

Research Methods and Analysis

Qualitative and Quantitative Methods

There has been widespread debate in recent years within many of the social sciences regarding the relative merits of quantitative and qualitative strategies for research. The positions taken by individual researchers vary considerably, from those who see the two strategies as entirely separate and based on alternative views of the world, to those who are happy to mix these strategies within their research projects. For example, Bryman (1988) argued for a 'best of both worlds' approach and suggested that qualitative and quantitative approaches should be combined. Hughes (1997), nevertheless, warns that such technicist solutions underestimate the politics of legitimacy that are associated with choice of methods. In particular, quantitative approaches have been seen as more scientific and 'objective'.

Quantitative research consists of those studies in which the data concerned can be analysed in terms of numbers. Research can also be qualitative, that is, it can describe events, persons and so forth scientifically without the use of numerical data ... Quantitative research is based more directly on its original plans and its results are more readily analysed and interpreted. Qualitative research is more open and responsive to its subject. Both types of research are valid and useful. They are not mutually exclusive. It is possible for a single investigation to use both methods.

Qualitative research is harder, more stressful and more time-consuming than other types. Quantitative research is, as the term suggests, concerned with the collection and analysis of data in numeric form. It tends to emphasize relatively large-scale and representative sets of data, and is often, falsely in our view, presented or perceived as being about the gathering of 'facts'. Qualitative research, on the other hand, is concerned with collecting and analysing information in as many forms, chiefly non-numeric, as possible. It tends to focus on exploring, in as much detail as possible, smaller numbers of instances or examples which are seen as being interesting or illuminating, and aims to achieve depth rather than breadth.

Research is a systematic investigation to find answers to a problem. Research in professional social science areas, like research in other subjects, has generally followed the traditional objective scientific method. Since the 1960s, however, a strong move towards a more qualitative, naturalistic and subjective approach has left social science research divided between two competing methods: the scientific empirical tradition, and the naturalistic phenomenological mode. In the scientific method, quantitative research methods are employed in an attempt to establish general laws or principles. Such a scientific approach is often termed **nomothetic** (founded upon or derived from law) and assumes social reality is objective and external to the individual. The naturalistic approach to research emphasises the importance of the subjective experience of individuals, with a focus on qualitative analysis. Social reality is regarded as a creation of individual consciousness, with meaning and the evaluation of events seen as a personal and subjective construction. Such a focus on the individual case rather than general law-making is termed an **ideographic** approach.

QUANTITATIVE RESEARCH

KEY CHARACTERISTICS

CONTROL: This is the most important element because it enables the scientist to identify the causes of his or her observations. Experiments are conducted in an attempt to answer certain questions. They represent attempts to identify why something happens, what causes some event, or under what conditions an event does occur. Control is necessary in order to provide unambiguous answers to such questions. To answer questions in education and social science we have to eliminate the simultaneous influence of many variables to isolate the cause of an effect. Controlled inquiry is absolutely essential to this because without it the cause of an effect could not be isolated.

OPERATIONAL DEFINITION: This means that terms must be defined by the steps or operations used to measure them. Such a procedure is necessary to eliminate any confusion in meaning and communication. Consider the statement 'Anxiety causes students to score poorly in tests'. One might ask, 'What is meant by anxiety?' Stating that anxiety refers to being tense or some other such term only adds to the confusion. However, stating that anxiety refers to a score over a criterion level on an anxiety scale enables others to realise what you mean by anxiety. Stating an operational definition forces one to identify the empirical referents, or terms. In this manner, ambiguity is minimised. Again, introversion may be defined as a score on a particular personality scale, hunger as so many hours since last fed, and social class as defined by occupation.

REPLICATION: To be replicable, the data obtained in an experiment must be reliable; that is, the same result must be found if the study is repeated. If observations are not repeatable, our descriptions and explanations are thought to be unreliable.

HYPOTHESIS TESTING: The systematic creation of a hypothesis and subjecting it to an empirical test.

STRENGTHS AND LIMITATIONS

STRENGTHS

- Precision - through quantitative and reliable measurement
- Control - through sampling and design
- Ability to produce causality statements, through the use of controlled experiments
- Statistical techniques allow for sophisticated analyses
- Replicable

LIMITATIONS

- Because of the complexity of human experience it is difficult to rule out or control all the variables;
- Because of human agency people do not all respond in the same ways as inert matter in the physical sciences;
- Its mechanistic ethos tends to exclude notions of freedom, choice and moral responsibility;
- Quantification can become an end in itself.
- It fails to take account of people's unique ability to interpret their experiences, construct their own meanings and act on these.
- It leads to the assumption that facts are true and the same for all people all of the time.
- Quantitative research often produces banal and trivial findings of little consequence due to the restriction on and the controlling of variables.
- It is not totally objective because the researcher is subjectively involved in the very choice of a problem as worthy of investigation and in the interpretation of the results.

QUALITATIVE RESEARCH

KEY CHARACTERISTICS

- Events can be understood adequately only if they are seen in context. Therefore, a qualitative researcher immerses her/himself in the setting.
- The contexts of inquiry are not contrived; they are natural. Nothing is predefined or taken for granted.
- Qualitative researchers want those who are studied to speak for themselves, to provide their perspectives in words and other actions. Therefore, qualitative research is an interactive process in which the persons studied teach the researcher about their lives.
- Qualitative researchers attend to the experience as a whole, not as separate variables. The aim of qualitative research is to understand experience as unified.
- Qualitative methods are appropriate to the above statements. There is no one general method.
- For many qualitative researchers, the process entails appraisal about what was studied.

Ely et al add the following from Sherman and Webb (1988) to their definition:

Qualitative implies a direct concern with experience as it is 'lived' or 'felt' or 'undergone' ... Qualitative research, then, has the aim of understanding experience as nearly as possible as its participants feel it or live it.

STRENGTHS AND LIMITATIONS

LIMITATIONS

- The problem of adequate validity or reliability is a major criticism. Because of the subjective nature of qualitative data and its origin in single contexts, it is difficult to apply conventional standards of reliability and validity.
- Contexts, situations, events, conditions and interactions cannot be replicated to any extent nor can generalisations be made to a wider context than the one studied with any confidence.
- The time required for data collection, analysis and interpretation is lengthy.
- Researcher's presence has a profound effect on the subjects of study.
- Issues of anonymity and confidentiality present problems when selecting findings.
- The viewpoints of both researcher and participants have to be identified and elucidated because of issues of bias.

STRENGTHS

- Because of close researcher involvement, the researcher gains an insider's view of the field. This allows the researcher to find issues that are often missed (such as subtleties and complexities) by the scientific, more positivistic enquiries.

- Qualitative descriptions can play the important role of suggesting possible relationships, causes, effects and dynamic processes.
- Because statistics are not used, but rather qualitative research uses a more descriptive, narrative style, this research might be of particular benefit to the practitioner as she or he could turn to qualitative reports in order to examine forms of knowledge that might otherwise be unavailable, thereby gaining new insight.
- Qualitative research adds flesh and blood to social analysis.

Techniques of data collection

Basic requirements for scientific data are that it should be reliable and impartial. In Sociology these conditions are hard to meet. Yet numerous methods are used to minimize errors in data. Some of the commonly used sources in collecting data are:

- Existing materials including the official statistical record and historical and contemporary documents.
- Social surveys through questionnaire and schedules
- Interviewing
- Observation- Participants and non-participant

Statistical Sources

Government statistics particularly census or statistics produced by large industrial or commercial firms, trade unions or other organizations provide one important account of data which sociologist can use in their analysis. An outstanding example of the imaginative use of official statistics in the positivist tradition is the study of suicide made by the famous French sociologist Emile Durkheim in the 19th century. However official statistics are the kind of data that are not collected by sociologists themselves and so there problems while analyzing the data.

Historical documents

Records and accounts of qualitative kind for example relating to belief, values, social relationship or social behavior may also be contemporary or may refer to earlier periods. There are several difficulties immediately present themselves in the use of records from the past. Few chroniclers of social relation and social action record observations in the systematic way in which the sociologists are interested. There are often intriguing and sympathetic records but the information that is vital to the sociologist is often missing.

Contemporary Records

Contemporary records relating to social relationship and social behavior are seldom used as the sole source of information and sociological research. They are usually one source of a particular account or achievement.

Social Survey

The basic procedure in survey is that people are asked a number of questions on that aspect of behavior which the sociologist is interested in. A number of people carefully selected so that their representation of their population being studied are asked to answer exactly the same question so that the replies to different categories of respondents may be examined for differences. One type of survey relies on contacting the respondents by letter and asking them to complete the questionnaire themselves before returning it. These are called Mail questionnaires. Sometimes questionnaires are not completed by individuals separately but by people in a group under the direct supervision of the research worker. A variation of the procedure can be that a trained interviewer asks the questions and records the responses on a schedule from each respondent.

These alternate procedures have different advantages and disadvantages. Mail questionnaires are relatively cheap and can be used to contact respondents who are scattered over a wide area. But at the same time the proportion of people who return questionnaires sent through post is usually rather small. The questions asked in main questionnaires have also to be very carefully worded in order to avoid ambiguity since the respondents cannot ask to have questions clarified for them. Using groups to complete questionnaires means that the return rate is good and that information is assembled quickly and fairly. Administering the interview schedules to the respondents individually is probably the most reliable method. Several trained interviewers may be employed to contact specific individuals. The questionnaires and schedules can consist of both close-ended and open-ended questions. Also a special attention needs to be paid to ensure that the questionnaires are filled in logical order.

Where aptitude questions are included great care must be exercised to ensure the proper words are used. In case of schedules emphasis and interactions may also be standardized between different individuals and from respondents to respondents. Finally proper sampling techniques must be used to ensure that the sample under study represents the universe of study. In order to enhance the reliability of data collected through questionnaires and schedules, these questionnaires and schedules must be pretested through pilot studies.

Interviewing

Social surveys may depend either on questionnaires that are self-administered or on schedules completed by trained research workers personally interviewing then is not a method of data collection distinct from social surveying but rather a technique which may vary from the brief formal contact as when the interviewer is working for the firms public opinion consultants or a market research organization and simply asks a housewife a few highly specific questions on limited range of topics to a long interview in which the research worker allows the respondents to develop points at leisure and take up others as he chooses.

The brief formal interview in which the working of the questions and the order in which they are asked is fixed is called structured interview while the freer discursive interview is called unstructured interview. The object of using structured interview is to standardize the interview as much as possible and thus to reduce the effect that the interviewer's personal approach or biases may have upon the result and even when structured interviews are used, proper training can do a lot to ensure further the reliability and validity of research. The personality of the interviewer and the social characteristics that the respondents attribute to him can be having influence on the result. The effort of interviewer's bias can be estimated by comparing one interviewer's result with other. The problem of interviewer's bias in an unstructured interview is much greater. Here the interviewer is left to his common devices as far as the way he approaches a respondent is concerned. There is no fixed list of questions to work through. Instead the interviewer may work from a guide that will remind him of the topics he wishes to cover.

The training of the interviewer is crucial here not simply training in the social skills of keeping the conversation going on a topic that the respondent may not be very interested in but also in acquiring sensitivity to those things his respondents tells him which are specially relevant to the theoretical topics he is pursuing. This means that unstructured interviews can be carried out by people trained in sociological theory. They are then able to size upon stray comments made by the respondents which can be developed and lead on to important theoretical insight.

Observation: Participant and non participant

The rationale behind the use of observation in sociological research is that the sociologist should become party to a set of social actions sufficiently able to be able to assess directly the social relationship involved. The degree of involvement may vary considerable from being merely a watcher on the sidelines to be deeply involved in and being a part of what is going on. The former type of observation techniques are called non-participant while the latter is called participant observation. Sometimes one way observations screen have been used to watch groups in actions that they are unaware that they are being watched and the observer cannot affect their actions by his presence. The sociologist is visibly present and is a part of the situation either as a sociologist or in another guise. Where the sociologist is merely an observer it is usually assumed that he knows enough about what the actors are doing to be able to understand their behaviour.

Any sociological observer has then to some extent be a participant observer he must at least share sufficient cultural background with the actors to be able to construe their behavior meaningfully but the degree of participation and of sharing of meaning may vary considerably. Examples of such studies are Nel Anderson's study of Hobo-Indians and William White study of Street Corner Society.

Sampling

For practical and cost reasons, it is often impossible to collect information about the entire population of people or things in which social researchers are interested. In these cases, a sample of the total is selected for study. Most statistical studies are based on samples and not on complete enumerations of all the relevant data. The main criteria when sampling are to ensure that a sample provides a faithful representation of the totality from which it is selected, and to know as precisely as possible the probability that a sample is reliable in this way. Randomization meets these criteria, because it protects against bias in the selection process and also provides a basis on which to apply statistical distribution theory that allows an estimate to be made of the probability that conclusions drawn from the sample are correct. A statistical sample is a miniature picture or cross-section of the entire group or aggregate from which the sample is taken. The entire group from which a sample is chosen is known as the population, universe or supply.

Simple random sampling

The basic type of random sample is known as a simple random sample, one in which each person or item has an equal chance of being chosen. Often a population contains various distinct groups or strata that differ on the attribute that is being researched.

Stratified random sampling

Stratified random sampling involves sampling of each stratum separately. This increases precision, or reduces time, effort and cost of allowing smaller sample sizes for a given level of precision. For example, poverty is known to be most common among the elderly, the unemployed and single parent families, so research on the effect of poverty might will sample separately each of these three strata as part of a survey of poverty in the population as a whole which would permit the total sample size to be reduced because the investigator would know that the groups most affected by poverty were guaranteed inclusion.

Cluster sampling

Cluster sampling is sometimes used when the population naturally congregates into clusters. For example, managers are clustered in organizations, so a sample of managers could be obtained by taking a random sample of organizations and investigating the managers in each of these. Interviewing or observing managers on this basis would be cheaper and easier than using a simple random sample of managers scattered across all organizations in the country. This is usually less precise than a simple random sample of the same size, but in practice the reduction in cost per element more than compensated for the decrease in precision.

Multi-stage sampling

Sampling may be done as one process or in stages, known as multi-stage sampling. Multi-stage designs are common when populations are widely dispersed. Thus a survey of business managers might proceed by selecting a sample of corporations as first stage units, perhaps choosing these corporations with a probability proportionate to their size, and then selecting a sample of managers within these corporations at the second stage. Alternatively, a sample of individual factories or office buildings within each corporation could be chosen as the second stage units, followed by sample of managers in each of these as a third stage. Stratification can also be used in the design, if for example occupational sub-groups are known to differ from each other, by selecting state such as personnel, production, and finance management and sampling within each of these. For sampling to be representative, one needs a complete and accurate list of the first stage units that make up the relevant population, a basic requirement that is not always easily met. This forms the sampling frame. Selection from the frame is best done by numbering the items and using a table of random numbers to identify which items form the sample, though a quasi-random method of simply taking every item from the list is often appropriate. The reliability of a sample taken from a population can be assessed by the spread of the sampling distribution, measured by the standard deviation of this distribution, called the standard error. As a general rule, the larger is the size of the sample the smaller the standard error.

Area sampling

In sampling of this kind small areas are designated as sampling units and the households interviewed include all or a specified fraction of those found in a canvass of these designated small areas. The basic sampling units or segments chosen may be relatively large or relatively small depending on such factors as the type of area being studied, population distribution, the availability of suitable maps and other information and the nature and desired accuracy of the data being collected.

Non-probability sampling design

It is based on the assumption that proportionately all combinations of the items to be studied will be present in the sample. But there is no assurance that every such element has a chance of being included. There are different types of non-probability sampling like:

Purposive Samples: Its main aim is to choose the cases that are of special interest. The selection of elements proceeds under the assumption that errors of judgement in the selection written to counterbalance each other. The researcher selects a sample group which is atypical of population. This subgroup represents the population. Observation on these strata are made and the findings are generalised for the whole population. It is difficult to compute sampling errors and biases. Strong assumptions must be made about the population in the case of judgement samples than in probability sampling or stop these cannot be used for statistical testing of hypotheses in probability sampling.

Quota Sampling: In this method, a sample that is a replica of the population in respect of which one wishes to generalise is selected. It by and large force of the insured is that the diverse elements in the population are included in a sample and that these elements are taken account of in proportions in which the octane in the population. One of the most commonly used methods of sampling in marketing research is an election polls is the method of quota sampling. The technique will vary from one researcher to another, but in general the pattern is to leave considerable freedom of choice to the interviewer with the restriction that certain characteristics of the respondents be representative of the area.

Hypothesis

Facts are dependent upon a theoretical framework for their meaning. They are also statements of relationships between concepts. Theory can give direction to the search for facts. A hypothesis states what we are looking for. When facts are assembled, ordered and seen in a relationship they constitute a theory. The theory is not speculation but is built upon fact. Now the various facts in a theory may be logically analyzed and relationships other than those stated in the theory can be deduced. At this point there is no knowledge as to whether such deductions are correct. The formulation of the deduction however constitutes a hypothesis; if verified it becomes part of a future theoretical construction. The relation between the hypothesis and theory is very close indeed. A theory states a logical relationship between facts. From this theory other propositions can be deduced that should be true, if the first relationship holds. These deduced propositions are hypotheses.

A hypothesis looks forward. It is a proposition which can be put to a test to determine its validity. It may seem contrary to or in accord with common sense. It may prove to be correct or incorrect. In any event however, it leads to an empirical test. Whatever the outcome, the hypothesis is a question put in such a way that an answer of some kind can be forthcoming. It is an example of the organized skepticism of science. The refusal to accept any statement without empirical verification. Every worthwhile theory then permits the formulation of additional hypotheses. These when tested are either proved or disapproved and in turn constitute further tests of the original theory.

Design of Proof: Testing the Hypothesis

The function of the hypothesis is to state a specific relationship between phenomena in such a way that this relationship can be empirically tested. The basic method of this demonstration is to design the research so that logic will require the acceptance or rejection of the hypothesis on the basis of resulting data.

The basic designs of logical proof were formulated by John Stuart Mill and still remain the foundation of experimental procedure although many changes have been made. His analysis provides two methods. The first of these is called the method of agreement. When stated positively this holds that when two or more cases of a given phenomenon have one and only one condition in common then that condition may be regarded as the cause or effect of the phenomenon. The classical experimental design is a development from both the positive and negative canons and attempts to avoid the weaknesses of both of them. In the simplified form Mill called it the method of difference. To develop the classical design of proof by the method of difference it is necessary only to make two series of observations and situations.

Reliability and validity of data

Data is only useful if it actually measures what it claims to be measuring and, in this respect, the concept of validity refers to the extent to which the data we collect gives a true measurement / description of "social reality" (what is "really happening" in society).

Valid data will have a depth and level of detail that gives the researcher a wellrounded picture of whatever they are studying.

Unemployment statistics: We can be reasonably sure the statistics are collected reliably, month-on-month, but we need to know how accurate (or "valid") a picture of unemployment they represent. For example, if we wanted to compare levels / rates of unemployment in our society between today and twenty years ago, could we use government statistics for this purpose?

Although such statistics are collected reliably, definitions of "unemployment" have changed over time - and since the definition has changed about 25 times over the past 15 years, such statistics are not valid for purposes of comparison (we are not, in technical terms, "comparing like with like").

Additionally, since such statistics do not use a definition of "unemployment" that involves counting everyone who wants to find a job (but can't) it's unlikely that they represent a true or valid picture of unemployment.

The concepts of reliability and validity go together in sociological research:

- If data is reliable but not valid, it may have limited use. We can make general statements about the world, but such statements may not actually apply to any one social group (such as the "unemployed").

- If data is valid, but not reliable, we may not be able to use it to make general statements about the world (for example, we may be able to understand something about one group of unemployed people that doesn't necessarily apply to all unemployed people).