LABORATORY EXPERIMENT

A laboratory experiment is a research study in which the variance of all or nearly all of the possible influential independent variables not pertinent to the immediate problem of investigation is kept at a minimum. This is done by isolating the research in a physical situation apart from the routine of ordinary living and by manipulating one or more independent variables under rigorously specified, operationalized and controlled conditions.

Laboratory studies usually require relatively small number of subjects. It may be necessary to work within the laboratory when experimentation requires equipment or apparatus. According to Festinger and katz, it is "one in which the investigator creates a situation with the exact conditions he wants to have and in which he controls some and manipulates other variables". The aim in general of all controlling techniques is to equalize the effects that the relevant variables have on the dependent variables. This is necessary to determine the relationship between independent and dependent variables under pure and uncontaminated conditions. Such relationships will enable the researcher to predict the dependent variable more precisely.

Strengths of Laboratory Experiment:

1) Laboratory experiment has the inherent virtue of the possibility of relatively complete control.
2) Laboratory experiments can ordinarily use random assignment and can manipulate one or more independent variables. The experimenter, in most cases, can achieve a high degree of specificity in the operational definitions of his variables.
3) There is precision of laboratory experiments. Precise means accurate, definite and unambiguous. Precise measurements are made with precision instruments. In variance terms, the more precise an experimental procedure is, the less will be the error variance.
4) Precise laboratory results are achieved mainly by controlled manipulation and measurement in an environment from which possible "contaminating" conditions have been eliminated.
5) In laboratory experiment, the observed relationship or the result is explicit in establishing direction of causality.
6) Replication is one of the most useful techniques in obtaining valid results as by repeating an experiment in the laboratory condition.

Weaknesses of Laboratory Experiment:

1) The greatest weakness of the laboratory experiment is probably the lack of strength of the independent variables. Since laboratory situations are, after all, situations that are created for special purposes, it can be said that the effects of experimental manipulations are usually weak.

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2) One reason for the preoccupation with the laboratory precision and refined statistics is the weakness of the laboratory effects. To detect a significant difference in the laboratory requires situations and measures with a minimum of random noise and accurate and sensitive statistical tests that will show relations and significant differences when they exist.
3) Another weakness is a product of the experimental research situation which comes from individuals lacking an understanding of the purposes of laboratory experiments.
4) Although laboratory experiments have relatively high internal validity, they lack external validity.
5) Some laboratory experiments are very costly.

FIELD EXPERIMENT

A field experiment is a research study in a realistic situation in which one or more independent variables are manipulated by the experimenter under as carefully controlled conditions as the situation will permit. The contrast between the laboratory experiment and the field experiment is not sharp. The differences are mostly matters of degree. Sometimes it is hard to label a particular study as "laboratory experiment" or "field experiment". Where the laboratory experiment has a maximum of control, most field experiments must operate with less control because the exercise of control is dependent to the extent of permissibility of natural situations in which the experiment is being carried out. Such absence of tight control makes the field experiment open to the suspicion that the independent variable is contaminated by uncontrolled environmental variables.

Strengths of Field Experiment:

1) Field experiment has values that especially recommend it to social psychologists, sociologists and educators because it is admirably suited to many of the social and educational problems of interest to social psychology, sociology and education.
2) The control of the experimental field situation, however, is rarely as tight as that of the laboratory. But if the research situation can be kept tight, the field experiment is powerful because one can, in general, have greater confidence that relations are indeed what one says they are.
3) The variables in a field situation usually have a stronger effect than those of laboratory experiments. The principle is: the more realistic is the research situation, the stronger will be the variables.

4) Realism in turn increases the external validity. Since the more realistic is the situation, the more valid are generalizations to other situations likely to be.
5) Another virtue of field experiments is their appropriateness for studying complex social and psychological influences, processes and changes in lifelike situations.
6) Laboratory experiments are suited mainly to testing aspects of theories whereas field experiments are suited both to testing hypotheses derived from theories and to finding answers to practical problems.
7) Flexibility and applicability to a wide variety of problems are important characteristics of field experiments.

Weaknesses of Field Experiment:

1) Manipulation of independent variables and randomization are perhaps the two most important problems. They are particularly acute in research in school settings. Manipulation, although quite possible, may often not be practicable because, for example, parents object when their children, who happen to have been randomly assigned to a control group, will not get a desirable experimental treatment.
2) There is no real reason why randomization cannot be used in field experiments. Nevertheless, difficulties are met. Unwillingness to break up class groups is one of the examples. Even if random assignment is possible and permitted, the independent variable may be seriously blurred, because the effects of the treatments cannot be isolated from their effects. Teachers and children, for example, may discuss what is happening during the course of the experiment. To prevent such muddying of the variables the experimenter should explain to administrators and teachers the necessity for random assignment and careful control.

   The consent and cooperation of teachers and administrators can often be obtained if a proper approach with adequate and accurate orientations is used and if explanations of the reasons for the use of specific experimental methods are given.
3) Field investigators have to be socially skilled operators. They should be able to work with people, talk to them, and convince them of the importance and necessity of their research.
4) An important obstacle to good design is the researcher's attitude.
5) Another weakness of field experimental situation is lack of precision. In realistic situations, there is always a great deal of systematic and random noise. In order to measure the effect of an independent variable on a dependent variable in a field experiment, it is not only necessary to maximize the variance of the manipulated variable and any assigned variables, but also to measure the dependent variables as precisely as possible.

FIELD STUDIES

Field studies are non experimental scientific enquiries aimed at discovering the relations and interactions among sociological, psychological and educational variables in real social structures. The investigator in a field study first looks at a social or institutional situation and then studies the relations among the attitudes, values, perceptions, and behaviours of individuals and groups in the situation. He ordinarily manipulates no independent variables. Accordingly, such types of studies are called correlational studies. Hence, the question asked in this kind of studies is what changes in a specific variable are associated with changes in a second variable? For example, whether living in a high density urban area creates any impact on the physical, psychological and social health of the concerned dwellers.

The correlational method can study what man has not learnt to control or can never hope to control. The correlator's mission is to observe and organize the data from nature's experiments. As a minimum outcome, such correlations improve immediate decisions and guide experimentation. By and large, the field study as a correlational study is an ex-post-facto research where the researcher draws the inferences regarding the relationship between variables on the basis of such independent variables whose manifestations have already occurred.

Katz has divided field studies into broad types: exploratory and hypotheses testing. The exploratory type seeks what is rather than predicts relations to be found. The second subtype of field studies aimed at discovering or uncovering relations is indispensable in scientific advance in social sciences.

Strengths of Field Studies:

1) The variance of many variables in actual field settings is large, especially when compared to the variance of the variables of laboratory experiments.
2) The realism of field studies is obvious of all types of studies; they are closest to real life.
3) Field studies are highly heuristic. The field is rich in discovery potential.
4) Field studies deal with such variables which have so far not been amenable to experimentation either in laboratory or in field setting.

Weaknesses of Field Studies:

1) Field study is the scientific weak cousin of laboratory and field experiments. Its most serious weakness, of course, is its non experimental character. Thus statements of relations are weaker than they are in experimental research.
2) In field studies, the extraneous variables are controlled by more indirect and less satisfactory means than in the experimental situation.
3) Another methodological weakness of field study is the lack of precision in the measurement of field variables. Much of the lack of precision is due to the greater complexity of field situations.
4) In a field situation there is usually so much noise in the channel that even though the effects may be strong and the variance great, it is not easy for the researcher to separate the variables.
5) Other weaknesses of field studies are practical problems – feasibility, cost, sampling and time.

SURVEY RESEARCH

Survey research studies large and small population (or universe) by selecting and studying samples chosen from the population to discover the relative incidence, distribution and interrelations of sociological and psychological variables. Survey research is considered to be a branch of social scientific research. Survey researchers are interested in the accurate assessment of the characteristics of whole population of people. Only rarely, however, they study the whole population; rather they study samples randomly drawn from the population. From these samples, they infer the characteristics of the defined population or universe. Random samples can often furnish the same information as a census at much less cost, with greater efficiency, and sometimes greater accuracy.

The social scientific nature of survey research is revealed by the nature of its variables, which can be classified as sociological facts and opinions and attitudes. Sociological facts are attributes of individuals that spring from their membership in social groups: sex, income, political and religious affiliation, socioeconomic status, education, age, living expenses, occupation, race, and so on. The second type of variable is psychological which includes opinions and attitudes on the one hand, and behaviour on the other.

There may be a wide variety of applications of survey research methodology that throws ample light on factual information about people's behaviour or situations. The followings are some of the ***major applications*** of survey research.

- Surveys of business and industries are carried out to describe production and man-power needs. Industrial psychologists sometimes use survey method within the organizations to ascertain those

factors that contribute to job satisfaction and employee morale. Some large organizations have their own poll-taking staffs that are kept busy conducting employee surveys on variety of work-related issues. It has been observed that periodic polling serves several purposes including giving employees the opportunity to voice their complaints and grievances, assessing workers' reactions to changes in work procedures and policies, and providing employees scope to participate in policy making. Such activities lead to an increase in employee morale and motivation.

- Survey research also provides sufficient information in understanding consumer behaviour. Advertising and motivation research agencies generally use survey techniques to uncover consumer preferences for specific products. The companies that produce consumable goods must continuously be aware of buying preferences of their target groups of consumers.
- Agricultural surveys can provide useful information regarding estimation of crops, effectiveness of manure etc.
- Surveys can provide significant information about people's income and the way they spend their money – an important criterion for understanding the trends in economy.
- In spite of the availability of mere records of crime in police records, surveys provide a more reliable measure of the rate at which crime occurs and the nature of their distribution in certain geographical regions. This facilitates to identify the different crime-prone zones of the city, and to apply effective measures to combat the crimes, in advance.
- Epidemiological studies through comprehensive surveys are very much useful to get an adequate understanding of the typical predisposed conditions that lead to different kinds of mental disorder or deviant behaviour and even mental retardation.

According to Campbell and Katona, survey data may be classified as personal, environmental, behavioural and psychological. The ***personal*** and ***environmental data*** may fall into the broad category of socioeconomic data. They include age, sex, marital status, education, occupation, income etc, and those of the environment into which the respondents were born, brought up, and are living, the facilities and limitations obtaining in the environment, existing educational and health services, and so on. The ***behavioural data*** may refer to economic behaviour like nature of spending and saving, geographical and occupational movements, political and other information getting behaviours. Under the category of ***psychological data***, the awareness of subjects under investigation and their knowledge of relevant details, opinions, attitudes, motives and expectations are included.

By and large, survey research depends on three significant aspects:

- The survey researcher must establish direct contact with the group of individuals called samples as the research mainly deals with their characteristics, attitudes and behaviours.
- The cooperativeness and willingness of the sample from whom the desired information are to be collected are the essential preconditions for the success of the survey.
- Survey research demands manipulative skill and research insight of the researcher. He must be a trained personnel having adequate social intelligence to deal with people effectively for gathering desired information from them.

Methods of collecting survey data

Surveys can be conveniently classified by the methods of obtaining information, that is, personal interview, mail questionnaire, panel and telephone. Of these, the personal interview far overshadows the others as perhaps the most powerful and useful tool of social scientific survey research.

1. **Personal interview**: The best survey research uses the personal interview as the principal method of gathering information. This is accomplished in part by the careful and laborious construction of a schedule or questionnaire. Personal interview is an interpersonal, face-to-face, conversational situation in which the interviewer asks questions pertinent to the research and the respondent answers them. Schedule information includes factual information, opinions and attitudes, and reasons for behaviour, opinions, and attitudes. Interview schedules are difficult to construct; they are time consuming and relatively costly. The factual information gathered in surveys includes the so called sociological data. Other kinds of factual information include what respondents know about the subject under investigation, what respondents did in the past, what they are doing now, and what they intend to do in future.

2. **Panel**: In this type, a sample of respondents is selected and interviewed, and then re-interviewed and studied at later times. The panel technique enables the researcher to study changes in people's behaviour and attitude.

3. **Telephone survey**: This type has little to recommend about itself beyond speed and low cost. Especially when the interviewer is unknown to the respondents, telephone surveys are limited by possible non-response, uncooperativeness and reluctance to answer more than simple and superficial questions. Yet telephoning can be useful in obtaining information essential to a study. Its principal defect, obviously, is the inability to obtain detailed information.

4. **Mail survey**: This is a cheaper and more convenient method of obtaining information from a large number of people over a wide geographical area. Those being questioned are able to remain anonymous and this largely activates and motivates people to respond more freely and openly on sensitive or personal issues. The respondents are given more time to formulate their answers in comparison to personal interview situation.

   The defects of mail surveys are possible lack of response and the inability to check the responses given. Responses to mail questionnaires are generally poor. Returns of less than 40% or 50 % are common. The responses are influenced by the opinions of others, for e.g., one's spouses, friends or co-workers. As a result of low returns, valid generalizations of the findings cannot be made. Several means may be employed for securing larger returns of questionnaires and reducing deficiencies, such as, administering follow-up questionnaires, enclosing money with the questionnaires, interviewing a random sample of non-respondents, analyzing non-respondent data etc. These measures, however, are costly, time consuming and may not be full proof.

Advantages of survey research:

1. Survey research has the advantage of wide scope. A great deal of information can be obtained from a large population. The population may be studied with much less expense than that incurred by a census.
2. Survey research information is generally accurate, within sampling error, of course. A sample of 600 to 700 individual or families, for example, can give a remarkably accurate portrait of a community, its values, attitudes and beliefs.
3. In market research, the understanding of consumer's preferences of a specific brand or article is made by survey research methodology.
4. The reaction of a group of individuals or a community to a social interaction programme may be perfectly assessed through survey research techniques.

Disadvantages of survey research:

1. Survey information ordinarily does not penetrate very deeply below the surface.
2. Survey research is demanding of time, energy and money.
3. While survey information has been found to be relatively accurate, there is always the one chance in twenty or a hundred that an error more serious than might be caused by minor fluctuations of chance may occur.
4. The survey interview can temporarily lift the respondent out of his own social context, which may make the results of the survey invalid.

5. Survey research also requires a good deal of research knowledge and sophistication. The competent survey investigator must know sampling, questionnaire and schedule construction, interviewing, analysis of data, and other technical aspects of the survey. Few investigators get this kind and amount of expertise and experience.
6. Finally because so many organizations are now conducting surveys, many people are no longer willing to devote the time necessary to respond sincerely and appropriately.
