

CATHOLIC UNIVERSITY OF RWANDA

FACULTY OF SOCIAL WORK

DEPARTMENTS OF WSD & CFS

Initiation to Scientific Research (Basics)

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COURSE DESCRIPTION

Class: level II

Departments: Welfare and Social Development & Child and Family Studies

Subdivisions:

Chapter I. Scientific Research: Characteristics and Types

Chapter II. Research Methods

ChapterIII. Initiation to social research

Assignment Pattern:

60% CAT (Written and oral, Individual and Group Works)

40% Final exam

Course Weight: 10 credits

Face-to-face: 100 hours

For CUR students only

Chapter One

Scientific Research: Characteristics and Types

1.1. Science and Common Sense

Many a time we make certain statements which we have not to prove that they are true. They are based either on common sense or on practical observations *and* experiences on social life, though sometimes they may be based on wisdom too. However, often they are based on ignorance, prejudices and mistaken interpretation. Common sense knowledge, based on the accumulated experiences, prejudices and beliefs of the people, is often contradictory and inconsistent. On the other hand, scientific observations are based on verifiable evidence or systematic body of proof that can be cited. For example, some common sense statements may be quoted here: man is more intelligent than women; married people remain more happy than single people; high-caste people are more talented than low-caste people; the rural people are more hardworking than the urban people; urban people are more Congress-oriented than BJP-oriented; and die like. Contrary to this, the scientific research or scientific inquiry finds that woman is as intelligent as man; there is no association between happiness and remaining married or unmarried by a person; caste does not determine individual's efficiency; hard work is not related to environment alone; and urban people are not necessarily Congress-oriented. Thus, a statement made way of saying something, generally based on ignorance, bias, prejudice or mistaken interpretation, though occasionally it may be wise, true, and a useful bit of knowledge. At one time, common sense statements might have preserved folk wisdom but today, scientific method has become a common way of seeking truths about our social world.

Conant ("Science and Common Sense", 1951, quoted by Fred. N. Kerlinger in *Foundations of Behavioural Research*, 1964:4) has differentiated science and common sense in the following five ways:

(i) Use of conceptual schemes

Though conceptual schemes are used in both science and common sense but in common sense, the man in the street uses them in a loose fashion while the scientist systematically builds his conceptual and theoretical structures and tests them for consistency. For example, on a common sense basis, a person's birth in a Dalit caste is described as a result of his past *karmas*, the death of a corrupt person's son is thought to be a punishment for his sinfulness, lack of rains is due to displeasing Indra—the rain-

god—and so forth. The scientist describes such conceptual ideas and feelings as having no relation to reality.

(ii) Empirical tests

The scientist tests his hypotheses and theories through a systematic empirical testing but the man in the street tests his so-called hypotheses and theories in a selective way. He often 'selects' evidence simply because it suits his hypotheses. For example, in the past, a common man's belief in India was that all untouchables are dirty, lethargic and superstitious. He 'verified' his belief by noting that all untouchables are so and described those who were not so as 'exceptions'. The sophisticated social scientist rejects such 'selective tendency'. Instead of giving an armchair explanation of a relationship, he believes in 'testing' the relationship in the field/laboratory.

(iii) Notion of control

In scientific research, 'control' means focusing on those variables that are hypothesized to be the 'causes and ruling out those that are 'possible causes' of the effects on the phenomenon under study. The layman seldom bothers to control any variables or extraneous sources of influence. He accepts all those factors which are in accord with his preconceptions. For example, if a layman assumes that Inter-community riots are initiated by anti-social elements, he will talk only of this factor and never bother of other factors like the role of religious fanatics, politicians with vested interests, support of 'foreign' elements through cash and weapons, role of 'interested' businessmen, and the like. The scientist, on the other hand, will not discard the role of all these factors but would rather 'control' the study of communal riots in terms of different variables.

(iv) Relations among phenomena

The difference between science and common sense in terms of relations among phenomena is perhaps not so sharp because both talk of relations. However, while the scientist consciously and systematically pursues relations, the layman does not do this. His concern with relations is loose, unsystematic and uncontrolled. He often seizes on the fortuitous occurrence of two phenomena and immediately links them as cause and effect. Take, for example, the relation between crime and punishment. A layman says that punishment controls crime while a scientist says that punishment can make a criminal a more confirmed enemy of society and that rewards also can control crime. Thus, while a scientist would 'test' both relations, a layman would ignore 'reward' factor.

(v) Explanation of observed phenomena

One main difference between common sense and scientific explanation of observed phenomena is that the scientist carefully rules out philosophical and metaphysical explanations in explaining relations among the observed phenomena because these cannot be tested. For example, saying that the poverty of a person is because God wishes it so is talking metaphysically, since this proposition cannot be tested.

All these differences between science and common sense indicate -that a scientist gives statements and propositions which can be empirically verified but a layman does not believe in testing and validity. In short, the method of science is different from the methods of *intuition* (accepted by the *A priorist* because it is agreeable to reason if not with experience) or *tenacity* (fact is true because it is known to be true and the repetition enhances its validity).

1.2. Empiricism (Positivism) V/S Philosophical Approach

The study of society and social phenomena till the middle of the nine-teenth century was made mostly on the basis of speculation, logic, theological thinking and rational analysis. August Comte, a French philosopher, described these methods inadequate and insufficient in the study of social life. In 1848, he proposed *positive method* in the field of social research. He maintained that social phenomena should be studied not through logics or theological principles or metaphysical theories but rather in society itself and in the structure of social relations. For example, he explained poverty in terms of the social forces that dominate society. He described this method of study as *scientific*. Comte considered scientific method, called *positivism*, as the most appropriate tool of social research. This new methodology rejected speculation and philosophical approach and focused on gathering of empirical data and became *positivistic methodology*, using similar methods as employed by natural sciences. By the 1930s, positivism came to flourish in the USA and gradually other countries also followed the trend.

Comte's positivism (that knowledge can be derived only from sensory experience) was criticised both from within and outside the positivist domain. Within positivism, a branch called *lay ad positivism* was developed in early twentieth century which claimed that science is both *logical* and also based on observable facts and that the truth of any statement lies in its verification through sensory experience. Outside positivism developed schools of thought like symbolic interactionism, phenomenology and ethno methodology, etc. These schools questioned the positivist methodology and its perception of social reality.

Frankfurt and Marxist schools also sharply criticised positivism. But *empiricism* came to be accepted more in the 1950s and 1960s onwards by the academics. Today some writers refer to the emergence of a new stage of research, *post-empiricist* research marked by the notion that the scientific method is not the only source of knowledge, truth and validity (Sarantakos, *Social Research*, 1998:5). Thus, today, sociological methodology is no longer based on *positivist* methodology as in the past but it has become a body of diverse methods and techniques, all of which are perceived as valid and legitimate in social research.

We have thus today two approaches to social science research: the scientific empirical method and the naturalistic phenomenological method (Robert B. Burns, *Introduction to Research*, 4th ed., 2000:3). In the former, quantitative research methods are employed in an attempt to establish general laws or principles. This approach, also termed as *nomothetic*, -assumes that social reality is objective and external to the individual. The latter approach to research emphasises the importance of the subjective experience of individuals, with a focus on qualitative analysis. It regards social reality as a creation of individual consciousness, with evaluation of events seen as a personal and subjective construction. This approach {with focus on individual case rather than general law-making) is termed as *ideographic* approach.

1.3. Scientific Research or Scientific Method in Conducting Research

The first question is» what is research? Research is a careful and exhaustive investigation of a phenomenon with an objective of advancing knowledge. 'According to Theodorson and Theodorson (1969:347), "it is a systematic and objective attempt to study a problem for the purpose of deriving general principles". Robert Burns (2000:3) describes it as a systematic investigation to find solutions to a problem. The investigation is guided by previously collected information. Man's knowledge grows by studying what is already known and revising past knowledge in the light of new findings. Activity undertaken for the purpose of personal learning or enlightenment or any causal investigation is not research.

While talking of research, sometimes we talk of empirical (scientific) research and sometimes of library research, historical research, social research, and so on. *Empirical research* involves observation of facts or interaction with people. *Library research* is done in library situation. *Historical research* is the study of history (e.g., functioning of caste system in different periods of history) or biographical research (e.g., research into the life and times of Mahatma Gandhi). *Social research* is a research that focuses on the study of human groups or the processes of social interaction. *Scientific research* is

building of knowledge through collection of empirically verifiable facts. The term 'verifiable' here means "which can be checked by others for accuracy". KerHnger (op.cit., 1964:13) has def in ed~ scientific research as "a systematic, controlled, empirical and-critical investigation of hypoetical propositions about the presumed relations among phenomena". Three points that have been emphasised here are: (i) it is *systematic* and *controlled*, i.e., the investigation is so ordered that investigators can have confidence in research outcomes. In other words, the research situation Js tightly disciplined; (ii) investigation is *empirical*, i.e., subjective belief is checked against objective reality; and (iii) it is *critical*, i.e., the researcher is critical not only of the results of his own inquiry but of the research results of others too. Though it is easy to err, to exaggerate, to over-generalise when writing up one's own work, it is not easy to escape the feeling of scientific eyes of others.

Royce A. Singleton and Bruce C. Straits (*Approaches to Social Research*, 1999:1) have said that "scientific social research consists of the process of formulating and seeking answers to questions about the social world". For example, why do husbands batter their wives? Why do people take drugs? What are the consequences of population explosion? and so on. Similarly, the issues of inquiry may be of rural poverty, urban slums, youth crime, political corruption, exploitation / of the weak, environmental pollution, and the like. To answer these / questions, social scientists have devised basic guidelines, principles and techniques. Scientific social research thus investigates any curiosity about *social* phenomena, utilising scientific method. Scientific sociological research, broadly speaking, is concerned with discovering, organising and developing systematic reliable knowledge about soci-^lety or social life, social action, social behaviour, social relations, social Groups (like families, castes, tribes, communities, etc.), social organisations (like social, religious, political, business, etc.), and social systems and social structures.

Theodorson and Theodorson (1969:370) have maintained that scientific method is "building of a body of scientific knowledge through observation, experimentation, generalisation and verification". Their contention is that scientific inquiry develops knowledge experienced through the senses, i.e., which is based on empirical evidence. Accord-,ing to Manheim (1994:77), scientific research involves a method / characterised by objectivity, accuracy and systematisation. Objectivity eliminates biases in fact-collect ion and .interpretation: Accuracy makes sure that things are exactly as described. Systematisation aims at consistency and comprehension.

The assumption is that any statement pertaining to any social phenomenon made on the basis of scientific inquiry can be accepted as true and meaningful, if it is empirically verifiable. Thus, individual's idiosyncratic observations not shared by all scientists are not regarded as 'scientific facts'. For example, a statement that "skilled workers are more indisciplined than non-skilled workers" lacks empirical validity; hence no one will accept it as a 'scientific fact'. But, if a statement is given that "the important cause of child's delinquent behaviour is a disorganised family", it will be taken as scientific, considering it a proposition which has been found valid in a number of studies. "About whom" the facts will be collected in a scientific inquiry will depend upon the 'focus of the discipline' to which the researcher belongs. If the researcher is a sociologist, he will collect facts about social phenomena or social world. But if he is a student of business administration (MBA), he will collect facts pertaining to "different aspects of business like finance, marketing, personnel, and the process that facilitates the managerial decision-making and problem-solving". In sociology, social inquiry will help the researcher and the people to understand the social phenomenon (say, a social problem like exploitation of the weak? poverty, political corruption, etc., or the structure of political parties, or the functioning of political elite, or social institutions in a village community, and so on), or to understand why the behaviour of an individual in a group (crowd) is different from the one when he is in isolation (crowd behaviour) or how the behaviour patterns of a number of persons change when they respond to a common stimulus (collective behaviour), or why and how the patterns of interaction within a small group or of interrelationships of social processes (group dynamics).

In business administration, according to Zikmund (1984:56-57), the scientific inquiry will help managers to clarify their objectives and decisions. For example, a manager of an organisation wants to find out why has the morale of the subordinates declined? Is it because the overtime has been totally stopped or the employees for higher posts are directly recruited and the serving employees have no opportunities for seeking higher posts, or the employer has developed the tendency of appointing persons on contract basis, or the credit facility provided earlier by the organisation has been stopped, or the profits are not being shared by the employer with the employees, or the employer has refused to provide housing facilities even to senior employees, and so forth. Thus, while the major areas of inquiry/research for a sociologist, personnel, sales and marketing (advertising, buyer's behaviour), responsibility (legal, constraints) and general business (i.e., location, trend, import and export, etc).

Although scientific research method depends on the collection of empirical facts, yet facts alone do not constitute a science. For meaningful understanding facts must be ordered in some fashion, analysed, generalised, and related to other facts. Thus, theory construction is a vital part of the scientific inquiry.

Since facts collected and findings evolved through the scientific method are interrelated with the previous findings of other scholars or earlier theories, scientific knowledge is a cumulative process.

The scientific method could either be an *inductive* method or the *deductive* method. Inductive method involves establishing generalisations, i.e., building generalisations inferred from specific facts, or drawing particular principles from general instances, while deductive method involves testing generalisations, i.e., it is the process of reasoning from general principles to particular instances.

Research and theory are not opposed to each other. Research leads to theory and theory to research. In fact, descriptive research leads to explanatory research which leads to theoretical research.

According to Singleton and Straits (op. cit.: 5-9), there are four research strategies for understanding the social world: (1) experiments (2) surveys, (3) field research, and (4) use of available data. *Experimental research* offers the best approach for investigating the causes of phenomena. In the experiment, the researcher systematically manipulates some feature of the environment and then observes whether a systematic change follows in the behaviour under study. *Survey research* involves the administration of questionnaires or interviewing relatively large groups of people. *Field research* is engaging oneself in naturally occurring set of events in order to gain firsthand knowledge of the situation. The *available data* are the data that have been generated for purposes other than those for which the researcher is using them, e.g., written records, newspapers, government documents, books, diaries, etc.

1.4.Characteristics of Scientific Research

Horton and Hunt have given following nine characteristics (1984:4-7) of scientific method:

- *Verifiable evidence*, i.e., factual observations which other observers can see and check.
- *Accuracy*, i.e., describing what really exists. It means truth or correctness of a statement or describing things exactly as they are and avoiding jumping to unwarranted conclusions either by exaggeration or fantasising.

- *Precision*, i.e., making it as exact as necessary, or giving exact number or measurement. Instead of saying, "I interviewed a large number of people", one says, "I interviewed 493 persons". Instead of saying, "most of the people were against family planning", one says, "seventy two per cent people were against family planning". Instead of saying, "every moment one is born; every moment dies a man", one says, "thirty persons are born in one minute in India". Thus, in scientific precision, one avoids colourful literature and vague meanings. How much precision is needed in social science will depend upon what the situation requires.
- *Systematisation*, i.e.,¹ attempting to find *all* the relevant data, or collecting data in a systematic and organised way so that the conclusions drawn are reliable. Data based on casual recollections are generally incomplete and give unreliable judgements and conclusions.
- *Objectivity*, i.e., being free from all biases and vested interests. It means, observation is unaffected by the observer's values, beliefs and preferences to the extent possible and he is able to see and accept facts as they are, not as he might wish them to be. The researcher remains detached from his emotions, prejudices and needs, and guards his biases. A *bias* is an unconscious tendency to see facts in a certain way because of one's wishes, interests and values. For example, the protest demonstration of students in a university may be perceived by some as a logical effort for the welfare of the students while others may see it as a misguided method of getting the grievances mitigated. The researcher who wants to see it objectively will present all facts and views of students, teachers, administrators, etc. He will neither attempt to overlook some facts deliberately nor emphasise some other facts, as he himself will not be emotionally involved in the situation. He will make conscious effort to be accurate in information he collects or what he hears and sees. As an objective researcher, he will have no vested interest in reporting and analysing facts. The researcher is also conscious of the fact that others with a different point of view can check and criticise his analysis. Being afraid of shoddy exposure of his research, he will not permit his biases to affect his results and conclusions.
- *Recording*, i.e., jotting down complete details as quickly as possible. Since human memory is fallible, all data collected are recorded. Researcher will not depend on the recalled facts but will analyse the problem on the basis of the recorded data. Conclusions based on recalled unrecorded data are not trustworthy.
- *Controlling conditions*, i.e., controlling all variables except one and then attempting to examine what happens when that variable is varied. This is the basic technique in all scientific experimentation allowing one variable to vary while holding all other variables constant. Unless all variables except one have been controlled, we cannot be sure which

variable has produced the results. Though a physical scientist is able to control as many variables as he wishes in an experiment he conducts in the laboratory (say, heat, light, air pressure, time interval, etc.) but a social scientist cannot control all variables as he wishes. He functions under many constraints. For instance, a researcher wants to study the behaviour of students in a classroom. Now, students' behaviour in a classroom depends upon several factors, like efficiency of the teacher of communicating his views, subject which is being taught, availability of black-board, fan, etc., in the room, quietness in the verandah outside the classroom, and so forth. A researcher may be able to control some of these variables but not all. Varying conditions will be responsible for varying behaviour of the students. It is, however, possible for a researcher in social science to work with two or more variables at a time. It is called multivariate analysis. Since the social scientist is not always able to control all the variables he wants, his conclusions do not permit him to predict.

- *Training investigators*, i.e., imparting necessary knowledge to investigators to make them understand what to look for, how to interpret it and avoid inaccurate data collection. When some remarkable observations are reported, the scientist first tries to know what is the observer's level of education, training and sophistication? Does he really understand facts he reports? The scientists are always impressed by authenticated reports.

All above characteristics of scientific method point out that any generalisation based on this type of investigation is true. A systematically collected body of scientific evidence is rarely challenged. No wonder, Zikmund has also said that the data collected haphazardly can not be described as scientific inquiry.

Henry Johnson has stated following four characteristics of scientific research (see, Black and Champion, 1960: 5-6):

1. *It is empirical*, i.e., it is based on observation and reasoning and not on speculation.
2. *It is theoretical*, i.e. it summarises data precisely giving logical relationship between propositions which explain causal relationship.
3. *It is cumulative*, i.e., generalisations/theories are corrected, rejected and newly developed theories are built upon one another.
4. *It is non-ethical*, i.e., scientists do not say whether particular things /events/phenomena/institutions/systems/structures are good or bad. They only explain them.

Robert B. Burns (2000:5-7) has discussed four characteristics of scientific approach: control, operational definition, replication and hypothesis testing.

Control is necessary to eliminate the simultaneous influence of many variables to isolate the cause of an effect. Control provides unambiguous answers to why something happens, what causes some event or under what conditions an event does occur.

Operational definition means that the terms must be defined in terms of steps to measure them; e.g., economic class may be defined by family income, and social class by father's occupation or both parents' educational level.

Replication means that for repeated study, the data obtained must be reliable. If observations are not repeatable, our descriptions and explanations are unreliable and useless.

Hypothesis testing means that the researcher 'systematically creates a hypothesis and subjects it to empirical test.

1.5.Aims of Social Research

The aims of social research coincide with the type of research, i.e., whether it is exploratory research or explanatory research or descriptive research. In other words, it depends upon the general goals (understanding for its own sake), the academic goals, the theoretical goals and the pragmatic goals of research. Broadly speaking, the important aims of social research are:

- To understand the functioning of society.
- To study individual behaviour and social action.
- To evaluate social problems, their effects on society, and to find out possible solutions.
- To explore social reality and explain social life.
- To develop theories.

Becker (1989) and Sarantakos (1998:16) have referred to the following goals of social research:

- *General goals*: Understanding for its own sake.
- *Theoretical goals*: Verification, falsification, modification or discovery of a theory.
- *Pragmatic goals*: Solution of social problems.
- *Political goals*: Development of social policy, evaluation of pro-liberation.

Sometimes the aims of social research coincide with the motives of social research but not always. The motives can be *intrinsic* (i.e., related to personal interests of the

researcher) or *extrinsic* (i.e., related to the interests of those contracting the research). Mahr (1995:84) has outlined the following *motives* of social research:

- *Educational*: to educate and inform the public. -
- *Personal*: to promote the academic status of the researcher.
- *Institutional*: to enhance the research quantum of the institutions for which the Researcher works.
- *Political*: to provide support to political plans and programmes.
- *Tactical*: to delay decision or action for as long as the investigation is under Way.

1.6.Steps in Scientific Research

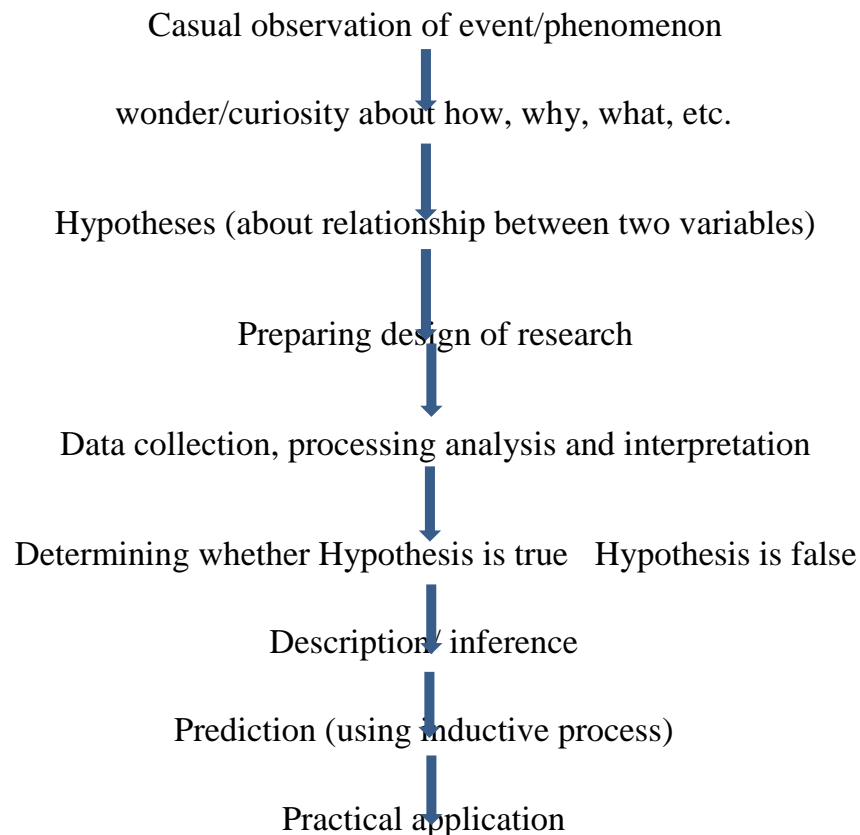
According to Theodorson and Theodorson (1969:370-371), scientific method involves the following steps: *First*, the problem is defined. *Second*, the problem is stated in terms of a particular theoretical framework and related to relevant findings of previous research. *Third*, a hypothesis (or hypotheses) relating to the problem is devised, utilising previously accepted theoretical principles. *Fourth*, the procedure to be used in gathering data to test the hypothesis is determined. *Fifth*, the data are gathered. *Sixth*, the data are analysed to determine if the hypothesis is verified or rejected. *Finally*, the conclusions of the study are related to the original body of theory, which is modified in accordance with the new findings.

Kenneth D. Bailey (*Methods of Social Research*, 2nd ed., 1982:9) has delineated five stages of social research: (1) choosing the research problem and stating the hypotheses; (2) formulating the research design; (3) gathering the data; (4) analysing the data; and (5) interpreting the results so as to test the hypotheses. We concede Bailey's view that each research problem has a goal but is it necessary that the goal be stated in terms of hypotheses? Many researches have no hypotheses to test but the findings provide knowledge to the researchers to throw some hypotheses to be tested and generalised, or to revise the hypotheses propounded on the basis of some *i. arlier* work done by some other researcher.

A problem cannot be formulated in a vacuum. It is either based upon past research or on relationship observed/conceived between and polarisation of two religious communities or sects (see, V.V. Singh, *Communal Riots*, 1992). The researcher has only to measure two variables of (a) polarisation of commrmities, and (b) hatred as a negative social effect of polarisation. The researcher has, of course, to focus upon the nature of polarisation, causes of polarisation, conflicts ^ arisen because of mutual hatred on different occasions, the precipitating factor in the riot, role of leader in instigation/suppression of hostile feelings, and so on. Of course, the researcher has to

control the extraneous factors that might interfere with the finding, e.g., conflict which cannot be attributed to religious hatred, etc. The hypothesis that "hatred caused by religious polarisation causes aggression" will be supported if people show or do not show dislike for strangers from different religions. The tool for collecting data would depend upon the nature of relationship to be examined between two variables and the type of people involved in the study. Data analysis may sometimes be complicated because more variables may be involved and many confounding factors might affect the relationship between the two given variables, which may not have been properly controlled. Interpreting the results many a time requires replicating the study either with a new sample or a larger sample to make sure that the finding was not a fluke.

Henry Manheim (1980:80) has suggested nine steps in scientific research which may be shown diagrammatically in the following way:



Thus, this is a never-ending aspect of science, with the process constantly being repeated with increasing refinement.

Earl Babbie (*The Practice of Social Research*, 8th ed., 1998:112) has proposed the following six elements of a research proposal:

- *Problem or objective*, i.e., stating what is to be studied, its worth and practical significance, and its contribution to the construction of social theories.
- *Literature review*, i.e., what¹ others have said about this topic, what theories have been addressed to it and what are the flaws in the existing research that can be remedied.
- *Subjects for study*, i.e., from whom is the data to be collected, how to reach persons who are available for study, whether selecting sample will be appropriate, and if yes, how to select this sample and how to insure that research that is being conducted will not harm the respondents.
- *Measurement*, i.e., determining key variables for the study, how will these variables be defined and measured, how will these definitions and measurements differ from previous researches on the topic.
- *Data, collection methods*, i.e., determining methods to be used for collecting data-survey or experiment, etc. statistics to be used or not.
- *Analysis*, i.e., spell out the logic of analysis whether variations in some quality are to be accounted or not, and the possible explanatory variables to be analysed.

Horton and Hunt (1984:10) have pointed out eight steps in scientific research or scientific method of investigation:

1. *Define the problem*, which is worth studying through the methods of science.
2. *Review literature*, so that errors of other research scholars may not be repeated.
3. *Formulate the hypotheses*, i.e., propositions which can be tested,
4. *Plan the research design*, i.e., outlining the process as to how, what and where the data is to be collected, processed and analyzed.
5. *Collect the data*, i.e., actual collection of facts and information in accordance with the research design. Sometimes it may become necessary to change the design to meet some unforeseen difficulty.
6. *Analyze the data*, i.e., classify, tabulate and compare the data, making whatever tests are necessary to get the results.
7. *Draw conclusions*, i.e., whether the original hypothesis is found true or false and is confirmed or rejected, or are the results inconclusive? What has the research added to our knowledge? What implications has it for sociological theory? What new questions have been posed for further research?
8. *Replicate the study*. Though the above-mentioned seven steps complete a single research study but research findings are confirmed by replication. Only after several researches can the research conclusions be accepted as generally true.

These steps help us in summarizing the so-called scientific approach to inquiry. First, there is doubt whether an indeterminate situation can be made determinate. The scientist experiences vague doubts and is emotionally disturbed. He struggles to formulate the problem, even if inadequately. He studies the literature and scans his own experience and the experiences of others. With the problem formulated, with the basic questions properly asked, he constructs the hypotheses mainly on experimented lines. By collecting the required data, he tests the hypotheses which he may ultimately accept, change, abandon, broaden or narrow down. In this process, sometimes one phase may be expanded, other may be skimmed and there may be fewer or more steps involved. These things are not important. What is important is a controlled rational process of reflective inquiry.

Example of a research problem indicating steps

We may take one example to understand the steps in social research as suggested by various scholars. As a *first step*, we need a research problem. Suppose our problem is "Role Adjustment of Working Women", i.e., how do working women face conflict between the role of a householder and that of a wage-earner and how do they adjust themselves in family and office? In fact, this problem covers too many aspects. We need *a limited and a specific aspect for research*. For this we take the aspect of assessing: "Do working women suffer professionally by not devoting much time to their work? The review of the literature—the *second step*—may not provide us much information; yet it is necessary to check whether this theme has been studied by other scholars and what are their findings? One can check from books and journals, including *Sociological Abstracts*. This search of literature is extremely important. The *third step* is to formulate one or more hypotheses. One might be: "Married working women get less promotions than single (unmarried, divorcee) working women." Other might be: "The reputation of childless married women of being dedicated and committed workers is much higher than women with two or more children." Planning research design is the *fourth step*. Ali categories must be designed and the variables to be controlled must be decided. We must be sure that the two groups we compare are similar in all important respects except marital status or number of children. We must select sources of data, kinds of data sought, and procedures for collecting and processing them. One possibility is that the research is confined to female lecturers in a university, the other possibility is to study female clerks in some office (say secretariat) and so forth. The *fifth step* is actual collection of data and classifying and processing it. In this age of research, the data are generally made "computer sensible" (prepared for computer processing by assigning codes to various response categories, etc.). The computer gives the desired computations and comparisons including data for statistical tests. The *sixth step* is to ana-

lyse data for finding out contrast between the two groups. In this process, sometimes unexpectedly, even some additional hypotheses may be developed. The *seventh step* is drawing conclusions. Are our hypotheses true or false? What further study is suggested by our research? *Finally*, other researchers will undertake replication studies.

The basic procedure is the same for all scientific inquiries and researches. Only techniques may vary according to the problem under study. However, one thing that needs to be remembered is that hypotheses are not involved in all researches. Some researches may only collect the data and develop hypotheses from the analysis of data. Thus, "anything involving careful objective collecting of verifiable evidence in search for knowledge is scientific research" (Horton and Hunt, op.cit.:12).

1.7. Types of scientific research

1.7.1. Quantitative research

Quantitative research is generally associated with the positivist/postpositivist paradigm. It usually involves collecting and converting data into numerical form so that statistical calculations can be made and conclusions drawn.

The process

Researchers will have one or more **hypotheses**. These are the questions that they want to address which include predictions about possible relationships between the things they want to investigate (**variables**). In order to find answers to these questions, the researchers will also have various instruments and materials (e.g. paper or computer tests, observation check lists etc.) and a clearly defined plan of action.

Data is collected by various means following a strict procedure and prepared for **statistical analysis**. Nowadays, this is carried out with the aid of sophisticated statistical computer packages. The analysis enables the researchers to determine to what extent there is a relationship between two or more variables. This could be a simple association (e.g. people who exercise on a daily basis have lower blood pressure) or a causal relationship (e.g. daily exercise actually leads to lower blood pressure). Statistical analysis permits researchers to discover complex causal relationships and to determine to what extent one variable influences another.

The results of statistical analyses are presented in journals in a standard way, the end result being a **P value**. For people who are not familiar with scientific research jargon, the discussion sections

at the end of articles in peer reviewed journals usually describe the results of the study and explain the implications of the findings in straightforward terms

Principles

Objectivity is very important in quantitative research. Consequently, researchers take great care to avoid their own presence, behaviour or attitude affecting the results (e.g. by changing the situation being studied or causing participants to behave differently). They also critically examine their methods and conclusions for any possible bias.

Researchers go to great lengths to ensure that they are really measuring what they claim to be measuring. For example, if the study is about whether background music has a positive impact on restlessness in residents in a nursing home, the researchers must be clear about what kind of music to include, the volume of the music, what they mean by restlessness, how to measure restlessness and what is considered a positive impact. This must all be considered, prepared and controlled in advance.

External factors, which might affect the results, must also be controlled for. In the above example, it would be important to make sure that the introduction of the music was not accompanied by other changes (e.g. the person who brings the CD player chatting with the residents after the music session) as it might be the other factor which produces the results (i.e. the social contact and not the music). Some possible contributing factors cannot always be ruled out but should be acknowledged by the researchers.

The main emphasis of quantitative research is on deductive reasoning which tends to move from the general to the specific. This is sometimes referred to as a top down approach. The validity of conclusions is shown to be dependent on one or more premises (prior statements, findings or conditions) being valid. Aristotle's famous example of deductive reasoning was: All men are mortal → Socrates is a man → Socrates is mortal. If the premises of an argument are inaccurate, then the argument is inaccurate. This type of reasoning is often also associated with the fictitious character Sherlock Holmes. However, most studies also include an element of inductive reasoning at some stage of the research (see section on qualitative research for more details).

Researchers rarely have access to all the members of a particular group (e.g. all people with dementia, carers or healthcare professionals). However, they are usually interested in being able to make inferences from their study about these larger groups. For this reason, it is important that the people involved in the study are a representative **sample** of the wider population/group. However, the extent to which generalizations are possible depends to a certain extent on the number of people involved in the study, how they were selected and whether they are representative of the wider group. For example, generalizations about psychiatrists should be based on a study involving psychiatrists and not one based on psychology students. In most

cases, random samples are preferred (so that each potential participant has an equal chance of participating) but sometimes researchers might want to ensure that they include a certain number of people with specific characteristics and this would not be possible using random sampling methods. Generalizability of the results is not limited to groups of people but also to situations. It is presumed that the results of a laboratory experiment reflect the real life situation which the study seeks to clarify.

When looking at results, the **P value** is important. P stands for probability. It measures the likelihood that a particular finding or observed difference is due to chance. The P value is between 0 and 1. The closer the result is to 0, the less likely it is that the observed difference is due to chance. The closer the result is to 1, the greater the likelihood that the finding is due to chance (random variation) and that there is no difference between the groups/variables.

- **Quantitative method**

The main preoccupation or focus of quantitative researchers is *Measurement*.

Measurement involves two issues reliability and viability. The issues of reliability and viability are central in quantitative research though this is not always manifested in practice. Reliability is concerned with the question of whether the results of a study are repeatable given the same context-whether a measure is stable or not. Validity is concerned with the integrity (truth) of the conclusions that are generated from a piece of research.

Causality

There is a strong concern in most quantitative research of need to have explanation. Quantitative researchers are rarely concerned merely to describe how things are but are keen to say why things are the way they are which means examining causes. In quantitative research reports you will often come across the idea of independent and dependent variables which reflect the tendency to think in terms of causes and effects

Generalization

In quantifiable research the researcher is usually concerned with being able to say that his or her findings can be generalized beyond the confines of the particular context in which the research was conducted. This is the reason why the issue of obtaining a representative sample is stressed.

Replication

The quantitative researcher is interested in spelling out the details of procedures of conducting research so that it can be carried out elsewhere.

Quantitative data analysis

Quantitative data analysis is indeed something that occurs typically at a late stage in the overall process and is also a distinct stage. However that does not mean that you should not be considering how you will analyze your data until then. In fact, you should be fully aware of what techniques you will apply at a fairly early stage for example when designing a questionnaire.

The two mention reasons for this are as follows:

1. You can not apply just any technique to any variable. Techniques have to be appropriately matched to the types of variables that you have created through your research. This means you must be fully conversant with the ways in which different types of variables are classified
2. The size and nature of your sample are likely to impose limitations on the kinds of techniques you can use. A large sample which is usually what is required requires different techniques from a small sample. SPSS is for large samples.

Types of variables in quantitative research

In a questionnaire, the kind of information that is looked for varies by question. Some of the questions call for answers in terms of real numbers, others ask for either or answers, others are in form of list of categories etc. These considerations lead to a classification of the different types of variables that are generated in the course of the research.

The classification is also at times referred to as measurement. In the social and behavioural sciences, as in many other areas of science, we typically assign numbers to various attributes of people, objects, or concepts. This process is known as measurement. For example, we can measure the height of a person by assigning the person a number based on the number of inches tall that person is. Or, we can measure the size of a city by assigning the city a number which is equal to the number of residents in that city.

The four main types of variables/measurements are:

Interval/ratio variables

An interval variable is one where the intervals between the values of the variable are equally spaced. For example, suppose you have a variable such as annual income that is measured in dollars, and we have three people who make \$10,000, \$15,000 and \$20,000. The second person makes \$5,000 more than the first person and \$5,000 less than the third person, and the size of these intervals is the same. If there were two other people who make \$90,000 and \$95,000, the size of that interval between these two people is also the same (\$5,000).

An interval variable is a measurement where the difference between two values is meaningful.

With these variables, the distances between the categories are identical across the range of categories for example age of respondent. An interval variable allows us not only to rank order the items that are measured, but also to quantify and compare the sizes of differences between them.

As a type of measurement, Interval scales, provide us with still more quantitative information.

When a variable is measured on an interval scale, the distance between numbers or units on the scale is equal over all levels of the scale. An example of an Interval scale is the Fahrenheit scale of temperature. In the Fahrenheit temperature scale, the distance between 20 degrees and 40 degrees is the same as the distance between 75 degrees and 95 degrees.

With Interval scales, there is no absolute zero point. For this reason, it is inappropriate to express Interval level measurements as ratios; it would not be appropriate to say that 60 degrees is twice as hot as 30 degrees

Ratio scales, do have a fixed or absolute zero point. That is, zero represents the absence of the thing being measured. Not only are numbers or units on the scale equal over all levels of the scale, but there is also a meaningful zero point which allows for the interpretation of ratio comparisons. Time is an example of a ratio measurement scale. Not only can we say that difference between three hours and five hours is the same as the difference between eight hours and ten hours (equal intervals), but we can also say that ten hours is twice as long as five hours (a ratio comparison).

Ordinal variables

An ordinal variable is one where the order matters but not the difference between values. For example, you might ask patients to express the amount of pain they are feeling on a scale of 1 to 10. A score of 7 means more pain than a score of 5, and that is more than a score of 3. But the difference between the 7 and the 5 may not be the same as that between 5 and 3. For example in the question how frequently do you usually go to the gym? (please tick)

Everyday.....

4-6 days a week.....

2 or 3 days a week.....

Once a week.....

2 or 3 times a month.....

The difference between the category everyday and 4-6 days a week is not the same as the distance between 4-6 days and 2-3 days a week. However we can say that “everyday” is more frequent than 4-6 days a week which is more frequent than 2 or 3 days a week.

In terms of measurement, ordinal measurement scales, do indicate something about the rank-ordering of study participants. For example, if you think of some type of competition or race (swimming, running), it is possible to rank order the finishers from first place to last place. If someone tells you they finished 2nd, you know that one person finished ahead of them, and all other participants finished behind them.

Although ordinal variables provide information concerning the relative position of participants or observations in our research study, ordinal variables do not tell us anything about the absolute magnitude of the difference between 1st and 2nd or between 2nd and 3rd. That is, we know 1st was before 2nd, and 2nd was before 3rd, but we do not know how close 3rd was to 2nd or how close 2nd was to 1st. The 1st place finisher could have been a great deal ahead of the 2nd place finisher, who finished a great deal ahead of the 3rd place finisher; or, the 1st, 2nd, and 3rd place finishers may have all finished very close together.

The image below illustrates the ordinal ranking of individuals in a competition. The tick mark to the far right illustrates the person who finished in first place, while the tick mark to the far left represents the person who finished sixth out of six.

The limits of ordinal data are most apparent when one looks at the distance between the third and the fourth place finishers. Although the absolute distance between third and fourth was not that large, the measurement of ordinal data does not indicate this detail.

Note: if you group an interval /ratio variable like age into categories like 20 under, 21-30, 31-40, 41-50, 51 above etc, you are transforming it into an ordinal variable.

Nominal variables

These variables also known as categorical variables comprise categories that cannot be rank ordered.

The values of a nominal variable do not indicate the amount of the thing being measured, nor are they in any particular order. If coded numerically, the numbers chosen are arbitrary. For example, if we list the regions of the United States as Northeast, South, Midwest, and West, we are not indicating the amount of "regionness" each possesses, nor listing them in order of "regionness." We may code the regions as "1," "2," "3," and "4" respectively, but this is done merely for convenience and in no way quantifies what we are doing. Each value, numerical or otherwise, is merely a label or name (hence the term "nominal").

A nominal variable has two or more categories, but there is no intrinsic ordering to the categories. For example, gender is a categorical variable having two categories (male and

female) and there is no intrinsic ordering to the categories. Hair colour is also a categorical variable having a number of categories (blonde, brown, brunette, red, etc.) and again, there is no agreed way to order these from highest to lowest. A purely categorical variable is one that simply allows you to assign categories but you cannot clearly order the variables. If the variable has a clear ordering, then that variable would be an ordinal variable, E.g. in a question

Which of the following best describes your main reason for going to the gym (Please tick only one)

Relaxation.....

Lose weight....

Meet others.....

We cannot say that relaxation is more of something than losing weight or meeting others

In terms of measurement, sometimes the assignment of numbers to concepts we are studying is rather simplistic, such as when we assign a number to reflect a person's gender (i.e., Male = 0 and Female = 1). This type of measurement is known as a Nominal measurement scale. A

Nominal measurement scale is used for variables in which each participant or observation in the study must be placed into one mutually exclusive and exhaustive category. For example, categorizing study participants into "male" and "female" categories demonstrates that 'sex' is measured on a nominal scale. Every observation in the study falls into one, and only one, Nominal category.

With a nominal measurement scale, there is no relative ordering of the categories -- the assignment of numeric scores to each category (Male, Female) is purely random

Dichotomous variables

These variables contain data that have only two categories and may sometimes be treated as nominal, ordinal, or interval. Data has only one interval e.g. gender. One is either a man or woman

Types of quantitative analysis

1. Univariate Analysis

This refers to the analysis of one variable at a time. The commonest approaches include Frequency tables

These provide the number of people and the percentage to each of the categories for the variable in the question

Frequency table showing reasons for visiting the gym

Reason	N	Per cent
Relaxation	9	10
Maintain or improve fitness	31	34
Lose weight	33	37
Build strength	17	19
Total	90	100

Frequency table showing ages of gym members

Age	N	Per cent
20 and under	3	3
21-30	39	44
31-40	23	26
41-50	21	24
51 and over	3	3
Total	89	100

- **Diagrams**

If you are working with nominal or ordinal variables the bar chart and the pie chart are two of the easiest methods.

- **Measures of central tendency**

This is seeking out an average for a distribution and in quantitative data analysis 3 forms of averages are recognized

- **Arithmetic mean**

This is where we sum all the values in a distribution and then divide by the number of values.

The mean should be employed only in relation to interval/ratio variables though it is not uncommon to see it being used for ordinal variables as well.

Note: the mean is affected by outliers (extreme values at either end of the distribution) which exert considerable upward or downward pressure on the mean.

- **Median**

The midpoint in a distribution of values

The median is not affected by outliers. The median is derived by arraying all the values in a distribution from the smallest to the largest then finding a midpoint. If there is an even

- **Mode**

The value that occurs most frequently in a distribution

- **Measures of dispersion**

The most obvious way of measuring dispersion is by range-the difference between the maximum and the minimum. Like the mean, the range is also affected by the outliers.

- **Standard deviation**

Another measure of dispersion is the standard deviation which is the amount of variation around the mean.

2. Bivariate analysis

This is concerned with the analysis of two variables at a time in order to uncover whether the two variables are related. Exploring relationships, between variables, means searching for evidence that the variation in one variable coincides with variation in another variable. A variety of techniques are available for examining relationships, but their use depends on the nature of the two variables being analysed.

Methods of Bivariate Analysis

	Nominal	Ordinal	Interval/ratio	Dichotomous
Nominal	Contingency table Chi Square (x2)	Contingency table Chi Square	Contingency table Chi Square	Contingency table Chi Square
Ordinal	Contingency table Chi Square Cramer's V	Spearman's rho (p)	Spearman's rho (P)	Spearman's rho (P)
Interval/ratio	Contingency table Chi Square (x2) Cramer's V	Spearman's rho (P)	Pearson's rho	Spearman's rho (p)
Dichotomous	Contingency table Chi Square (x2) Cramer's V	Spearman's rho (P)	Spearman's rho (P)	Phi

Note: Bivariate analysis is concerned with relationships and not causality. An important point to bear in mind about all the methods of analyzing relationships between variables is that it is precisely relationships that they uncover and one cannot therefore infer that one variable causes another.

Relationship refers to an association between two variables where by the variation in one variable coincides – corresponds - matches with variation in another variable.

Sometimes a researcher may feel confident that they can infer a causal direction when a relationship between two variables is looked at. Although such conclusions may be based on sound reasoning, they can only be inferences or assumptions and there is the possibility that the real pattern of causal direction is the opposite of that which is anticipated or assumed.

Correlation. An approach to the analysis of relationships between interval/ratio variables and/or ordinal variables that seeks to assess the strength and direction of the relationship between the variables concerned. Pearson's r and Spearman's rho are both methods of assessing the level of correlation between the variables.

1.7.2. Qualitative research

Qualitative research is the approach usually associated with the social constructivist paradigm which emphasises the socially constructed nature of reality. It is about recording, analysing and attempting to uncover the deeper meaning and significance of human behaviour and experience, including contradictory beliefs, behaviours and emotions. Researchers are interested in gaining a rich and complex understanding of people's experience and not in obtaining information which can be generalized to other larger groups.

The process

The approach adopted by qualitative researchers tends to be inductive which means that they develop a theory or look for a pattern of meaning on the basis of the data that they have collected. This involves a move from the specific to the general and is sometimes called a bottom-up approach. However, most research projects also involve a certain degree of deductive reasoning (see section on quantitative research for more details).

Qualitative researchers do not base their research on pre-determined hypotheses. Nevertheless, they clearly identify a problem or topic that they want to explore and may be guided by a theoretical lens - a kind of overarching theory which provides a framework for their investigation.

The approach to data collection and analysis is methodical but allows for greater flexibility than in quantitative research. Data is collected in textual form on the basis of observation and interaction with the participants e.g. through participant observation, in-depth interviews and focus groups. It is not converted into numerical form and is not statistically analysed.

Data collection may be carried out in several stages rather than once and for all. The researchers may even adapt the process mid-way, deciding to address additional issues or dropping questions which are not appropriate on the basis of what they learn during the process. In some cases, the researchers will interview or observe a set number of people. In other cases, the process of data collection and analysis may continue until the researchers find that no new issues are emerging.

Principles

Researchers will tend to use methods which give participants a certain degree of freedom and permit spontaneity rather than forcing them to select from a set of pre-determined responses (of which none might be appropriate or accurately describe the participant's thoughts, feelings, attitudes or behaviour) and to try to create the right atmosphere to enable people to express themselves. This may mean adopting a less formal and less rigid approach than that used in quantitative research.

It is believed that people are constantly trying to attribute meaning to their experience. Therefore, it would make no sense to limit the study to the researcher's view or understanding of the situation and expect to learn something new about the experience of the participants. Consequently, the methods used may be more open-ended, less narrow and more exploratory (particularly when very little is known about a particular subject). The researchers are free to go beyond the initial response that the participant gives and to ask why, how, in what way etc. In this way, subsequent questions can be tailored to the responses just given.

Qualitative research often involves a smaller number of participants. This may be because the methods used such as in-depth interviews are time and labour intensive but also because a large number of people are not needed for the purposes of statistical analysis or to make generalizations from the results.

The smaller number of people typically involved in qualitative research studies and the greater degree of flexibility does not make the study in any way "less scientific" than a typical quantitative study involving more subjects and carried out in a much more rigid manner. The objectives of the two types of research and their underlying philosophical assumptions are simply different. However, as discussed in the section on "philosophies guiding research", this does not mean that the two approaches cannot be used in the same study.

The nature of this type of research is exploratory and open ended. Small number of people are interviewed in depth and or a relatively small number of focus groups are conducted. Qualitative research can be further classified in the following type.

I. **Phenomenology**:-a form of research in which the researcher attempts to understand how one or more individuals experience a phenomenon. Eg:-we might interview 20 victims of bhopal tragedy.

II. **Ethnography**:- this type of research focuses on describing the culture of a group of people. A culture is the shared attributes, values, norms, practices, language, and material things of a group of people. Eg:-the researcher might decide to go and live with the tribal in Andaman island and study the culture and the educational practices.

III. **Case study**:-is a form of qualitative research that is focused on providing a detailed account of one or more cases. Eg:-we may study a classroom that was given a new curriculum for technology use.

IV. **Grounded theory**:- it is an inductive type of research, based or grounded in the observations of data from which it was developed; it uses a variety of data sources, including quantitative data, review of records, interviews, observation and surveys

V. **Historical research**:-it allows one to discuss past and present events in the context of the present condition, and allows one to reflect and provide possible answers to current issues and problems. Eg:-the lending pattern of business in the 19th century.

1.7.3. Pragmatic approach to research (mixed methods)

The pragmatic approach to science involves using the method which appears best suited to the research problem and not getting caught up in philosophical debates about which is the best approach. Pragmatic researchers therefore grant themselves the freedom to use any of the methods, techniques and procedures typically associated with quantitative or qualitative research. They recognise that every method has its limitations and that the different approaches can be complementary.

They may also use different techniques at the same time or one after the other. For example, they might start with face-to-face interviews with several people or have a focus group and then use the findings to construct a questionnaire to measure attitudes in a large scale sample with the aim of carrying out statistical analysis.

Depending on which measures have been used, the data collected is analysed in the appropriate manner. However, it is sometimes possible to transform qualitative data into quantitative data and vice versa although transforming quantitative data into qualitative data is not very common.

Being able to mix different approaches has the advantages of enabling triangulation. Triangulation is a common feature of mixed methods studies. It involves, for example:

- the use of a variety of data sources (data triangulation)
- the use of several different researchers (investigator triangulation)
- the use of multiple perspectives to interpret the results (theory triangulation)
- the use of multiple methods to study a research problem (methodological triangulation)

In some studies, qualitative and quantitative methods are used simultaneously. In others, first one approach is used and then the next, with the second part of the study perhaps expanding on the results of the first. For example, a qualitative study involving in-depth interviews or focus group discussions might serve to obtain information which will then be used to contribute towards the development of an experimental measure or attitude scale, the results of which will be analysed statistically.

1.7.4. Advocacy/participatory approach to research (emancipatory)

To some degree, researchers adopting an advocacy/participatory approach feel that the approaches to research described so far do not respond to the needs or situation of people from marginalised or vulnerable groups. As they aim to bring about positive change in the lives of the research subjects, their approach is sometimes described as emancipatory. It is not a neutral stance. The researchers are likely to have a political agenda and to try to give the groups they are studying a voice. As they want their research to directly or indirectly result in some kind of reform, it is important that they involve the group being studied in the research, preferably at all [stages](#), so as to avoid further marginalising them.

The researchers may adopt a less neutral position than that which is usually required in scientific research. This might involve interacting informally or even living amongst the research participants (who are sometimes referred to as co-researchers in recognition that the study is not simply about them but also by them). The findings of the research might be reported in more personal terms, often using the precise words of the research participants. Whilst this type of research could be criticised for not being objective, it should be noted that for some groups of people or for certain situations, it is necessary as otherwise the thoughts, feelings or behaviour of the various members of the group could not be accessed or fully understood.

Vulnerable groups are rarely in a position of power within society. For this reason, researchers are sometimes members of the group they are studying or have something in common with the members of the group.

Research can be classified in many different ways on the basis of the methodology of research, the knowledge it creates, the user group, the research problem it investigates etc.,.

1.7.5. Basic Research

The research which is done for knowledge enhancement, the research which does not have immediate commercial potential. The research which is done for human welfare, animal welfare and plant kingdom welfare. It is called basic, pure, fundamental research. The main motivation is to expand man's knowledge, not to create or invent something. According to Travers, "Basic Research is designed to add to an organized body of scientific knowledge and does not necessarily produce results of immediate practical value." Such a research is time and cost intensive.

1.7.6. Applied Research

Applied research is designed to solve practical problem of the modern world, rather than to acquire knowledge for knowledges sake. The goal of applied research is to improve the human condition. It focus on analysis and solving social and real life problems. This research is generally conducted on large scale basis, it is expensive. As such, it often conducted with the support of some financing agency like government , public corporation , world bank, UNICEF, UGC,Etc,. According to hunt, “applied research is an investigation for ways of using scientific knowledge to solve practical problems” for example:- improve agriculture crop production, treat or cure a specific disease, improve the energy efficiency homes, offices, how can communication among workers in large companies be improved? Applied research can be further classified as problem oriented and problem solving research.

=== Problem oriented research

Research is done by industry apex body for sorting out problems faced by all the companies. Eg:- WTO does problem oriented research for developing countries, in india agriculture and processed food export development authority (APEDA) conduct regular research for the benefit of agri-industry.

Problem solving

This type of research is done by an individual company for the problem faced by it. Marketing research and market research are the applied research. For eg:- videocon international conducts research to study customer satisfaction level, it will be problem solving research. In short, the main aim of applied research is to discover some solution for some pressing practical problem.

Others

Also the research is classified in to 1. Descriptive research 2. Analytical research 3. Fundamental research 4. Conceptual research 5. Empirical research 6. One time research or longitudinal research 7. Field-setting research or laboratory research or simulation research 8. Clinical or diagnostic research 9. Exploratory research 10. Historical research 11. conclusion oriented research 12. case study research 13. short term research

Chapter Two

Research methods

2.1. Experiments

People who take part in research involving experiments might be asked to complete various tests to measure their cognitive abilities (e.g. word recall, attention, concentration, reasoning ability etc.) usually verbally, on paper or by computer. The results of different groups are then compared. Participants should not be anxious about performing well but simply do their best. The aim of these tests is not to judge people or measure so-called intelligence, but to look for links between performance and other factors. If computers are used, this has to be done in such a way that no previous knowledge of computers is necessary. So people should not be put off by this either.

The study might include an intervention such as a training programme, some kind of social activity, the introduction of a change in the person's living environment (e.g. different lighting, background noise, different care routine) or different forms of interaction (e.g. linked to physical contact, conversation, eye contact, interaction time etc.). Often the interaction will be followed by some kind of test (as mentioned above), sometimes before and after the intervention. In other cases, the person may be asked to complete a questionnaire (e.g. about his/her feelings, level of satisfaction or general well-being).

Some studies are just based on one group (within-group design). The researchers might be interested in observing people's reactions or behaviour before and after a certain intervention (e.g. a training programme). However, in most cases, there are at least two groups (a between-subjects design). One of the groups serves as a **control group** and is not exposed to the intervention. This is quite similar to the procedure in clinical trials whereby one group does not receive the experimental drug. This enables researchers to compare the two groups and determine the impact of the intervention. Alternatively, the two groups might differ in some important way (e.g. gender, severity of dementia, living at home or in residential care, etc.) and it is that difference that is of interest to the researchers.

2.2. Surveys

Surveys involve collecting information, usually from fairly large groups of people, by means of questionnaires but other techniques such as interviews or telephoning may also be used. There are different types of survey. The most straightforward type (the "one shot survey") is administered to a sample of people at a set point in time. Another type is the "before and after survey" which people complete before a major event or experience and then again afterwards.

2.3. Questionnaires

Questionnaires are a good way to obtain information from a large number of people and/or people who may not have the time to attend an interview or take part in experiments. They enable people to take their time, think about it and come back to the questionnaire later. Participants can state their views or feelings privately without worrying about the possible reaction of the researcher. Unfortunately, some people may still be inclined to try to give socially acceptable answers. People should be encouraged to answer the questions as honestly as possible so as to avoid the researchers drawing false conclusions from their study.

Questionnaires typically contain multiple choice questions, attitude scales, closed questions and open-ended questions. The drawback for researchers is that they usually have a fairly low response rate and people do not always answer all the questions and/or do not answer them correctly. Questionnaires can be administered in a number of different ways (e.g. sent by post or as email attachments, posted on Internet sites, handed out personally or administered to captive audience (such as people attending conferences). Researchers may even decide to administer the questionnaire in person which has the advantage of including people who have difficulties reading and writing. In this case, the participant may feel that s/he is taking part in an interview rather than completing a questionnaire as the researcher will be noting down the responses on his/her behalf.

2.4. Interviews

Interviews are usually carried out in person i.e. face-to-face but can also be administered by telephone or using more advance computer technology such as Skype. Sometimes they are held in the interviewee's home, sometimes at a more neutral place. It is important for interviewees to decide whether they are comfortable about inviting the researcher into their home and whether they have a room or area where they can speak freely without disturbing other members of the household.

The interviewer (which is not necessarily the researcher) could adopt a formal or informal approach, either letting the interviewee speak freely about a particular issue or asking specific pre-determined questions. This will have been decided in advance and depend on the approach used by the researchers. A semi-structured approach would enable the interviewee to speak relatively freely, at the same time allowing the researcher to ensure that certain issues were covered.

When conducting the interview, the researcher might have a check list or a form to record answers. This might even take the form of a questionnaire. Taking notes can interfere with the flow of the conversation, particularly in less structured interviews. Also, it is difficult to pay attention to the non-verbal aspects of communication and to remember everything that was said and the way it was said. Consequently, it can be helpful for the researchers to have some kind of additional record of the interview such as an audio or video recording. They should of course obtain permission before recording an interview.

2.5. Case studies

Case studies usually involve the detailed study of a particular case (a person or small group). Various methods of data collection and analysis are used but this typically includes observation and interviews and may involve consulting other people and personal or public records. The researchers may be interested in a particular phenomenon (e.g. coping with a diagnosis or a move into residential care) and select one or more individuals in the respective situation on whom to base their case study/studies. Case studies have a very narrow focus which results in detailed descriptive data which is unique to the case(s) studied. Nevertheless, it can be useful in clinical settings and may even challenge existing theories and practices in other domains.

2.6. Participant and non-participant observation

Studies which involve observing people can be divided into two main categories, namely participant observation and non-participant observation.

In participant observation studies, the researcher becomes (or is already) part of the group to be observed. This involves fitting in, gaining the trust of members of the group and at the same time remaining sufficiently detached as to be able to carry out the observation. The observations made might be based on what people do, the explanations they give for what they do, the roles they have, relationships amongst them and features of the situation in which they find themselves. The researcher should be open about what s/he is doing, give the participants in the study the chance see the results and comment on them, and take their comments seriously.

In non-participant observation studies, the researcher is not part of the group being studied. The researcher decides in advance precisely what kind of behaviour is relevant to the study and can be realistically and ethically observed. The observation can be carried out in a few different ways. For example, it could be continuous over a set period of time (e.g. one hour) or regularly for shorter periods of time (for 60 seconds every so often) or on a random basis. Observation does not only include noting what happened or was said but also the fact that a specific behaviour did not occur at the time of observation.

2.7. Observational trials

Observational trials study health issues in large groups of people but in natural settings. **Longitudinal** approaches examine the behaviour of a group of people over a fairly lengthy period of time e.g. monitoring cognitive decline from mid to late life paying specific attention to diet and lifestyle factors. In some cases, the researchers might monitor people when they are middle-aged and then again after 15 years and so on. The aim of such studies is usually to determine whether there is a link between one factor and another (e.g. whether high alcohol consumption is correlated with dementia). The group of people involved in this kind of study is known as a **cohort** and they share a certain characteristic or experience within a defined period. Within the cohort, there may be subgroups (e.g. people who drink moderately, people who drink heavily, people who binge drink etc.) which allow for further comparisons to be made.

In some cases, rather than following a group of people from a specific point in time onwards, the researchers take a **retrospective** approach, working backwards as it were. They might ask participants to tell them about their past behaviour, diet or lifestyle (e.g. their alcohol consumption, how much exercise they did, whether they smoked etc.) They might also ask for permission to consult the participants' medical records (a chart review). This is not always a reliable method and may be problematic as some people may forget, exaggerate or idealise their behaviour. For this reason, a prospective study is generally preferred if feasible although a retrospective pilot study preceding a prospective study may be helpful in focusing the study question and clarifying the hypothesis and feasibility of the latter (Hess, 2004).

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Chapter Three

Initiation to Social Research

Social research as a practice does not exist in a vacuum or empty space. It is in an environment or context. Research data are collected in relation to something. That something may be a social problem or a theory or just a fact finding exercise.

3.1. Influences of Social Research

By virtue of not operating in space, social research is influenced by a number of elements which include: theory, epistemological considerations, ontological considerations, values and practical considerations. These are discussed in detail below.

3.2. What is a theory?

A theory is an explanation of observed regularities e.g. why high blood pressure is a disease affecting mainly the fat. Data is collected to either test or build theories. Research data achieve significance in sociology when viewed in relation to the theoretical concerns. This raises the issue of the nature of the relationship between theory and research.

3.3. Relationship between theory and research

Theory is important to social research because it provides a back bone and rationale/justification for the research that is being conducted. It also provides a framework within which social phenomena or occurrences can be understood and the research findings can be interpreted. There are two theories that influence social research-Deductive and inductive theory.

Deductive:

- ♣ The research progresses from theory =====> data
- ♣ Develops clear hypothesis to be confirmed or rejected
- ♣ Influences quantitative research

Inductive:

- ♣ The research progresses from data =====> theory
- ♣ General sable conclusions from observations form theory
- ♣ Influences qualitative research

Epistemological considerations

- ✧ This is concerned with what is (or should be) taken as acceptable knowledge?
- ✧ What can be accepted as knowledge?
- ✧ Can the social world be studied scientifically?
- ✧ Is it appropriate to apply the methods of the natural sciences to social science research?
- ✧ There are two epistemological considerations – positivist and interpretive epistemologies

Positivism/Positivist epistemology

- ✧ This thinking advocates application of natural science methods to social science research
- ✧ Believes information is only valid if it can be confirmed by our senses (associated to Natural sciences)
- ✧ based on theory we produce and hypothesis that we can test (deduction)
- ✧ Believes in an objective, value-free or neutral/unbiased researcher
- ✧ Under this, the purpose is to explain human behaviour

Interpretivism/Interpretivist epistemology

- ✧ This thinking believes people are different, the action is meaningful to the actor, and must be interpreted from their point of view
- ✧ subject matter of the social sciences (people) demands non-positivist (non natural science) methods
- ✧ Believes information is valid based on how people subjectively make sense of their world
- ✧ Under this, the purpose is to understand human behaviour

Ontological considerations

- ✧ This is at times called social ontology and is concerned with the nature/reality of social entities or things that exist in the world.
- ✧ Do social entities exist independently of our perceptions of them?
- ✧ Is social reality external to social actors or constructed by them?
- ✧ There are two ontological considerations - Objectivism and Constructivism

Objectivism

- ✧ Under this thinking, it is believed that social entities have a reality independent of social actors.
- ✧ social phenomena confront us as external facts i.e. we do not influence what is around us
- ✧ individuals are born into a pre-existing social world
- ✧ social forces and rules exert pressure on actors (people) to conform and not the reverse

E.g. culture exists independently of social actors who are socialized into its values

- For example an Organisation exists separate from the workers in it

Constructivism

- ✧ Social phenomena is created by constant social interaction and therefore constantly revised

For example Culture is as a result of peoples creations

- ✧ social phenomena and their meanings are constructed by social actors
- ✧ Researchers. accounts of events are also constructions - many alternative interpretations

3.4. Research strategy: Quantitative and Qualitative

- Research strategy refers to a useful way of classifying social research
- There are two distinctive clusters of research strategies: quantitative and qualitative
- these strategies differ in terms of their:
 - ✓ general orientation to social research
 - ✓ epistemological foundations
 - ✓ ontological basis

a. Quantitative research strategy

This strategy is characterized by the following:

- Measurement of social variables
- Common research designs: surveys and experiments
- Numerical and statistical data
- Deductive approach: theory testing
- Positivist epistemology
- Objectivist view of reality as external to social actors

b. Qualitative research strategy

This research strategy is characterized by the following:

- Understanding the subjective meanings held by actors
(interpretivist epistemology)
- Common methods: interviews, ethnography/participant observations
- Data are words, texts and stories
- Inductive approach: theory emerges from data

- Social constructionist ontology

3.5. Research Designs in social sciences

This is a framework for the collection and analysis of data. A choice of research design reflects decisions about the priority being given to a range of dimensions of the research process. These include the importance attached to:

- Expressing causal connections between variables i.e. are you interested in showing how one variable influences another
- Generalizing to larger groups of individuals than those actually forming part of the investigation
- Understanding behaviour and the meaning of that behaviour in its specific social context

Examples of research designs include;

- **Experimental design**

True experiments are quite unusual in sociology but are employed in related areas of enquiry such as social psychology and organization studies. Researchers in social policy sometimes use them in order to assess the impact of new reforms or policies.

Why experiment designs are unusual in social research?

In order to conduct a true experiment, it is necessary to manipulate the independent variable in order to determine whether it does in fact have an influence on the dependent variable. However the vast majority of independent variables with which social researchers are concerned cannot be manipulated.

If for example we are interested in the effects of gender on work experiences, we cannot manipulate gender so that some people are made male and others female. If we are interested in the effects of variations in social class on health, we cannot allocate people to different social class groupings instead people are studied in their categories which is not true experimental design. However there is a way this research design is used in social research - classical experimental design.

Classical experimental design (randomized experiment or randomized controlled trial)

Under this, two groups are established and it is this that forms the experimental manipulation.

One group is called the experimental group and the other control group.

The experimental group receives the experimental treatment but the control group does not receive an experimental treatment. The dependent variable is measured before and after the experimental manipulation so that before and after analysis can be conducted.

- **Cross sectional design (survey design)**

This design entails the collection of data on more than one case (usually quite a lot more than one) at a single point in time in order to collect a body of quantitative or quantifiable data in connection with two or more variables which are then examined to detect patterns of association.

More than one case

Researchers employing cross sectional designs are interested in variation. That variation can be in respect of people, families, organizations etc. Variation can only be established when more than one case is being examined.

Quantifiable data

In order to establish variation between cases and establish associations, it is necessary to have a systematic and standardized method of gauging or determining variation. One of the most important advantages of quantification is that it provides the researcher with a consistent benchmark.

- **Case study design**

This entails the detailed and intensive analysis of a single case. Case study research is concerned with the complexity and particular nature of the case in question. Cases can include a single community, a single school, a single organization etc.

There is a tendency to associated case studies with qualitative research but this should not be so.

It is true that qualitative methods such as participant observation and unstructured interviewing are particularly helpful in generation of an intensive detailed examination of a case; however case studies can be used in both quantitative and qualitative research.

- **Comparative design**

This design entails studying two contrasting cases using more or less identical methods. It is believed that we can understand social phenomena better when they are compared to two or more meaningfully contrasting cases or situations. This can be in either qualitative or quantitative studies

Group Assignments

1. Description of qualitative research methods
2. Description of quantitative research methods
3. Analysis of research designs in social research
4. Content and thematic analysis

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