of little value because the respondents’ answers towards such questions do not reflect anything concrete.

6.4.3.2 Characteristics of a Good Questionnaire

1. The questionnaire should be concerned with specific topics, which must be regarded as relevant by the respondents. The investigator must clearly state the significance, objectives and aims of the questionnaire either in a separate letter or in the questionnaire itself.
2. The questionnaire should, as far as possible, be short because very lengthy questionnaires often find their way into the wastebasket.
3. Directions and wordings of the questions should be simple and clear. Each question should deal with a single idea.
4. The questions should be objective and should not provide any hints or suggestions regarding a possible answer.
5. Embarrassing questions, presuming questions and hypothetical questions should be avoided.
6. The questions should be presented in a good order proceeding from general to specific responses or from those showing a favourable attitude to an unfavourable attitude.
7. Lastly, a questionnaire must be attractive in appearance, neatly printed or duplicated and clearly arranged.

6.4.3.3 TYPES OF QUESTIONNAIRE

Questionnaire, as used in behavioural researches, can be classified on the basis of two dimensions – (a) type of response required, and (b) type of questionnaire administration.

Based upon the type of response required, the questionnaire may be of the following two types –

1. Fixed – response Questionnaire: It consists of questions with a fixed number of options or choices. The respondent is asked to check the option or response that best fits or suits him. Such questionnaire is also known as closed-form questionnaire or pre-coded type of questionnaire.
2. Open-end Questionnaire: It consists of questions that require short or lengthy answers by the respondents. Usually here the answers are longer than those given in the fixed-response questionnaire.

Based upon the method of administering questionnaire, the following are the two common types of questionnaire:

1. Mail Questionnaire: It is a questionnaire, which is mailed to the designated subject with a request to answer the questions and return it through mail. A survey conducted in this area has revealed that about 70% of the questionnaires mailed are not returned.
2. Face-to-face Administered Questionnaire: Here the selected subjects are given questionnaires with the instruction to complete them in the presence of the investigator or his associates. It is usually preferred where subjects for the study are readily available at one place.

6.4.4 TESTS

6.4.4.1 PROJECTIVE TECHNIQUES

Projective techniques (or what are sometimes called as indirect interviewing techniques) for the collection of data have been developed by psychologists to use projections of respondents for inferring about underlying motives, urges, or intentions which are such that the respondent either resists to reveal them or is unable to figure out himself. In projective techniques the respondent in supplying information tends unconsciously to project his attitudes or feelings on the subject under study.

Some of the important projective techniques are:

- (i) **Word association tests:** These tests are used to extract information regarding such words, which have maximum association. In this sort of test the respondent is asked to mention the first word that comes to mind without thinking, as the interviewer reads out each word from a list.
- (ii) **Sentence completion tests:** These tests happen to be an extension of the technique of word association tests. Under this, informant may be asked to complete a sentence, such as, persons who wear Khadi are....., to find association of Khadi clothes with certain personality characteristics. This technique is also quick and easy to use, but it often leads to analytical problems, particularly when the response happens to be multidimensional.
- (iii) **Story completion tests:** Such tests are a step further wherein the researcher may contrive stories instead of sentences and ask the informant to complete them. The respondent is given just enough of story to focus his attention on a given subject and he is asked to come up with a conclusion to the story.
- (iv) **Verbal projection tests:** These are the tests wherein the respondent is asked to comment on or to explain what other people do. For example why do people smoke? Answers may reveal the respondent's own motivations.
- (v) **Pictorial techniques:** There are several pictorial techniques. The important ones are as follows:

(a) **Thematic Apperception Test (TAT):** It consists of a set of pictures that are shown to respondents who are asked to describe what they think the pictures represent. The replies of respondents constitute the basis for the investigator to draw inferences about their personality.

(b) **Rosenzweig test:** This test consists of a series of cartoons with words inserted in 'balloons' above. The respondent is asked to put his own words in the space provided for the purpose in the picture. The responses indicate the attitudes of the respondents.

(c) **Rorschach test:** This test consists of ten cards having prints of inkblots. The design are symmetrical in nature. The respondents are asked to describe what they perceive in such symmetrical inkblots and the responses are interpreted on the basis of some pre-determined psychological framework.

(d) **Holtzman Inkblot Test (HIT):** This test from W.H.Holtzman is a modification of the Rorschach test. This test consists of 45 inkblot cards, which are based on colour, movement, shading and other factors involved in inkblot perception.

(e) **Tomkins-Horn picture arrangement test:** This test is designed for group administration. It consists of twenty-five plates, each containing three sketches that may be arranged in different ways to portray a sequence of events. The respondent is asked to arrange them in a sequence, which he considers as reasonable. The responses are interpreted as providing evidence confirming certain norms, respondent's attitudes etc.

(vi) **Play techniques:** Under play techniques subjects are asked to improvise or act out a situation in which they have been assigned various roles. The researcher may observe such traits as hostility, dominance, sympathy, prejudice or the absence of such traits.

(vii) **Sociometry:** It is a technique for describing the social relationships among individuals in a group. In an indirect way, sociometry attempts to describe attractions or repulsions between individuals by asking them to indicate whom they would choose or reject in various situations. Thus, sociometry is a new technique of studying the underlying motives of respondents.

6.4.4.2 LIMITATIONS OF PSYCHOLOGICAL TESTS

Psychological tests are widely used but they have been criticized on the following grounds:

- (i) Psychological tests may be invasion of privacy if they are used without the permission of the testees to obtain personal and sensitive information.
- (ii) On the basis of the performance on psychological tests, the testees or examinees are given certain categories. This has a serious implication for the examinees. The examinees can change and great care should be taken in the interpretation and use of the test results.
- (iii) It is said that the psychological tests cannot measure the most important human traits. They force the examinees to take decisions based on superficial and relatively unimportant criteria.

- (iv) Generally, it has been reported that when the assessment is to be done through psychological tests, the examinees feel anxious and this anxiety interferes with his performance
- (v) Psychological tests are insensitive to atypical and creative responses. Such responses are given not much special credit thus providing a discrimination against the talented examinees.

Thus psychological tests have some obvious limitations.

SUMMARY

- The task of data collection begins after a research problem has been defined and research design/plan chalked out.
- There are different types of research tools and each of them utilizes distinct ways of describing and quantifying the obtained data.
- There are several methods of collecting primary data, particularly in surveys and descriptive researches.
- Observation refers to watching and listening to the behaviour of other persons over time without manipulating and controlling it and recording findings in ways that allow some degree of analytical interpretation and discussion.
- Interview is a face-to-face situation between the interviewer and the respondent, which intends to elicit some desired information from the latter.
- A questionnaire is used where factual information from the respondents is desired. It consists of a form containing a series of questions where the respondents themselves fill in the answer.
- Tests infer about underlying motives, urges, or intentions, which are such that the respondent either resists revealing them or is unable to figure out.

TECHNICAL TERMS

- *Observer Bias* Systematic errors occurring in observation due to observer's expectations regarding the outcome of a study.
- *Interviewer Bias* Bias shown by the interviewer in which he tries to adjust the wording of a question to suit the respondent or tries to record only the favourable position of the respondent's answers
- *Filter Questions* General questions framed in a survey to determine whether the respondent needs to be asked some specific questions later on

- *Funnel Questions* Questions dealing with a particular topic in a questionnaire ordered from the most general to the most specific

MODEL QUESTIONS

1. Describe briefly the two main approaches to objective observation and elucidate the factors affecting the reliability of observational data?
2. What is a questionnaire? Discuss the characteristics of a good questionnaire.
3. What are the major functions of an interview? What are the major sources of error in interview?
4. Describe the different methods of data collection with examples.

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