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METHODS OF DATA COLLECTION

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CHAPTER – 9

METHODS OF DATA COLLECTION

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9.1 CONCEPT OF DATA COLLECTION

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes. The data collection component of research is common to all fields of study including physical and social sciences, humanities, business, etc. While methods vary by discipline, the emphasis on ensuring accurate and honest collection remains the same. The goal for all data collection is to capture quality evidence that then translates to rich data analysis and allows the building of a convincing and credible answer to questions that have been posed. Regardless of the field of study or preference for defining data (quantitative, qualitative), accurate data collection is essential to maintaining the integrity of research. Both the selection of appropriate data collection instruments (existing, modified, or newly developed) and clearly delineated instructions for their correct use reduce the likelihood of errors occurring.

Data collection is one of the most important stages in conducting a research. You can have the best research design in the world but if you cannot collect the required data you will be not be able to complete your project. Data collection is a very demanding job which needs thorough planning, hard work, patience, perseverance and more to be able to complete the task successfully. Data collection starts with determining what kind of data required followed by the selection of a sample from a certain population. After that, you need to use a certain instrument to collect the data from the selected sample.

9.2 TYPES OF DATA

Data are organized into two broad categories: qualitative and quantitative.

Qualitative Data: Qualitative data are mostly non-numerical and usually descriptive or nominal in nature. This means the data collected are in the form of words and sentences. Often (not always), such data captures feelings, emotions, or subjective perceptions of something. Qualitative approaches aim to address the 'how' and 'why' of a program and tend to use unstructured methods of data collection to fully explore the topic. Qualitative questions are open-ended. Qualitative methods include focus groups, group discussions and interviews. Qualitative approaches are good for further exploring the effects and unintended consequences of a program. They are, however, expensive and time consuming to implement. Additionally the findings cannot be generalized to participants outside of the program and are only indicative of the group involved.

Qualitative data collection methods play an important role in impact evaluation by providing information useful to understand the processes behind observed results and assess changes in people's perceptions of their well-being. Furthermore qualitative methods can be used to improve the quality of survey-based quantitative evaluations by helping generate evaluation hypothesis; strengthening the design of survey questionnaires and expanding or clarifying quantitative evaluation findings. These methods are characterized by the following attributes -

- they tend to be open-ended and have less structured protocols (i.e., researchers may change the data collection strategy by adding, refining, or dropping techniques or informants);
- they rely more heavily on interactive interviews; respondents may be interviewed several times to follow up on a particular issue, clarify concepts or check the reliability of data;
- they use triangulation to increase the credibility of their findings (i.e., researchers rely on multiple data collection methods to check the authenticity of their results);

- generally their findings are not generalizable to any specific population, rather each case study produces a single piece of evidence that can be used to seek general patterns among different studies of the same issue.

Regardless of the kinds of data involved, data collection in a qualitative study takes a great deal of time. The researcher needs to record any potentially useful data thoroughly, accurately, and systematically, using field notes, sketches, audiotapes, photographs and other suitable means. The data collection methods must observe the ethical principles of research. The qualitative methods most commonly used in evaluation can be classified in three broad categories -

- In-depth interview
- Observation methods
- Document review.

Quantitative Data: Quantitative data is numerical in nature and can be mathematically computed. Quantitative data measure uses different scales, which can be classified as nominal scale, ordinal scale, interval scale and ratio scale. Often (not always), such data includes measurements of something. Quantitative approaches address the 'what' of the program. They use a systematic standardized approach and employ methods such as surveys and ask questions. Quantitative approaches have the advantage that they are cheaper to implement, are standardized so comparisons can be easily made and the size of the effect can usually be measured. Quantitative approaches however are limited in their capacity for the investigation and explanation of similarities and unexpected differences. It is important to note that for peer-based programs quantitative data collection approaches often prove to be difficult to implement for agencies as lack of necessary resources to ensure rigorous implementation of surveys and frequently experienced low participation and loss to follow up rates are commonly experienced factors.

The Quantitative data collection methods rely on random sampling and structured data collection instruments that fit diverse experiences into predetermined response categories. They produce results that are easy to summarize, compare, and generalize. If the intent is to generalize from the research participants to a larger population, the researcher will employ probability sampling to select participants. Typical quantitative data gathering strategies include -

- Experiments/clinical trials.
- Observing and recording well-defined events (e.g., counting the number of patients waiting in emergency at specified times of the day).
- Obtaining relevant data from management information systems.
- Administering surveys with closed-ended questions (e.g., face-to face and telephone interviews, questionnaires etc).
- In quantitative research (survey research), interviews are more structured than in Qualitative research. In a structured interview, the researcher asks a standard set of questions and nothing more. Face -to -face interviews have a distinct advantage of enabling the researcher to establish rapport with potential participants and therefore gain their cooperation.
- Paper-pencil-questionnaires can be sent to a large number of people and saves the researcher time and money. People are more truthful while responding to the questionnaires regarding controversial issues in particular due to the fact that their responses are anonymous.

Mixed Methods: Mixed methods approach as design, combining both qualitative and quantitative research data, techniques and methods within a single research framework. Mixed methods approaches may mean a number of things, i.e. a number of different types of methods in a study or at different points within a study or using a mixture of qualitative and quantitative methods. Mixed

methods encompass multifaceted approaches that combine to capitalize on strengths and reduce weaknesses that stem from using a single research design. Using this approach to gather and evaluate data may assist to increase the validity and reliability of the research. Some of the common areas in which mixed-method approaches may be used include –

- Initiating, designing, developing and expanding interventions;
- Evaluation;
- Improving research design; and
- Corroborating findings, data triangulation or convergence.

Some of the challenges of using a mixed methods approach include –

- Delineating complementary qualitative and quantitative research questions;
- Time-intensive data collection and analysis; and
- Decisions regarding which research methods to combine.

Mixed methods are useful in highlighting complex research problems such as disparities in health and can also be transformative in addressing issues for vulnerable or marginalized populations or research which involves community participation. Using a mixed-methods approach is one way to develop creative options to traditional or single design approaches to research and evaluation.

There are many ways of classifying data. A common classification is based upon who collected the data.

PRIMARY DATA

Data that has been collected from first-hand-experience is known as primary data. Primary data has not been published yet and is more reliable, authentic and objective. Primary data has not been changed or altered by human beings; therefore its validity is greater than secondary data.

Importance of Primary Data: In statistical surveys it is necessary to get information from primary sources and work on primary data. For example, the statistical records of female population in a country cannot be based on newspaper, magazine and other printed sources. A research can be conducted without secondary data but a research based on only secondary data is least reliable and may have biases because secondary data has already been manipulated by human beings. One of such sources is old and secondly they contain limited information as well as they can be misleading and biased.

Sources of Primary Data: Sources for primary data are limited and at times it becomes difficult to obtain data from primary source because of either scarcity of population or lack of cooperation. Following are some of the sources of primary data.

Experiments: Experiments require an artificial or natural setting in which to perform logical study to collect data. Experiments are more suitable for medicine, psychological studies, nutrition and for other scientific studies. In experiments the experimenter has to keep control over the influence of any extraneous variable on the results.

Survey: Survey is most commonly used method in social sciences, management, marketing and psychology to some extent. Surveys can be conducted in different methods.

Questionnaire: It is the most commonly used method in survey. Questionnaires are a list of questions either open-ended or close-ended for which the respondents give answers. Questionnaire can be conducted via telephone, mail, live in a public area, or in an institute, through electronic mail or through fax and other methods.

Interview: Interview is a face-to-face conversation with the respondent. In interview the main problem arises when the respondent deliberately hides information otherwise it is an in depth source of information. The interviewer can not only record the statements the interviewee speaks

but he can observe the body language, expressions and other reactions to the questions too. This enables the interviewer to draw conclusions easily.

Observations: Observation can be done while letting the observing person know that s/he is being observed or without letting him know. Observations can also be made in natural settings as well as in artificially created environment.

Advantages of Using Primary Data

- The investigator collects data specific to the problem under study.
- There is no doubt about the quality of the data collected (for the investigator).
- If required, it may be possible to obtain additional data during the study period.

Disadvantages of Using Primary Data

1. The investigator has to contend with all the hassles of data collection-
- deciding why, what, how, when to collect;
- getting the data collected (personally or through others);
- getting funding and dealing with funding agencies;
- ethical considerations (consent, permissions, etc.).

2. Ensuring the data collected is of a high standard-
- all desired data is obtained accurately, and in the format it is required in;
- there is no fake/ cooked up data;
- unnecessary/ useless data has not been included.

3. Cost of obtaining the data is often the major expense in studies.

SECONDARY DATA

Data collected from a source that has already been published in any form is called as secondary data. The review of literature in any research is based on secondary data. It is collected by someone else for some other purpose (but being utilized by the investigator for another purpose). For examples, Census data being used to analyze the impact of education on career choice and earning. Common sources of secondary data for social science include censuses, organizational records and data collected through qualitative methodologies or qualitative research. Secondary data is essential, since it is impossible to conduct a new survey that can adequately capture past change and/or developments.

Sources of Secondary Data: The following are some ways of collecting secondary data –

- Books
- Records
- Biographies
- Newspapers
- Published censuses or other statistical data
- Data archives
- Internet articles
- Research articles by other researchers (journals)
- Databases, etc.

Importance of Secondary Data: Secondary data can be less valid but its importance is still there. Sometimes it is difficult to obtain primary data; in these cases getting information from secondary sources is easier and possible. Sometimes primary data does not exist in such situation one has to confine the research on secondary data. Sometimes primary data is present but the respondents are not willing to reveal it in such case too secondary data can suffice. For example, if the research is on the psychology of transsexuals first it is difficult to find out transsexuals and second they may

not be willing to give information you want for your research, so you can collect data from books or other published sources. A clear benefit of using secondary data is that much of the background work needed has already been carried out. For example, literature reviews, case studies might have been carried out, published texts and statistics could have been already used elsewhere, media promotion and personal contacts have also been utilized. This wealth of background work means that secondary data generally have a pre-established degree of validity and reliability which need not be re-examined by the researcher who is re-using such data. Furthermore, secondary data can also be helpful in the research design of subsequent primary research and can provide a baseline with which the collected primary data results can be compared to. Therefore, it is always wise to begin any research activity with a review of the secondary data.

Advantages of Using Secondary Data

- No hassles of data collection.
- It is less expensive.
- The investigator is not personally responsible for the quality of data ('I didn't do it').

Disadvantages of Using Secondary Data

- The data collected by the third party may not be a reliable party so the reliability and accuracy of data go down.
- Data collected in one location may not be suitable for the other one due variable environmental factor.
- With the passage of time the data becomes obsolete and very old.
- Secondary data collected can distort the results of the research. For using secondary data a special care is required to amend or modify for use.
- Secondary data can also raise issues of authenticity and copyright.

Keeping in view the advantages and disadvantages of sources of data requirement of the research study and time factor, both sources of data i.e. primary and secondary data have been selected. These are used in combination to give proper coverage to the topic.

9.3 ISSUES TO BE CONSIDERED FOR DATA COLLECTION/ NORMS IN RESEARCH

There are several reasons why it is important to adhere to ethical norms in research. First, norms promote the aims of research, such as knowledge, truth, and avoidance of error. For example, prohibitions against fabricating, falsifying, or misrepresenting research data promote the truth and avoid error. Second, since research often involves a great deal of cooperation and coordination among many different people in different disciplines and institutions, ethical standards promote the values that are essential to collaborative work, such as trust, accountability, mutual respect, and fairness. For example, many ethical norms in research, such as guidelines for authorship, copyright and patenting policies, data sharing policies, and confidentiality rules in peer review, are designed to protect intellectual property interests while encouraging collaboration. Most researchers want to receive credit for their contributions and do not want to have their ideas stolen or disclosed prematurely. Third, many of the ethical norms help to ensure that researchers can be held accountable to the public. Fourth, ethical norms in research also help to build public support for research. People more likely to fund research project if they can trust the quality and integrity of research. Finally, many of the norms of research promote a variety of other important moral and social values, such as social responsibility, human rights, animal welfare, compliance with the law, and health and safety. Ethical lapses in research can significantly harm human and animal subjects, students, and the public. For example, a researcher who fabricates data in a clinical trial may harm

or even kill patients, and a researcher who fails to abide by regulations and guidelines relating to radiation or biological safety may jeopardize his health and safety or the health and safety of staff and students.

Given the importance of ethics for the conduct of research, it should come as no surprise that many different professional associations, government agencies, and universities have adopted specific codes, rules, and policies relating to research ethics. The following is a rough and general summary of some ethical principles that various codes address -

Honesty: Strive for honesty in all scientific communications. Honestly report data, results, methods and procedures, and publication status. Do not fabricate, falsify, or misrepresent data. Do not deceive colleagues, granting agencies, or the public.

Objectivity: Strive to avoid bias in experimental design, data analysis, data interpretation, peer review, personnel decisions, grant writing, expert testimony, and other aspects of research where objectivity is expected or required. Avoid or minimize bias or self-deception. Disclose personal or financial interests that may affect research.

Integrity: Keep your promises and agreements; act with sincerity; strive for consistency of thought and action.

Carefulness: Avoid careless errors and negligence; carefully and critically examine your own work and the work of your peers. Keep good records of research activities, such as data collection, research design, and correspondence with agencies or journals.

Openness: Share data, results, ideas, tools, resources. Be open to criticism and new ideas.

Respect for Intellectual Property: Honor patents, copyrights, and other forms of intellectual property. Do not use unpublished data, methods, or results without permission. Give credit where credit is due. Give proper acknowledgement or credit for all contributions to research. Never plagiarize.

Confidentiality: Protect confidential communications, such as papers or grants submitted for publication, personnel records, trade or military secrets, and patient records.

Responsible Publication: Publish in order to advance research and scholarship, not to advance just your own career. Avoid wasteful and duplicative publication.

Responsible Mentoring: Help to educate, mentor, and advise students. Promote their welfare and allow them to make their own decisions.

Respect for Colleagues: Respect your colleagues and treat them fairly.

Social Responsibility: Strive to promote social good and prevent or mitigate social harms through research, public education, and advocacy.

Non-Discrimination: Avoid discrimination against colleagues or students on the basis of sex, race, ethnicity, or other factors that are not related to their scientific competence and integrity.

Competence: Maintain and improve your own professional competence and expertise through lifelong education and learning; take steps to promote competence in science as a whole.

Legality: Know and obey relevant laws and institutional and governmental policies.

Animal Care: Show proper respect and care for animals when using them in research. Do not conduct unnecessary or poorly designed animal experiments.

Human Subjects Protection: When conducting research on human subjects, minimize harms and risks and maximize benefits; respect human dignity, privacy, and autonomy; take special precautions with vulnerable populations; and strive to distribute the benefits and burdens of research fairly.

Training in research ethics should be able to help researchers grapple with ethical dilemmas by introducing researchers to important concepts, tools, principles, and methods that can be useful in resolving these dilemmas. In fact, the issues have become so important for training in research.

9.4 METHODS OF PRIMARY DATA COLLECTION

In primary data collection, you collect the data yourself using qualitative and quantitative methods. The key point here is that the data you collect is unique to you and your research and, until you publish, no one else has access to it. There are many methods of collecting primary data.

The main methods include –

- Questionnaires
- Interviews
- Focus Group Interviews
- Observation
- Survey
- Case-studies
- Diaries
- Activity Sampling Technique
- Memo Motion Study
- Process Analysis
- Link Analysis
- Time and Motion Study
- Experimental Method
- Statistical Method etc.

9.4.1 QUESTIONNAIRE METHOD

A questionnaire is a research instrument consisting of a series of questions and other prompts for the purpose of gathering information from respondents. Although they are often designed for statistical analysis of the responses, this is not always the case. The questionnaire was invented by Sir Francis Galton (1822 - 1911). Questionnaires have advantages over some other types of surveys in that they are cheap, do not require as much effort from the questioner as verbal or telephone surveys, and often have standardized answers that make it simple to compile data. As a type of survey, questionnaires also have many of the same problems relating to question construction and wording that exist in other types of opinion polls.

Types: A distinction can be made between questionnaires with questions that measure separate variables, and questionnaires with questions that are aggregated into either a scale or index. Questionnaires within the former category are commonly part of surveys, whereas questionnaires in the latter category are commonly part of tests. Questionnaires with questions that measure separate variables, could for instance include questions on –

- preferences (e.g. political party)
- behaviors (e.g. food consumption)
- facts (e.g. gender).

Questionnaires with questions that are aggregated into either a scale or index, include for instance questions that measure -

- latent traits (e.g. personality traits such as extroversion)
- attitudes (e.g. towards immigration)
- an index (e.g. Social Economic Status).

Question Types: Usually, a questionnaire consists of a number of questions that the respondent has to answer in a set format. A distinction is made between open-ended and closed-ended questions. An open-ended question asks the respondent to formulate his/her own answer, whereas a closed-ended question has the respondent pick an answer from a given number of options. The response options for a closed-ended question should be exhaustive and mutually exclusive. Four types of response scales for closed-ended questions are distinguished –

- Dichotomous, where the respondent has two options.
- Nominal-polytomous, where the respondent has more than two unordered options.
- Ordinal-polytomous, where the respondent has more than two ordered options.
- Continuous (Bounded), where the respondent is presented with a continuous scale.

A respondent's answer to an open-ended question is coded into a response scale afterwards. An example of an open-ended question is a question where the testee has to complete a sentence (sentence completion item).

Question Sequence: In general, questions should flow logically from one to the next. To achieve the best response rates, questions should flow from the least sensitive to the most sensitive, from the factual and behavioral to the attitudinal, and from the more general to the more specific. There typically is a flow that should be followed when constructing a questionnaire in regards to the order that the questions are asked. The order is as follows -

- Screens
- Warm-ups
- Transitions
- Skips
- Difficult
- Changing Formula

Screens are used as a screening method to find out early whether or not someone should complete the questionnaire. Warm-ups are simple to answer, help capture interest in the survey, and may not even pertain to research objectives. Transition questions are used to make different areas flow well together. Skips include questions similar to 'If yes, then answer question 3. If no, then continue to question 5'. Difficult questions are towards the end because the respondent is in 'response mode'. Also, when completing an online questionnaire, the progress bars lets the respondent know that they are almost done so they are more willing to answer more difficult questions. Classification or demographic question should be at the end because typically they can feel like personal questions which will make respondents uncomfortable and not willing to finish survey.

Basic Rules for Questionnaire Item Construction: The basic rules are -

- Use statements which are interpreted in the same way by members of different subpopulations of the population of interest.
- Use statements where persons that have different opinions or traits will give different answers.
- Think of having an 'open' answer category after a list of possible answers.
- Use only one aspect of the construct you are interested in per item.

- Use positive statements and avoid negatives or double negatives.
- Do not make assumptions about the respondent.
- Use clear and comprehensible wording, easily understandable for all educational levels.
- Use correct spelling, grammar and punctuation.
- Avoid items that contain more than one question per item (e.g. Do you like strawberries and potatoes?).
- Question should not be biased or even leading the participant towards an answer.

Questionnaire Administration Modes: Main modes of questionnaire administration are -

- Face-to-face questionnaire administration, where an interviewer presents the items orally.
- Paper-and-pencil questionnaire administration, where the items are presented on paper.
- Computerized questionnaire administration, where the items are presented on the computer.
- Adaptive computerized questionnaire administration, where a selection of items is presented on the computer, and based on the answers on those items, the computer selects following items optimized for the testee's estimated ability or trait.

Concerns with Questionnaires: It is important to consider the order in which questions are presented. Sensitive questions, such as questions about income, drug use, or sexual activity, should be put at the end of the survey. This allows the researcher to establish trust before asking questions that might embarrass respondents. Researchers also recommend putting routine questions, such as age, gender, and marital status, at the end of the questionnaire. Double-barreled questions, which ask two questions in one, should never be used in a survey. An example of a double barreled question is, please rate how strongly you agree or disagree with the following statement - 'I feel good about my work on the job, and I get along well with others at work'. This question is problematic because survey respondents are asked to give one response for two questions. Researchers should avoid using emotionally loaded or biased words and phrases.

Advantages of Questionnaires: The advantages of questionnaires are -

- Large amounts of information can be collected from a large number of people in a short period of time and in a relatively cost effective way.
- Can be carried out by the researcher or by any number of people with limited affect to its validity and reliability.
- The results of the questionnaires can usually be quickly and easily quantified by either a researcher or through the use of a software package.
- Can be analyzed more scientifically and objectively than other forms of research.
- When data has been quantified, it can be used to compare and contrast other research and may be used to measure change.
- Positivists believe that quantitative data can be used to create new theories and / or test existing hypotheses.

Disadvantages of Questionnaires: The disadvantages of questionnaires are -

- To be inadequate to understand some forms of information - i.e. changes of emotions, behavior, feelings etc.
- Phenomenologists state that quantitative research is simply an artificial creation by the researcher, as it is asking only a limited amount of information without explanation.
- There is no way to tell how truthful a respondent is being.
- There is no way of telling how much thought a respondent has put in.
- The respondent may be forgetful or not thinking within the full context of the situation.
- People may read differently into each question and therefore reply based on their own interpretation of the question - i.e. what is 'good' to someone may be 'poor' to someone else, therefore there is a level of subjectivity that is not acknowledged.

Questionnaires are not among the most prominent methods in qualitative research, because they commonly require subjects to respond to a stimulus, and thus they are not acting naturally. However, they have their uses, especially as a means of collecting information from a wider sample than can be reached by personal interview. Though the information is necessarily more limited, it can still be very useful. For example, where certain clearly defined facts or opinions have been identified by more qualitative methods, a questionnaire can explore how generally these apply, if that is a matter of interest.

9.4.2 INTERVIEWS METHOD

Interviewing involves asking questions and getting answers from participants in a study. Interviewing has a variety of forms including: individual, face-to-face interviews and face-to-face group interviewing. The asking and answering of questions can be mediated by the telephone or other electronic devices (e.g. computers). Interviews can be –

A. Structured,
B. Semi-structure or
C. Unstructured.

Face to face interviews are advantageous since detailed questions can be asked; further probing can be done to provide rich data; literacy requirements of participants is not an issue; non verbal data can be collected through observation; complex and unknown issues can be explored; response rates are usually higher than for self-administered questionnaires. Disadvantages of face to face interviews include: they can be expensive and time consuming; training of interviewers is necessary to reduce interviewer bias and are administered in a standardized why they are prone to interviewer bias and interpreter bias (if interpreters are used); sensitive issues maybe challenging.

Telephone interviews yield just as accurate data as face to face interviews. Telephone interviews are advantageous as they: are cheaper and faster than face to face interviews to conduct; use less resources than face to face interviews; allow to clarify questions; do not require literacy skills. Disadvantages of telephone interviews include: having to make repeated calls as calls may not be answered the first time; potential bias if call backs are not made so bias is towards those who are at home; only suitable for short surveys; only accessible to the population with a telephone; not appropriate for exploring sensitive issues.

Structured Interviews

Characteristics of the Structured Interview

- The interviewer asks each respondent the same series of questions.
- The questions are created prior to the interview, and often have a limited set of response categories.
- There is generally little room for variation in responses and there are few open-ended questions included in the interview guide.

- Questioning is standardized and the ordering and phrasing of the questions are kept consistent from interview to interview.
- The interviewer plays a neutral role and acts casual and friendly, but does not insert his or her opinion in the interview.
- Self-administered questionnaires are a type of structured interview.

When to Use a Structured Interview: Development of a structured interview guide or questionnaire requires a clear topical focus and well-developed understanding of the topic at hand. A well-developed understanding of a topic allows researchers to create a highly structured interview guide or questionnaire that provides respondents with relevant, meaningful and appropriate response categories to choose from for each question. Structured interviews are, therefore, best used when the literature in a topical area is highly developed or following the use of observational and other less structured interviewing approaches that provide the researcher with adequate understanding of a topic to construct meaningful and relevant close-ended questions.

Recording Interviews: There are a range of ways to collect and record structured interview data. Data collections methods include, but are not limited to - paper-based and self-report (mail, face-to-face); telephone interviews where the interviewer fills in participants' responses; web-based and self-report.

Benefits: Structured interviews can be conducted efficiently by interviewers trained only to follow the instructions on the interview guide or questionnaire. Structured interviews do not require the development of rapport between interviewer and interviewee, and they can produce consistent data that can be compared across a number of respondents.

Semi-structured Interviews

Characteristics of Semi-structured Interviews

- The interviewer and respondents engage in a formal interview.
- The interviewer develops and uses an 'interview guide'. This is a list of questions and topics that need to be covered during the conversation, usually in a particular order.
- The interviewer follows the guide, but is able to follow topical trajectories in the conversation that may stray from the guide when s/he feels this is appropriate.

When to Use Semi-structured Interviews: Semi-structured interviewing, according to Bernard (1988), is best used when you won't get more than one chance to interview someone and when you will be sending several interviewers out into the field to collect data. The semi-structured interview guide provides a clear set of instructions for interviewers and can provide reliable, comparable qualitative data. Semi-structured interviews are often preceded by observation, informal and unstructured interviewing in order to allow the researchers to develop a keen understanding of the topic of interest necessary for developing relevant and meaningful semi-structured questions. The inclusion of open-ended questions and training of interviewers to follow relevant topics that may stray from the interview guide does, however, still provide the opportunity for identifying new ways of seeing and understanding the topic at hand.

Recording Semi-Structured Interviews: Typically, the interviewer has a paper-based interview guide that s/he follows. Since semi-structured interviews often contain open-ended questions and discussions may diverge from the interview guide, it is generally best to tape-record interviews and later transcript these tapes for analysis. While it is possible to try to jot notes to capture respondents' answers, it is difficult to focus on conducting an interview and jotting notes. This approach will result in poor notes and also detract for the development of rapport between interviewer and interviewee. Development of rapport and dialogue is essential in unstructured

interviews. If tape-recording an interview is out of the question, consider having a note-taker present during the interview.

Benefits: Many researchers like to use semi-structured interviews because questions can be prepared ahead of time. This allows the interviewer to be prepared and appear competent during the interview. Semi-structured interviews also allow informants the freedom to express their views in their own terms. Semi-structure interviews can provide reliable, comparable qualitative data.

Unstructured Interviews

Characteristics of Unstructured Interviews

- The interviewer and respondents engage in a formal interview in that they have a scheduled time to sit and speak with each other and both parties recognize this to be an interview.
- The interviewer has a clear plan in mind regarding the focus and goal of the interview. This guides the discussion.
- There is not a structured interview guide. Instead, the interviewer builds rapport with respondents, getting respondents to open-up and express themselves in their own way.
- Questions tend to be open-ended and express little control over informants' responses.
- Ethnographic, in depth interviews are unstructured. Fontana and Frey (1994) identify three types of in depth, ethnographic unstructured interviews – oral history, creative interviews and postmodern interviews.

When to Use Unstructured Interviews: Unstructured interviewing is recommended when the researcher has developed enough of an understanding of a setting and his/her topic of interest to have a clear agenda for the discussion with the informant, but still remains open to having his/her understanding of the area of inquiry open to revision by respondents. Because these interviews are not highly structured and because the researcher's understanding is still evolving, it is helpful to anticipate the need to speak with informants on multiple occasions.

Recording Unstructured Interviews: Since unstructured interviews often contain open-ended questions and discussions may develop in unanticipated directions, it is generally best to tape-record interviews and later transcript these tapes for analysis. This allows the interviewer to focus on interacting with the participant and follow the discussion. While it is possible to try to jot notes to capture respondents' answers, it is difficult to focus on conducting an interview and jotting notes. This approach will result in poor notes and also detract from the development of rapport between interviewer and interviewee. Development of rapport and dialogue is essential in unstructured interviews. If tape-recording an interview is out of the question, consider having a note-taker present during the interview.

Benefits: Unstructured interviews are an extremely useful method for developing an understanding of an as-of-yet not fully understood or appreciated culture, experience, or setting. Unstructured interviews allow researchers to focus the respondents' talk on a particular topic of interest, and may allow researchers the opportunity to test out his/her preliminary understanding, while still allowing for ample opportunity for new ways of seeing and understanding to develop. Unstructured interviews can be an important preliminary step toward the development of more structured interview guides or surveys.

Informal Interviewing

Characteristics of Informal interviewing

- The interviewer talks with people in the field informally, without use of a structured interview guide of any kind.
- The researcher tries to remember his/her conversations with informants, and uses jottings or brief notes taken in the field to help in the recall and writing of notes from experiences in the field.
- Informal interviewing goes hand-in-hand with participant observation.
- While in the field as an observer, informal interviews are casual conversations one might have with the people the researcher is observing.

When to Use Informal Interviews: Informal interviewing is typically done as part of the process of observing a social setting of interest. These may be best used in the early stages of the development of an area of inquiry, where there is little literature describing the setting, experience, culture or issue of interest. The researcher engages in fieldwork - observation and informal interviewing - to develop an understanding of the setting and to build rapport. Informal interviewing may also be used to uncover new topics of interest that may have been overlooked by previous research.

Recording Informal Interviews: Since informal interviews occur 'on the fly,' it is difficult to tape-record this type of interview. Additionally, it is likely that informal interviews will occur during the process of observing a setting. The researcher should participate in the conversation. As soon as possible, s/he should make jottings or notes of the conversation. These jottings should be developed into a more complete account of the informal interview. This type of account would tend to be included in the researcher's field notes. Developing field notes soon after an informal interview is recommended. Even with good field jottings the details of an informal interview are quickly lost from memory.

Benefits: Interviews can be done informally, and 'on the fly' and, therefore, do not require scheduling time with respondents. In fact, respondents may just see this as 'conversation'. Informal interviews may, therefore, foster 'low pressure' interactions and allow respondents to speak more freely and openly. Informal interviewing can be helpful in building rapport with respondents and in gaining their trust as well as their understanding of a topic, situation, setting, etc. Informal interviews, like unstructured interviews, are an essential part of gaining an understanding of a setting and its members' ways of seeing. It can provide the foundation for developing and conducting more structured interviews.

Interviewing, when considered as a method for conducting qualitative research, is a technique used to understand the experiences of others. Characteristics of qualitative research interviews –

- ❖ Interviews are completed by the interviewer based on what the interviewee says.
- ❖ Interviews are a far more personal form of research than questionnaires.
- ❖ In the personal interview, the interviewer works directly with the interviewee.
- ❖ Unlike with mail surveys, the interviewer has the opportunity to probe or ask follow up questions.
- ❖ Interviews are generally easier for the interviewee, especially if what is sought are opinions and/or impressions.

Types of Interviews

Informal, Conversational interview: No predetermined questions are asked, in order to remain as open and adaptable as possible to the interviewee's nature and priorities; during the interview the interviewer 'goes with the flow'.

General interview guide approach: Intended to ensure that the same general areas of information are collected from each interviewee; this provides more focus than the conversational approach, but still allows a degree of freedom and adaptability in getting the information from the interviewee.

Standardized, open-ended interview: The same open-ended questions are asked to all interviewees; this approach facilitates faster interviews that can be more easily analyzed and compared.

Closed, fixed-response interview: All interviewees are asked the same questions and asked to choose answers from among the same set of alternatives. This format is useful for those not practiced in interviewing. This type of interview is also referred to as structured.

Interviewer's judgments: According to Hackman and Oldman several factors can bias an interviewer's judgment about a job applicant. However these factors can be reduced or minimized by training interviews to recognized them. Some examples are -

Prior Information: Interviewers generally have some prior information about job candidates, such as recruiter evaluations, application blanks, online screening results, or the results of psychological tests. This can cause the interviewer to have a favorable or unfavorable attitude toward an applicant before meeting them.

The Contrast Effect: How the interviewers evaluate a particular applicant may depend on their standards of comparison, that is, the characteristics of the applicants they interviewed previously.

Iterviewers' Prejudices: This can be done when the interviewers' judgment is their personal likes and dislikes. These may include but are not limited to racial and ethnic background, applicants who display certain qualities or traits and refuse to consider their abilities or characteristics.

Preparation and Process of Conducting Interviews

Interviews are among the most challenging and rewarding forms of measurement. They require a personal sensitivity and adaptability as well as the ability to stay within the bounds of the designed protocol. The followings describe the preparation need to do for an interview study and then the process of conducting the interview itself.

- **Preparation**

Role of the Interviewer: The interviewer is really the 'jack-of-all-trades' in survey research. The interviewer's role is complex and multifaceted. It includes the following tasks –

Locate and enlist cooperation of respondents: The interviewer has to find the respondent. In door-to-door surveys, this means being able to locate specific addresses. Often, the interviewer has to work at the least desirable times (like immediately after dinner or on weekends) because that's when respondents are most readily available.

Motivate respondents to do good job: If the interviewer does not take the work seriously, why would the respondent? The interviewer has to be motivated and has to be able to communicate that motivation to the respondent. Often, this means that the interviewer has to be convinced of the importance of the research.

Clarify any confusion/concerns: Interviewers have to be able to think on their feet. Respondents may raise objections or concerns that were not anticipated. The interviewer has to be able to respond candidly and informatively.

Observe quality of responses: Whether the interview is personal or over the phone, the interviewer is in the best position to judge the quality of the information that is being received. Even a verbatim transcript will not adequately convey how seriously the respondent took the task, or any gestures or body language that were evident.

Conduct a good interview: Last, and certainly not least, the interviewer has to conduct a good interview! Every interview has a life of its own. Some respondents are motivated and attentive, others are distracted or disinterested. The interviewer also has good or bad days. Assuring a consistently high-quality interview is a challenge that requires constant effort.

Training the Interviewers: Here are some of the major topics that should be included in interviewer training –

Describe the entire study: Interviewers need to know more than simply how to conduct the interview itself. They should learn about the background for the study, previous work that has been done, and why the study is important.

State who is sponsor of research: Interviewers need to know who they are working for. They and their respondents have a right to know not just what agency or company is conducting the research, but also, who is paying for the research.

Teach enough about survey research: While you seldom have the time to teach a full course on survey research methods, the interviewers need to know enough that they respect the survey method and are motivated. Sometimes it may not be apparent why a question or set of questions was asked in a particular way. The interviewers will need to understand the rationale for how the instrument was constructed.

Explain the sampling logic and process: Naive interviewers may not understand why sampling is so important. They may wonder why you go through all the difficulties of selecting the sample so carefully. You will have to explain that sampling is the basis for the conclusions that will be reached and for the degree to which your study will be useful.

Explain interviewer bias: Interviewers need to know the many ways that they can inadvertently bias the results. And, they need to understand why it is important that they not bias the study. This is especially a problem when you are investigating political or moral issues on which people have strongly held convictions. While the interviewer may think they are doing good for society by slanting results in favor of what they believe, they need to recognize that doing so could jeopardize the entire study in the eyes of others.

'Walk through' the Interview: When you first introduce the interview, it's a good idea to walk through the entire protocol so the interviewers can get an idea of the various parts or phases and how they interrelate. Explain respondent selection procedures, including –

Reading maps: It's astonishing how many adults don't know how to follow directions on a map. In personal interviews, the interviewer may need to locate respondents who are spread over a wide geographic area. And, they often have to navigate by night (respondents tend to be most available in evening hours) in neighborhoods they're not familiar with. Teaching basic map reading skills and confirming that the interviewers can follow maps is essential.

Identifying households: In many studies it is impossible in advance to say whether every sample household meets the sampling requirements for the study. In your study, you may want to interview only people who live in single family homes. It may be impossible to distinguish townhouses and apartment buildings in your sampling frame. The interviewer must know how to identify the appropriate target household.

Identify respondents: Just as with households, many studies require respondents who meet specific criteria. For instance, your study may require that you speak with a male head-of-household between the ages of 30 and 40 who has children under 18 living in the same household. It may be impossible to obtain statistics in advance to target such respondents. The interviewer may have to ask a series of filtering questions before determining whether the respondent meets the sampling needs.

Rehearse interview: You should probably have several rehearsal sessions with the interviewer team. You might even videotape rehearsal interviews to discuss how the trainees responded in difficult situations. The interviewers should be very familiar with the entire interview before ever facing a respondent.

Explain supervision: In most interview studies, the interviewers will work under the direction of a supervisor. In some contexts, the supervisor may be a faculty advisor; in others, they may be the 'boss'. In order to assure the quality of the responses, the supervisor may have to observe a subsample of interviews, listen in on phone interviews, or conduct follow-up assessments of interviews with the respondents. This can be very threatening to the interviewers. You need to develop an atmosphere where everyone on the research team - interviewers and supervisors - feel like they're working together towards a common end.

Explain scheduling: The interviewers have to understand the demands being made on their schedules and why these are important to the study. In some studies it will be imperative to conduct the entire set of interviews within a certain time period. In most studies, it's important to have the interviewers available when it's convenient for the respondents, not necessarily the interviewer.

Interviewer's Kit: It's important that interviewers have all of the materials they need to do a professional job. Usually, you will want to assemble an interviewer kit that can be easily carried and includes all of the important materials such as –

- a 'professional-looking' notebook (this might even have the logo of the company or organization conducting the interviews);
- maps;
- sufficient copies of the survey instrument;
- official identification (preferable a picture ID);
- a cover letter from the Principal Investigator or Sponsor; and
- a phone number the respondent can call to verify the interviewer's authenticity.

- **Process**

So all the preparation is complete, the training done, the interviewers ready to proceed, their 'kits' in hand. It's finally time to do an actual interview. Each interview is unique, like a small work of art (and sometimes the art may not be very good). Each interview has its own ebb and flow - its own pace. To the outsider, an interview looks like a fairly standard, simple, prosaic effort. But to the interviewer, it can be filled with special nuances and interpretations that aren't often immediately apparent. Every interview includes some common components. There's the opening, where the interviewer gains entry and establishes the rapport and tone for what follows. There's the middle game, the heart of the process, that consists of the protocol of questions and the improvisations of the probe. And finally, there's the endgame, the wrap-up, where the interviewer and respondent establish a sense of closure. Whether it's a two-minute phone interview or a personal interview that spans hours, the interview is a bit of theater, a mini-drama that involves real lives in real time.

Opening Remarks: In many ways, the interviewer has the same initial problem that a salesperson has. You have to get the respondent's attention initially for a long enough period that you can sell them

on the idea of participating in the study. Many of the remarks here assume an interview that is being conducted at a respondent's residence. But the analogies to other interview contexts should be straightforward.

Gaining entry: The first thing the interviewer must do is gain entry. Several factors can enhance the prospects. Probably the most important factor is your initial appearance. The interviewer needs to dress professionally and in a manner that will be comfortable to the respondent. In some contexts a business suit and briefcase may be appropriate. In others, it may intimidate. The way the interviewer appears initially to the respondent has to communicate some simple messages - that you're trustworthy, honest, and non-threatening. Cultivating a manner of professional confidence, the sense that the respondent has nothing to worry about because you know what you're doing - is a difficult skill to teach and an indispensable skill for achieving initial entry.

Doorstep technique: You're standing on the doorstep and someone has opened the door, even if only halfway. You need to smile. You need to be brief. State why you are there and suggest what you would like the respondent to do. Don't ask suggest what you want. Instead of saying 'May I come in to do an interview?', you might try a more imperative approach like 'I'd like to take a few minutes of your time to interview you for a very important study'.

Introduction: If you've gotten this far without having the door slammed in your face, chances are you will be able to get an interview. Without waiting for the respondent to ask questions, you should move to introducing yourself. You should have this part of the process memorized so you can deliver the essential information in 20-30 seconds at most. State your name and the name of the organization you represent. Show your identification badge and the letter that introduces you. You want to have as legitimate an appearance as possible. If you have a three-ring binder or clipboard with the logo of your organization, you should have it out and visible. You should assume that the respondent will be interested in participating in your important study - assume that you will be doing an interview here.

Explaining the study: At this point, you've been invited to come in. Or, the respondent has continued to listen long enough that you need to move onto explaining the study. There are three rules to this critical explanation - (1) Keep it short; (2) Keep it short; and (3) Keep it short! The respondent doesn't have to or want to know all of the neat nuances of this study, how it came about, how you convinced your thesis committee to buy into it, and so on. You should have a one or two sentence description of the study memorized. No big words. No jargon. No detail. There will be more than enough time for that later (and you should bring some written materials you can leave at the end for that purpose). This is the '25 words or less' description. What you should spend some time on is assuring the respondent that you are interviewing them confidentially, and that their participation is voluntary.

Asking the Questions: You've gotten in. The respondent has asked you to sit down and make yourself comfortable. It may be that the respondent was in the middle of doing something when you arrived and you may need to allow them a few minutes to finish the phone call or send the kids off to do homework. Now, you're ready to begin the interview itself.

Use questionnaire carefully, but informally: The questionnaire is your friend. It was developed with a lot of care and thoughtfulness. While you have to be ready to adapt to the needs of the setting, your first instinct should always be to trust the instrument that was designed. But you also need to establish a rapport with the respondent. If you have your face in the instrument and you read the questions, you'll appear unprofessional and disinterested. Even though you may be nervous, you need to recognize that your respondent is most likely even more nervous. If you memorize the first few

questions, you can refer to the instrument only occasionally, using eye contact and a confident manner to set the tone for the interview and help the respondent get comfortable.

Ask questions exactly as written: Sometimes an interviewer will think that they could improve on the tone of a question by altering a few words to make it simpler or more 'friendly' – don't. You should ask the questions as they are on the instrument. If you had a problem with a question, the time to raise it was during the training and rehearsals, not during the actual interview. It is important that the interview be as standardized as possible across respondents (this is true except in certain types of exploratory or interpretivist research where the explicit goal is to avoid any standardizing). You may think the change you made was inconsequential when, in fact, it may change the entire meaning of the question or response.

Follow the order given: Once you know an interview well, you may see a respondent bring up a topic that you know will come up later in the interview. You may be tempted to jump to that section of the interview while you're on the topic – don't. You are more likely to lose your place. You may omit questions that build a foundation for later questions.

Ask every question: Sometimes you'll be tempted to omit a question because you thought you already heard what the respondent will say. Don't assume that. If you hadn't asked the question, you would never have discovered the detail.

Obtaining Adequate Responses - The Probe: OK, you've asked a question. The respondent gives a brief, cursory answer. How do you elicit a more thoughtful, thorough response? You probe.

Silent probe: The most effective way to encourage someone to elaborate is to do nothing at all - just pause and wait. This is referred to as the 'silent' probe. It works (at least in certain cultures) because the respondent is uncomfortable with pauses or silence. It suggests to the respondent that you are waiting, listening for what they will say next.

Overt encouragement: At times, you can encourage the respondent directly. Try to do so in a way that does not imply approval or disapproval of what they said (that could bias their subsequent results). Overt encouragement could be as simple as saying 'Uh-huh' or 'OK' after the respondent completes a thought.

Elaboration: You can encourage more information by asking for elaboration. For instance, it is appropriate to ask questions like 'Would you like to elaborate on that?' or 'Is there anything else you would like to add?'

Ask for clarification: Sometimes, you can elicit greater detail by asking the respondent to clarify something that was said earlier. You might say, 'A minute ago you were talking about the experience you had in high school. Could you tell me more about that?'

Repetition: This is the old psychotherapist trick. You say something without really saying anything new. For instance, the respondent just described a traumatic experience they had in childhood. You might say 'What I'm hearing you say is that you found that experience very traumatic'. Then, you should pause. The respondent is likely to say something like 'Well, yes, and it affected the rest of my family as well. In fact, my younger sister...'

Recording the Response: Although we have the capability to record a respondent in audio and/or video, most interview methodologists don't think it's a good idea. Respondents are often uncomfortable when they know their remarks will be recorded word-for-word. They may strain to only say things in a socially acceptable way. Although you would get a more detailed and accurate record, it is likely to be distorted by the very process of obtaining it. This may be more of a problem in some situations than in others. It is increasingly common to be told that your

conversation may be recorded during a phone interview. And most focus group methodologies use unobtrusive recording equipment to capture what's being said. But, in general, personal interviews are still best when recorded by the interviewer using pen and paper.

Record responses immediately: The interviewer should record responses as they are being stated. This conveys the idea that you are interested enough in what the respondent is saying to write it down. You don't have to write down every single word – you're not taking stenography. But you may want to record certain key phrases or quotes verbatim. You need to develop a system for distinguishing what the respondent says verbatim from what you are characterizing.

Include all probes: You need to indicate every single probe that you use. Develop a shorthand for different standard probes. Use a clear form for writing them in (e.g., place probes in the left margin).

Use abbreviations where possible: Abbreviations will help you to capture more of the discussion. Develop a standardized system (e.g., R=respondent; DK=don't know). If you create an abbreviation on the fly, have a way of indicating its origin. For instance, if you decide to abbreviate Spouse with an 'S', you might make a notation in the right margin saying 'S=Spouse'.

Concluding the Interview: When you've gone through the entire interview, you need to bring the interview to closure. Some important things to remember -

Thank the respondent - Don't forget to do this. Even if the respondent was troublesome or uninformative, it is important for you to be polite and thank them for their time.

Tell them when you expect to send results - You owe it to your respondent to show them what you learned. Now, they may not want your entire 300-page dissertation. It's common practice to prepare a short, readable, jargon-free summary of interviews that you can send to the respondents.

Don't be brusque or hasty - Allow for a few minutes of winding down conversation. The respondent may want to know a little bit about you or how much you like doing this kind of work. They may be interested in how the results will be used. Use these kinds of interests as a way to wrap up the conversation. As you're putting away your materials and packing up to go, engage the respondent. You don't want the respondent to feel as though you completed the interview and then rushed out on them - they may wonder what they said that was wrong. On the other hand, you have to be careful here. Some respondents may want to keep on talking long after the interview is over. You have to find a way to politely cut off the conversation and make your exit.

Immediately after leaving write down any notes about how the interview went - Sometimes you will have observations about the interview that you didn't want to write down while you were with the respondent. You may have noticed them get upset at a question, or you may have detected hostility in a response. Immediately after the interview you should go over your notes and make any other comments and observations - but be sure to distinguish these from the notes made during the interview (you might use a different color pen, for instance).

Strengths and Weaknesses

Possibly the greatest advantage of interviewing is the depth of detail from the interviewee. Interviewing participants can paint a picture of what happened in a specific event, tell us their perspective of such event, as well as give other social cues. Social cues, such as voice, intonation, body language etc. of the interviewee can give the interviewer a lot of extra information that can be added to the verbal answer of the interviewee on a question. This level of detailed description, whether it be verbal or nonverbal, can show an otherwise hidden interrelatedness between emotions, people, objects unlike many quantitative methods of research. In addition, interviewing has a unique

advantage in its specific form. Researchers can tailor the questions they ask to the respondent in order to get rich, full stories and the information they need for their project. They can make it clear to the respondent when they need more examples or explanations. Not only can researchers also learn about specific events, they can also gain insight into people's interior experiences, specifically how people perceive and how they interpreted their perceptions. How events affected their thoughts and feelings. In this, researchers can understand the process of an event instead of what just happened and how they reacted to it.

Interviewing is not a perfect method for all types of research. It does have its disadvantages. First, there can be complications with the planning of the interview. Not only is recruiting people for interviews hard, due to the typically personal nature of the interview, planning where to meet them and when can be difficult. Participants can cancel or change the meeting place at the last minute. During the actual interview, a possible weakness is missing some information. This can arise from the immense multitasking that the interviewer must do. Not only do they have to make the respondent feel very comfortable, they have to keep as much eye contact as possible, write down as much as they can, and think of follow up questions. After the interview, the process of coding begins and with this comes its own set of disadvantages. Second, coding can be extremely time consuming. This process typically requires multiple people, which can also become expensive. Third, the nature of qualitative research itself, doesn't lend itself very well to quantitative analysis. Some researchers report more missing data in interview research than survey research, therefore it can be difficult to compare populations.

9.4.3 FOCUS GROUP DISCUSSION (FGD)

A focus group discussion (FGD) is an in-depth field method that brings together a small homogeneous group (usually six to twelve persons) to discuss topics on a study agenda. The purpose of this discussion is to use the social dynamics of the group, with the help of a moderator/ facilitator, to stimulate participants to reveal underlying opinions, attitudes, and reasons for their behavior. In short, a well facilitated group can be helpful in finding out the 'how' and 'why' of human behavior.

Focus group discussions are a data collection method. Data is collected through a semi-structured group interview process. Focus groups are generally used to collect data on a specific topic. Focus group methods emerged in the 1940s with the work of Merton and Fiske who used focus groups to conduct consumer satisfaction. The discussion is conducted in a relaxed atmosphere to enable participants to express themselves without any personal inhibitions. Participants usually share a common characteristic such as age, sex, or socio-economic status that defines them as a member of a target subgroup. This encourages a group to speak more freely about the subject without fear of being judged by others thought to be superior. The discussion is led by a trained moderator/facilitator (preferably experienced), assisted by an observer who takes notes and arranges any tape recording. The moderator uses a prepared guide to ask very general questions of the group. Usually more than one group session is needed to assure good coverage of responses to a set of topics. Each session usually lasts between one and two hours but ideally 60 to 90 minutes.

The aim of the focus group is to make use of participants' feelings, perceptions and opinions. This method requires the researcher to use a range of skills - group skills; facilitating; moderating; listening/observing; analysis. Focus groups or group discussions are useful to further explore a topic, providing a broader understanding of why the target group may behave or think in a particular

way, and assist in determining the reason for attitudes and beliefs. They are conducted with a small sample of the target group and are used to stimulate discussion and gain greater insights.

The design of focus group research will vary based on the research question being studied. Below, highlight some general principles to consider -

- Standardization of questions - focus groups can vary in the extent to which they follow a structured protocol or permit discussion to emerge.
- Number of focus groups conducted - or sampling will depend on the 'segmentation' or different stratifications (e.g. age, sex, socioeconomic status, health status) that the researcher identifies as important to the research topic.
- Number of participants per group - the rule of thumb has been 6-10 homogeneous strangers, but as Morgan (1996) points out there may be reasons to have smaller or slightly larger groups.
- Level of moderator involvement - can vary from high to low degree of control exercised during focus groups (e.g. extent to which structured questions are asked and group dynamics are actively managed).

Focus group interviews typically have the characteristics -

- Identify the target market (people who possess certain characteristics).
- Provide a short introduction and background on the issue to be discussed.
- Have focus group members write their responses to the issue(s).
- Facilitate group discussion.
- Recommended size of the sample group is 6 - 10 people as smaller groups may limit the potential on the amount of information collected, and more may make it difficult for all participants to participate and interact and for the interviewer to be able to make sense of the information given.
- Several focus groups should be used in order to get a more objective and macro view of the investigation, i.e. focusing on one group may give you idiosyncratic results. The use of several groups will add to the breadth and depth of information. A minimum of three focus groups is recommended for best practice approaches.
- Members of the focus group should have something in common which is important to the investigation.
- Groups can either be put together or existing groups - it is always useful to be mindful of the group dynamics of both situations.
- Provide a summary of the focus group issues at the end of the meeting.

The purpose of an FGD is to obtain in-depth information on concepts, perceptions, and ideas of the group. An FGD aims to be more than a question-answer interaction. In combination with other methods, focus groups might be used to -

- explore new research areas;
- explore a topic that is difficult to observe (not easy to gain access);
- explore a topic that does not lend itself to observational techniques (e.g. attitudes and decision-making);
- explore sensitive topics;
- collect a concentrated set of observations in a short time span;
- ascertain perspectives and experiences from people on a topic, particularly when these are people who might otherwise be marginalized;
- gather preliminary data;
- aid in the development of surveys and interview guides;

- clarify research findings from another method;
- explore the range of opinions/views on a topic of interest;
- collect a wide variety of local terms and expressions used to describe a disease (e.g., diarrhea) or an act (e.g., defecation);
- explore meanings of survey findings that cannot be explained statistically.

Steps in Focus Group Discussions (FGD)

The steps in using FGDs to study a problem are summarized below. The extent to which these steps must be followed varies, however, depending on the training and experience of those involved in the data collection.

STEP 1: Plan the entire FGD

- What activities need to be planned?
- Is there the need for a resource person.
- Role of resource person in training field staff.

STEP 2: Decide what types of groups are needed

- Method of sampling (selection criteria)
- Composition of groups
- Number of groups
- Group size
- Contacting and informing participants.

STEP 3: Select moderator and field team

- Field staff requirements
- Moderator
- Observer/recorder
- Other staff.

STEP 4: Develop moderator's guide and format for recording responses

- Structure and sequence of topics
- Wording of guide
- Number of topics
- Example of an FGD guide.

STEP 5: Train field team and conduct pilot test

- Training hints
- Training package
- Theory sessions
- Practice sessions
- On-going revision of FGD guide.

STEP 6: Prepare for the individual FGDs

- Site selection and location for FGD
- Date and time
- Plan for supporting materials or FGD checklist.

STEP 7: Conduct the FGD

- Conducting the Discussion
- Introduction
- Warm-up
- Discussion

- Wrap-up summary
- Debriefing
- Collecting and managing information in FGD.

STEP 8: Analyze and interpret FGD results

- How much analysis is required
- Debriefing;
- Notes;
- Transcripts; and log book
- Writing the report
- Interpretation of findings
- Example of format of an FGD report.

Identify suitable discussion participants and invite a small group to a meeting at an agreed place and time. The ideal number of participants is six to eight, but be flexible about numbers - do not turn away participants after they had arrived at the meeting and do not pressure people to come to the meeting. Be psychologically prepared for the session; you will need to remain alert to be able to observe, listen, and keep the discussion on track for a period of one to two hours. Make sure you arrive at the agreed place before the participants, and be ready to greet them. Maintain a neutral attitude and appearance, and do not start talking about the topic of interest before the official opening of the group discussion. Begin by introducing yourself and your team (even if the participants have already met them individually), and ask participants to introduce themselves. Explain clearly that the purpose of the discussion is to find out what people think about the practices or activities depicted by the pictures. Tell them that you are not looking for any right or wrong answer but that you want to learn what each participant's views are. It must be made clear to all participants that their views will be valued. Bring the discussion to a close when you feel the topic has been exhausted, and do nor let the group discussion degenerate into smaller discussions. Be sincere in expressing your thanks to the participants for their contributions. Refreshments may be served at the end of the meeting as a way of thanking the participants and maintaining good rapport with them.

Conducting FGD

The following guideline may be provided for conducting FGD.

Preparation

Selection of topic: It is appropriate to define and clarify the concepts to be discussed. The basic idea is to lay out a set of issues for the group to discuss. It is important to bear in mind that the moderator will mostly be improvising comments and questions within the framework set by the guidelines. By keeping the questions open-ended, the moderator can stimulates useful trains of thought in the participants that were not anticipated.

Selecting the study participants: Given a clear idea of the issues to be discussed, the next critical step in designing a focus group study is to decide on the characteristics of the individuals who are to be targeted for sessions. It is often important to ensure that the groups all share some common characteristics in relation to the issue under investigation. If you need to obtain information on a topic from several different categories of informants who are likely to discuss the issue from different perspectives, you should organize a focus group for each major category. For example a group for men and a group for women, or a group for older women and group for younger women. The selection of the participants can be on the basis of purposive or convenience sampling. The participants should receive the invitations at least one or two days before the exercise. The invitations should explain the general purpose of the FGD.

Physical arrangements: Communication and interaction during the FGD should be encouraged in every way possible. Arrange the chairs in a circle. Make sure the area will be quite, adequately lighted, etc., and that there will be no disturbances. Try to hold the FGD in a neutral setting that encourages participants to freely express their views. A health center, for example, is not a good place to discuss traditional medical beliefs or preferences for other types of treatment. Neutral setting could also be from the perspective of a place where the participants feel comfortable to come over and above their party factions.

Conducting the Session

- One of the members of the research team should act as a 'facilitator' or 'moderator' for the focus group. One should serve as 'recorder'.
- Functions of the Facilitator: The facilitator should not act as an expert on the topic. His/her role is to stimulate and support discussion. S/he should perform the following functions -

  Introduce the session - S/he should introduce himself/herself as facilitator and introduce the recorder. Introduce the participants by name or ask them to introduce themselves (or develop some new interesting way of introduction). Put the participants at ease and explain the purpose of the FGD, the kind of information needed, and how the information will be used (e.g., for planning of a health program, an education program, et.).

  Encourage discussion - The facilitator should be enthusiastic, lively, and humorous and show his/her interest in the group's ideas. Formulate questions and encourage as many participants as possible to express their views. Remember there are no 'right' or 'wrong' answers. Facilitator should react neutrally to both verbal and nonverbal responses.

  Encourage involvement - Avoid a question and answer session. Some useful techniques include asking for clarification (can you tell me more?); reorienting the discussion when it goes off the track (Saying - wait, how does this relate to the issue? Using one participant's remarks to direct a question to another); bringing in reluctant participants (Using person's name, requesting his/her opinion, making more frequent eye contact to encourage participation); dealing with

dominant participants (Avoiding eye contact or turning slightly away to discourage the person from speaking, or thanking the person and changing the subject).

Avoid being placed in the role of expert - When the facilitator is asked for his/her opinion by a respondent, remember that s/he is not there to educate of inform. Direct the question back to the group by saying 'What do you think?' 'What would you do?' Set aside time, if necessary, after the session to give participants the information they have asked. Do not try to give comments on everything that is being said. Do not feel you have to say Something during every pause in the discussion. Wait a little and see what happens.

Control the timing of the meeting but unobtrusively - Listen carefully and move the discussion from topic to topic. Subtly control the time allocated to various topics so as to maintain interest. If the participants spontaneously jump from one topic to the other, let the discussion continue for a while because useful additional information may surface and then summarize the points brought up and reorient the discussion.

- Take time at the end of the meeting to summarize, check for agreement and thank the participants: Summarize the main issues brought up, check whether all agree and ask for additional comments. Thank the participants and let them know that their ideas had been valuable contribution and will be used for planning the proposed research/intervention/or whatever the purpose of FGD was. Listen to the additional comments made after the meeting. Sometime some valuable information surfaces, which otherwise may remain hidden.

Advantages and Disvantages of FGD

Focus groups and group discussions are advantageous as they -

- Are useful when exploring cultural values and health beliefs;
- Can be used to examine how and why people think in a particular way and how is influences their beliefs and values;
- Can be used to explore complex issues;
- Can be used to develop hypothesis for further research;
- Do not require participants to be literate.

Disadvantages of focus groups include -

- Lack of privacy/anonymity;
- Having to carefully balance the group to ensure they are culturally and gender appropriate (i.e. gender may be an issue);
- Potential for the risk of 'group think' (not allowing for other attitudes, beliefs etc.);
- Potential for group to be dominated by one or two people;
- Group leader needs to be skilled at conducting focus groups, dealing with conflict, drawing out passive participants and creating a relaxed, welcoming environment;
- Are time consuming to conduct and can be difficult and time consuming to analyze.

9.4.4 PARTICIPATORY RURAL APPRAISAL/ ASSESSMENT (PRA)

Participatory rural appraisal/ assessment (PRA) is a set of participatory and largely visual techniques for assessing group and community resources, identifying and prioritizing problems and appraising strategies for solving them. During the 1980s, PRA was firstly developed in India and Kenya, mainly supported by NGOs operating at grass-roots level. Until today PRA evolved so fast in terms of the methodology, the creation of new tools and specifically in the different ways it is applied. It is a research/planning methodology in which a local community (with or without the assistance of outsiders) studies an issue that concerns the population, prioritizes problems, evaluates options for

solving the problem(s) and comes up with a Community Action Plan to address the concerns that have been raised. PRA is particularly concerned that the multiple perspectives that exist in any community are represented in the analysis and that the community itself takes the lead in evaluating its situation and finding solutions. Outsiders may participate as facilitators or in providing technical information but they should not 'take charge' of the process.

In PRA, a number of different tools are used to gather and analyze information. These tools encourage participation, make it easier for people to express their views and help to organize information in a way that makes it more useful and more accessible to the group that is trying to analyze a given situation. It is also called 'Participatory Learning for Action (PLA)', is a methodological approach that is used to enable farmers to analyze their own situation and to develop a common perspective on natural resource management and agriculture at village level.

Key Tenets / Principles of PRA

- Participation: Local people's input into PRA activities is essential to its value as a research and planning method and as a means for diffusing the participatory approach to development.
- Teamwork: To the extent that the validity of PRA data relies on informal interaction and brainstorming among those involved, it is best done by a team that includes local people with perspective and knowledge of the area's conditions, traditions, and social structure and either nationals or expatriates with a complementary mix of disciplinary backgrounds and experience. A well-balanced team will represent the diversity of socioeconomic, cultural, gender, and generational perspectives.
- Flexibility: PRA does not provide blueprints for its practitioners. The combination of techniques that is appropriate in a particular development context will be determined by such variables as the size and skill mix of the PRA team, the time and resources available, and the topic and location of the work.
- Optimal Ignorance: To be efficient in terms of both time and money, PRA work intends to gather just enough information to make the necessary recommendations and decisions.
- Triangulation: PRA works with qualitative data. To ensure that information is valid and reliable, PRA teams follow the rule of thumb that at least three sources must be consulted or techniques must be used to investigate the same topics.

Organizing PRA

A typical PRA activity involves a team of people working for two to three weeks on workshop discussions, analyses, and fieldwork. Several organizational aspects should be considered –

- Logistical arrangements should consider nearby accommodations, arrangements for lunch for fieldwork days, sufficient vehicles, portable computers, funds to purchase refreshments for community meetings during the PRA, and supplies such as flip chart paper and markers.
- Training of team members may be required, particularly if the PRA has the second objective of training in addition to data collection.
- PRA results are influenced by the length of time allowed to conduct the exercise, scheduling and assignment of report writing, and critical analysis of all data, conclusions, and recommendations.
- A PRA covering relatively few topics in a small area (perhaps two to four communities) should take between ten days and four weeks, but a PRA with a wider scope over a larger area can take several months. Allow five days for an introductory workshop if training is involved.

Reports are best written immediately after the fieldwork period, based on notes from PRA team members. A preliminary report should be available within a week or so of the fieldwork, and the final report should be made available to all participants and the local institutions that were involved.

PRA Tools

PRA is an exercise in communication and transfer of knowledge. Regardless of whether it is carried out as part of project identification or appraisal or as part of country economic and sector work, the learning-by-doing and teamwork spirit of PRA requires transparent procedures. For that reason, a series of open meetings (an initial open meeting, final meeting, and follow-up meeting) generally frame the sequence of PRA activities. Common tools in PRA are –

Mapping: Making a community map is probably the best approach for you to get started, and for a community to get started. Take a group on a walk through the community, and let them draw a map of the area. Let the map include communal facilities, personal and family buildings, assets and liabilities. Do not draw the map for them. One method is for individuals or small groups to each make a separate map, then, as a group exercise later, all the small groups of individuals prepare a large map (e.g. using newsprint or flip chart paper) combining and synthesizing what is included on all the maps. Valuable information over and above that shown on scientifically produced maps can be obtained from maps drawn by local people. These maps show the perspective of the drawer and reveal much about local knowledge of resources, land use and settlement patterns, or household characteristics. You can encourage community members to draw their map on the ground, using sticks to draw lines. Drawing the map on the ground, like drawing a large map on the wall, gives you and the participants a chance to easily make the drawing process a group process.

Models: If the community members add sticks and stones to a map scratched onto the ground, they are making a simple model - a three dimensional map. Do not draw the map or construct the model for the participants; encourage them to all contribute. As you watch them, note if some facilities are made before others, if some are larger in proportion than others. This will give you some insight into what issues may be more important than others to the participants. Make notes; these will contribute to your sociological understanding of the community. Make a copy on paper of the map or model as a permanent record. Maps and models can later lead to transect walks, in which greater detail is recorded

Creating a Community Inventory: The inventory, and especially the process of making it, is the most important and central element of participatory appraisal. The process of making the community inventory is sometimes called semi structured interviewing. If it were perfectly unstructured, then it would be a loose conversation that goes nowhere. A 'Brainstorm' session, in contrast, is highly structured (The brainstorm has its uses, especially in the project design phase of community empowering). Making the inventory is somewhere in between these two. You also allow the discussion to be a little bit free, especially in allowing participants to analyze their contributions to making the inventory. You do not work with a set of specific questions, but you might best prepare a check list of topics to cover and work from that so that you cover all topics. When you prepare your check list, remember that you should include both assets and liabilities in the community. Include available facilities, including how well they are working, or not working. Include potentials and opportunities as well as threats and hindrances, both possible and current. Remember that this is an assessment. Aim for an inventory that assesses the strengths and weaknesses of the community. Your job is not to create the inventory, but to guide the community members to construct it as a group.

Focus Group Discussions: There may be a range of experiences and opinions among members of the community or there may be sensitivity in divulging information to outsiders or to others within the community. This is where a focus group discussion can be useful. It is best here if you do not work alone, but as a facilitation team of two or three facilitators, one leading the discussion and another making a record. The discussion topics chosen should be fewer than for the general community

inventory. First conduct separate sessions for the different interest groups, record their contributions carefully, and then bring them together to share as groups their special concerns. It is important to be careful here. While you recognize the different interest groups in the community, you do not want to increase the differences between the groups - to widen the schism. You are not trying to make all the different groups the same as each other, but to increase the tolerance, understanding and co-operation between them. Special focus groups gives you the opportunity to work separately with different groups that may find it difficult at first to work together; but you must work towards bringing them together.

Preference Ranking: When you are working with a community with different interest groups, you may wish to list preference rankings of the different groups, and then look at them together with the groups together. Preference ranking is a good ice-breaker at the beginning of a group interview, and helps focus the discussion.

Wealth Ranking: This is a particularly useful method of (1) discovering how the community members define poverty, (2) to find who the really poor people are, and (3) to stratify samples of wealth. This is best done once you have built up some rapport with the community members. A good method here is to make a card the name of each of the households in the community on it. Select some members of the community. Ask them to put these cards into groups according to various measures of wealth and to give their rationale (reasons) for the groupings. How they categorize members of the community, and the reasons they give for making those categories and for putting different households into each category, are very revealing about the socio-economic makeup of the community.

Seasonal and Historical Diagramming: Seasonal and historical variations and trends can be easy to miss during a short visit to the field. You can attempt various diagramming techniques can help explore changes in - rainfall, labor demand, farming (fishing, hunting, herding) activities, wood supply for fuel, disease incidence, migration for employment, food stocks and many other elements that change over time. The diagrams you produce can be used as a basis for discussions for the reasons behind changes and implications for the people involved.

Institutional Mapping: Information about the social organization of the community and the nature of social groups is difficult to get in a short visit. Complex relationships between rich and poor segments of the community, family ties and feuds, and political groups cannot be untangled in a few weeks. Using participatory appraisal methods can be useful here. One way to understand the less sensitive aspects of social interaction in a community is to ask key informants to construct a 'Venn diagram'. This technique is simply a collection of circles, each of which represents a different group or organization active in the community. The size of each circle reflects the relative importance of the group represented-the smaller the circle, the less influential the group. The amount of overlap between two circles represents the amount of collaboration or joint decision making between two groups.

Participatory Mapping: Create a wall or ground map with group participation. Members should do the marking, drawing and coloring with a minimum of interference and instruction by outsiders. Using pencils, pens or local materials (e.g. small rocks, different colored sands or powders, plant material) members should draw maps that depict/illustrate certain things. Each group member is then asked 'to hold the stick' to explain the map or to criticize it or revise it. Create resource maps showing the location of houses, resources, infrastructure and terrain features-useful for analyzing certain community-level problems. Create social maps, showing who is related to whom and where they live.

Seasonal Calendars: These charts show monthly changes in climate (rainfall or temperature) or agricultural activities (agricultural hours worked, different activities undertaken, crop cycles). The calendars are useful in identifying planting and harvesting times, labor constraints and marketing opportunities.

Matrices: These are grid formats used to illustrate links between different activities or factors. They are useful in information gathering and analysis.

Important Techniques of Participatory Rural Appraisal (PRA)

Village Transect: A transect is constructed with the help of local inhabitants by walking through the village. The major objective of a transect is to identify the types of land-use, opportunities and constraints to the agricultural or rural development. The application of a transect is to identify and explain the cause and effect relationships between topography, soils, natural vegetation, cultivation and other production activities and human settlement patterns.

Procedure - Draw an outline map of the village. Ask villagers to select one or more routes which cover the main variations in topography. Ask two or more people to accompany you to the edge of the village. Stop when you arrive at the edge of a new topography zone; record the characteristics and distance covered by the last zone. When the transect is completed prepare a chart summarizing the major features encountered. When more than one transects has been completed, prepare a combined chart, compare results and generate questions and hypothesis for latter enquires.

Social and Physical Maps: The social and resource map is used to show the relative location of different households, resource points, roads, canals, crop fields, residential areas, markets, educational institutions, co-operative societies, etc. The villagers are asked to draw a social map of the village usually on the ground using a pointed stick. A social map drawn by villagers should encourage maximum participation and interaction of the villagers.

Procedure - Select a suitable space. Mark paths and other landmarks from the residential part of the village on the ground. Sub-divide the village into para or other units to enable the available informants to provide accurate information. Ask the informant to identify the position of each household, and write the name on a strip of paper, which can then be placed on the map. Use appropriate symbols and materials to build on any further information, which may be required about assets, group membership, etc. Start recording on a separate sheet of paper as soon as the locations of the households have been identified.

Seasonality Exercise: To identify the times of year at which people suffer from particular hardship like unemployment, diseases, rainfall, draught and some other allied aspects of the rural life. To take appropriate safety nets or other remedial action.

Procedure - Consider all the months in a year either in Bangla or in English year. Lay out the matrix on the ground considering months along one axis and the items of a particular phenomenon along the other axis. To get information with degree of differentiation by the villagers use sticks, seeds and other locally available materials. Count the number of seeds or sticks by row and column. Consider this number as score of the respective item. Assign rank according to score.

Chapati or Venn Diagrams: To identify the institutions in a community. To show how the various external institutions involved in the delivery of services. To show how they relate to each other.

Procedure - Cut a large circle of paper to represent the major institutions with which you are concerned (Village or Para). Cut or draw oval shapes to represent outside institutions with linkages in the village and place these overlapping with the outer edges of the circle (size can be used to indicate relative importance). Cut or draw further circles of appropriate sizes to represent institutions wholly contained within the village. Relate these to each other through overlaps where these exist, through incorporation where one institution lies entirely within another and through separate location where there is no overlap. Check that the basic diagram is correct before reproducing a clean version on another sheet of paper.

Wealth Ranking: Means of dividing households into different economic categories. This can be used to identify target group members before an activity is launched or to determine the extent to which targeting has proved successful after the event.

Procedure - List each household name on a card together with other information. Identify the criteria which they use in distinguishing between the better and less well off households. Keeping the criteria in mind request the participants to place the cards in a small number of piles. The category of each household to be recorded at the bottom of the card.

Finally, count the number of households in each pile and record accordingly.

Preference Ranking: Ranking means placing something in sequential order. Preference ranking is a tool that helps us prioritizing the problems.

Procedure- Organize one focus group representing relevant stakeholders. Make a list of all the problems to be prioritized.

Identify criteria on which problems are to be prioritized. Criteria can be identified through comparing the problems by pair wise. Define all of the criteria positively. For example 'tastes good', 'not tasted bad', or 'easy to cook', 'not hard to cook', then select a suitable symbol for each one. Decide whether you will ask the informant to rank items on a simple yes/no

basis, or whether you want to assign scores (say from one to three). Lay out the matrix on the ground with the problems along one axis and the criteria along the other. Ask the informant to rank or score each item against each criterion, using seeds or available material. This can be done on a scale of 1-3 or by allocating a fixed number of seeds for each criterion. When the exercise is completed verify the results with the participants. Put the most favored items at the top; the least favored at the bottom, the most powerful criteria on the left, and the weakest on the right.

Sequence of Techniques

PRA techniques can be combined in a number of different ways, depending on the topic under investigation. Some general rules of thumb, however, are useful. Mapping and modeling are good techniques to start with because they involve several people, stimulate much discussion and enthusiasm, provide the PRA team with an overview of the area, and deal with noncontroversial information. Maps and models may lead to transect walks, perhaps accompanied by some of the people who have constructed the map. Wealth ranking is best done later in a PRA, once a degree of rapport has been established, given the relative sensitivity of this information. Preference ranking is a good icebreaker at the beginning of a group interview and helps focus the discussion. Later, individual interviews can follow up on the different preferences among the group members and the reasons for these differences.

Seven major techniques used in PRA

1. Secondary data reviews - books, files, reports, news, articles, maps, etc.
2. Observation - direct and participant observation, wandering, DIY (do-it-yourself) activities.
3. Semi-structured interviews - this is an informal, guided interview session, where only some of the questions are pre-determined and new questions arise during the interview, in response to answers from those interviewed.
4. Analytical game - this is a quick game to find out a group's list of priorities, performances, ranking, scoring, or stratification.
5. Stories and portraits - colorful description of the local situation, local history, trend analysis, etc.
6. Diagrams - maps, aerial photos, transects, seasonal calendars, Venn diagram, flow diagram, historical profiles, ethno-history, timelines, etc.
7. Workshop - local and outsiders are brought together to discuss the information and ideas intensively.

Modified PRA Tools: Resource Map; Social Map; Wealth Ranking Objectives; Local Perceptions of Malnutrition Mapping Objectives; Venn Diagram on Institutions; Resource Cards; Seasonal Calendar; Income and Expenditure Matrix; Daily Activity Clocks; Focus Group Discussion; Semi Structured Interview; Community Workshop; Daily Evaluation and Planning Meeting.

Resource Map: It is a tool that helps us to learn about a community and its resource base. The primary concern is not to develop an accurate map but to get useful information about local perceptions of resources. The participants should develop the content of the map according to what is important to them. The objective is to learn the villagers' perceptions of what natural resources are found in the community and how they are used.

Social Map: It is a map that is drawn by the residents and which shows the social structures and institutions found in an area. It also helps us to learn about social and economic differences between the households. The objectives are – to learn about the social structures and the differences among the households by ethnicity, religion and wealth; to learn about who is living where; to learn about the social institutions and the different views local people might have regarding those institutions.

Wealth Ranking Objectives: To investigate perceptions of wealth differences and inequalities in a community; to identify and understand local indicators and criteria of wealth and well-being; to map the relative position of households in a community. Ranking and mapping methods are used. Carry out the exercise with a few key informants who know the community well.

Local Perceptions of Malnutrition Mapping Objectives: To identify various forms of malnutrition prevalent in the community; to understand the local perceptions of malnutrition; to map nutritionally vulnerable households. Ranking, mapping and matrix

methods are used. Carry out the interview with one or more key informants (Community Health Worker; Traditional Birth Attendant; Home Agent; Traditional Healer; Teacher etc.).

Venn Diagram on Institutions: It shows institutions, organizations, groups and important individuals found in the village (Kushet), as well as the villagers view of their importance in the community. Additionally the Diagram explains who participates in these groups in terms of gender and wealth. The Institutional Relationship Diagram also indicates how close the contact and cooperation between those organizations and groups is. The objectives are – to identify external and internal organizations/groups/important persons active in the community; to identify who participates in local organizations/ institutions by gender and wealth; to find out how the different organizations and groups relate to each other in terms of contact, co-operation, flow of information and provision of services.

Resource Cards: Resource picture cards are useful for facilitating a discussion about who uses and controls resources in a fun and non-threatening way. They show very clearly the resource base of both men and women. This can lead to discussions about differences between men's and women's priorities and their need for resources. The objective is to learn about differences between men and women in use and control over resources.

Seasonal Calendar: A seasonal calendar is a participatory tool to explore seasonal changes (e.g. gender-specific workload, diseases, income, expenditure etc.). The objective is to learn about changes in livelihoods over the year and to show the seasonality of agricultural and non agricultural workload, food availability, human diseases, gender-specific income and expenditure, water, forage, credit and holidays.

Income and Expenditure Matrix: It is a tool that helps us to identify and quantify the relative importance of different sources of income and expenditures. The tool also helps us to understand how secure or how vulnerable certain groups of people incomes are. In the Expenditures matrix, we can see if all, most or only some of people's total income is spent to meet basic needs - food, water, clothing, shelter, health care, education. We can also ask whether people have any money left over to save or to invest in tools, fertilizer, or other important items that could help them in their work. The objective is to learn about sources of income (cash and kind) and how income is proportionality spent by gender and wealth.

Daily Activity Clocks: Daily activity clocks illustrate all of the different kinds of activities carried out in one day. They are particularly useful for looking at relative work-loads between different groups in the community. Comparisons between clocks show who works the longest hours, who concentrates on a few activities and who does a number of tasks in a day, and who has the most leisure time and sleep. The objective is to learn what different people do during one day and how heavy their workloads are.

Focus Group Discussion: Semi-structured group interview, ranking and matrix methods are used. The objectives are – understand local perceptions of nutrition and household food security; identify and understand constraints in the household and community to achieving nutrition and household food security; identify and understand mechanisms in the household and the community to cope with nutrition and household food insecurity; identify what community, household and individual resources are required to obtain nutrition and household food security.

Semi Structured Interview: Semi-structured group interview, ranking and observation methods are used. The objectives are – understand why members of a household (that was mapped as being affected by malnutrition) have nutrition-related health problems and why other households are not affected; identify constraints and opportunities in the household and community for household members to achieve nutrition security.

Community Workshop: 'Group Discussion' and 'Presentation' are used as methods. The objectives are – to present the main findings and conclusions of the appraisal to the community at large; to provide an opportunity to the community for discussion of the main findings of the appraisal; to reach a consensus on the way forward and the roles and responsibilities of the community, the community support staff and the project. Organize a meeting with the community at large, ensuring that men and women are equally represented, as well as people from different socio-economic groups and ages.

Daily Evaluation and Planning Meeting: Every afternoon the PRA team comes together to reflect the process of day, to present the results gathered, to evaluate the results and to plan for the next day. The objectives are – to present the results of the day; to summarize and structure the results according to the key questions and according to related 'Strength and Weaknesses' inside the community and according to 'Opportunities and Threats' identified outside the community; to compare the results of the different groups and to identify differences and correspondences; to enable the PRA team to elaborate new relevant key questions and a program for the next day.

Using of PRA

PRA supports the direct participation of communities, with rural people themselves becoming the main investigators and analysts. Rural people set the priorities; determine needs; select and train community workers; collect, document, and analyze data; and plan and implement solutions based on their findings. Actions stemming from this research tend to serve the local community. Outsiders are there to facilitate the process but do not direct it. PRA uses group animation and exercises to facilitate information sharing, analysis, and action among stakeholders. PRA is an exercise in communication and transfer of knowledge. Regardless of whether it is carried out as part of project identification or appraisal or as part of country economic and sector work, the learning-by-doing and teamwork spirit of PRA requires transparent procedures. For that reason, a series of open meetings (an initial open meeting, final meeting, and follow-up meeting) generally frame the sequence of PRA activities. A typical PRA activity involves a team of people working for two to three weeks on workshop discussions, analyses, and fieldwork.

Scope of PRA

PRA is used –

- To ascertain needs;
- To establish priorities for development activities;
- Within the scope of feasibility studies;
- During the implementation phase of projects;
- Within the scope of monitoring and evaluation of projects;
- For studies of specific topics;
- For focusing formal surveys on essential aspects, and identifying conflicting group interests.

Areas of Application

- Natural resource management
- Agriculture
- Poverty alleviation/women in development programs
- Health and nutrition
- Preliminary and primary education
- Village and district-level planning
- Institutional and policy analysis.

Advantages of PRA

- ✓ *Identification of genuine priorities for target group.* PRA allows local people to present their own priorities for development and get them incorporated into development plans.
- ✓ *Devolution of management responsibilities.* An important goal of PRA is to encourage self-reliant development with as much of the responsibility for the management and implementation of development activities devolved to local people themselves. This can greatly improve the efficiency of development work and eliminate many of the problems regarding proprietorship of development activities at the community level.
- ✓ *Motivation and mobilization of local development workers.* Participation in PRA by local development workers, whether from NGOs, government or other agencies can greatly increase the motivation and level of mobilization in support of the project or program of which it is part. Where changes in development approaches are being introduced, such as a shift to a more integrated development planning mechanism, a PRA-type activity which illustrates how these new mechanisms will work on the ground can help to ensure better understanding and commitment by

local workers. This is one reason why involvement of people from different administrative and organizational levels can be vital so that commitment is built up right through the chain.

- ✓ *Forming better linkages between communities and development institutions.* PRA can assist in forming better links between communities and the agencies and institutions concerned with rural development. A PRA which encourages a better understanding of the environmental issues at stake in local communities and develops activities which enable them to benefit from better management could also lead to better monitoring of mangrove exploitation by the communities themselves. PRAs involve intensive interaction between communities and outsiders which can have lasting effects in breaking down the barriers of reticence and suspicion which often characterize these relationships.
- ✓ *Use of local resources.* Where local people have had more say in the design of projects they are also more likely to design activities which make full use of existing resources.
- ✓ *Mobilization of community resources.* Greater commitment from the community can also mean greater mobilization of community resources for development and less reliance on outside inputs. This can take the form of labor inputs, savings or time devoted to management functions.
- ✓ *More sustainable development activities.* This combination of effects will generally lead to more sustainable development activities which are less reliant on support from outside agencies and is technically, environmentally and socially appropriate to local conditions.

These benefits from participation can only be realized where the full implications of participation for the development agencies which are encouraging it have been taken into account and accommodated and the institutions involved are willing to support the sort of long-term changes in social, political and institutional frameworks which proper participation, and PRA, can set in motion. Where this is not the case, many of the following disadvantages can come into play.

Weaknesses of PRA

- *The term PRA itself can cause difficulties.* PRA need not be rural, and sometimes is not even participatory, and is frequently used as a trendy label for standard RRA techniques.
- *Raising expectations which cannot be realized.* One of the most immediate and frequently encountered risks in PRA is that it raises a complex set of expectations in communities which frequently cannot be realized given the institutional or political context of the area. This can be due to the political situation, the local power and social structure or simply too bureaucratic inertia in institutions which are supposed to be supporting development. In some cases the intended aim of the PRA may be to deliberately raise expectations 'at the grassroots' so as to put pressure on the institutional and political structures above to change. However, not all development agencies are in a position to support such activities and there is a risk that agencies which are not properly equipped to respond to PRA-type planning may use the approach inappropriately.
- *Hijacking.* If PRA becomes part of the global development agenda, there are risks of hijacking - When this occurs, the PRA agenda is externally driven, and used to create legitimacy for projects, agencies and NGOs.
- *Disappointment.* Local expectations can easily be raised. If nothing tangible emerges, local communities may come to see the process as a transient external development phenomenon. Lack of feedback to the community adds to the sense of disappointment.
- *Failure to take account of stratification in communities.* The fact that PRA is often carried out with the community as a whole can mean that stratification within the community, whether by wealth, social status, gender or ethnic group, can often be obscured and ignored.

- *Threats*. The empowerment implications of PRA, and the power of its social analysis, can create threats to local vested interests, although less so than with PAR (Participatory Action Research).

9.4.5 RAPID RURAL APPRAISAL/ ASSESSMENT (RRA)

Rapid Rural Appraisal (RRA) emerged in the late 1970s in response to some of the problems with large-scale, structured questionnaire surveys. It provided an alternative technique for outsiders – often scientists carrying out research into agriculture – to quickly learn from local people about their realities and challenges. RRA practitioners worked in multi-disciplinary teams and pioneered the use a suite of visual methods and semi-structured interviews to learn from respondents. While it was largely about data collection, usually analyzed by outsiders, RRA contained the seeds from which other primary methods grew in the 1980s. Reflections on RRA led to the development of Participatory Rural Appraisal (PRA), which focused more strongly on facilitation, empowerment, behavior change, local knowledge and sustainable action. It was developed in response to the disadvantages of more traditional research methods, including - the time taken to produce results, the high cost of formal surveys and the low levels of data reliability due to non-sampling errors. RRA is a bridge between formal surveys and unstructured research methods such as depth interviews, focus groups and observation studies. In developing countries, it is sometimes difficult to apply the standard marketing research techniques employed elsewhere. There is often a paucity of baseline data, poor facilities for marketing research (e.g. no sampling frames, relatively low literacy among many populations of interest and few trained enumerators) as well as the lack of appreciation of the need for marketing research. The nature of RRA is such that it holds the promise of overcoming these and other limitations of marketing research.

Unfortunately, there is no generally accepted definition of RRA. RRA is more commonly described as a systematic but semi-structured activity out in the field by a multidisciplinary team and is designed to obtain new information and to formulate new hypotheses about rural life. A central characteristic of RRA is that its research teams are multidisciplinary. Beyond that, the distinction between RRA and other research methodologies dependents upon its multidisciplinary approach and the particular combination of tools that in employs. A core concept of RRA is that research should be carried out not by individuals, but by a team comprised of members drawn from a variety of appropriate disciplines. Such teams are intended to be comprised of some members with relevant technical backgrounds and others with social science skills, including marketing research skills. In this way, it is thought that the varying perspectives of RRA research team members will provide a more balanced picture. The techniques of RRA include – interview and question design techniques for individual, household and key informant interviews; methods of cross-checking information from different sources; sampling techniques that can be adapted to a particular objective; methods of obtaining quantitative data in a short time frame; group interview techniques, including focus-group interviewing; methods of direct observation at site level, and use of secondary data sources. RRA is an approach for conducting action-oriented research in developing countries.

Many 'definitions' of RRA have been offered by different people who have worked on it, but there are always others who object to those definitions because they are not what they think RRA is or should be. The fact that it is difficult to give a precise definition to RRA is a reflection of the fact that it is very flexible - it is a tool which can be used in a lot of different situations to achieve very different objectives. Not surprisingly everybody seems to think RRA is what they have used it for. So it is probably best to avoid 'definitions' and just describe the features which most RRAs seem to have in common. RRA essentially consists of the following –

- an activity carried out by a group of people from different professional fields or disciplines which usually aims to learn about a particular topic, area, situation, group of people or whatever else is of concern to those organizing the RRA
- it usually involves collecting information by talking directly to people 'on the ground'
- it uses a set of guidelines on how to approach the collection of information, learning from that information and the involvement of local people in its interpretation and presentation
- it uses a set of tools - these consist of exercises and techniques for collecting information, means of organizing that information so that it is easily understood by a wide range of people, techniques for stimulating interaction with community members and methods for quickly analyzing and reporting findings and suggesting appropriate action.

These features are just about the 'bottom line' with RRA but everything else is fairly flexible within the guidelines described below.

RRA Guidelines

- *Structured but flexible:* RRA is a structured activity requiring careful planning, clear objectives, the right balance of people involved and a good choice of tools and techniques for use in the field. At the same time, it is flexible enough to respond to local conditions and unexpected circumstances. Progress is reviewed constantly so that new information can be understood and the focus of the RRA redirected.
- *Integrated and interdisciplinary:* RRA helps 'outsiders' to learn about rural conditions by looking at them from many points of view. This means having people participating with a variety of different technical and scientific skills and a balance of different institutional outlooks. This requires an integrated development approach which cuts across institutional and disciplinary boundaries.
- *Awareness of bias:* Researchers and development workers who are trying to understand rural conditions can be biased by their urban attitudes, their own professional and personal priorities, the type of transport they use, the language they speak. The people researchers talk to can be biased as well by their limited experience, their customs and beliefs and their own interests and those of their families. RRA seeks to avoid biases by being aware of them and by being systematic in taking into account different points of view and different sets of interests.
- *Accelerating the planning process:* RRA tries to shorten the time it takes to get from knowing nothing about an area or a situation to deciding what development interventions might be best for that area by using key informants, careful observation and by exploiting the knowledge and experience of local people. The information produced is analyzed 'on the spot' and presented in a form which is more easily used by planners and which can be discussed and understood by local people themselves.
- *Interaction with and learning from local people:* Whatever the purpose of the RRA it must involve the people who are the intended 'beneficiaries' of any eventual development activities. RRA should give them the opportunity to describe their lives and conditions. The people carrying

out an RRA must be prepared to listen to local people and learn from them. Participation by local people can take many forms but any RRA will involve intense interaction between researchers, planners, traditional and formal authorities and local people.

- *Combination of different tools:* The RRA approach uses a combination of communication and learning tools. These tools help outsiders to observe conditions in a concise but systematic way. They also allow local people to present their knowledge, concerns and priorities to outsiders. The combination of different tools and techniques builds up a more complete picture where different viewpoints can be compared and contrasted. The systematic cross-checking of information collected in different ways by different people from different sources can increases accuracy and comprehensiveness.
- *Iterative:* During an RRA, what has been learnt is constantly reviewed and analyzed in the field. This is usually done in workshops carried out at regular intervals. This means the focus of the RRA, the tools used and the people talked to can be adjusted constantly.

Obviously, these guidelines leave plenty of room for the people using RRA to decide exactly what they want to do with it. For example, if the most important thing for the people organizing the RRA is to collect information quickly, they might want to structure the activity more carefully so that things move faster. If one of the principal concerns is to get local people involved as much as possible, the structure of the RRA would probably have to be looser and more time allowed for getting to know the people and putting them at ease.

RRA Teams

The composition of the team which carries out an RRA is extremely important in determining the outcome of an RRA. Obviously, the composition of an RRA team depends very much on the objectives of the RRA and the particular concerns which it is addressing.

- *Gender Considerations:* Gender bias is particularly important for RRA teams. For male researchers, women in many rural communities are difficult to contact and talk to and may remain almost invisible to anyone visiting the community for a short time. However all aspects of rural conditions studied by an RRA team will have gender dimensions which need to be taken into consideration.
- *Multidisciplinary:* The composition of teams carrying out RRAs should be dictated by a careful consideration of the objectives of the appraisal, the issues which are thought to be of importance in the area and the need to have a balanced set of disciplinary, institutional and gender viewpoints represented on the team. As a minimum requirement, there should be a balance between specialists in the biological and physical sciences and specialists in the social sciences. However, the need for different formal backgrounds should not be overemphasized. The important point is to have people who can contribute different ways of looking at rural conditions - so, when organizing an RRA, it might be possible for people to 'cover' different disciplines at the same time if they have the relevant experience.
- *Levels of Expertise:* One of the risks of RRA is that it tends to rely on the knowledge, experience and 'sensitivity' of team members to come to conclusions about rural conditions. These conclusions cannot then be tested or checked against 'hard data'. This means that a great deal depends on the skills of team members. As a result, it has always been regarded as important to have experienced and skilled people on RRA teams. Obviously this is preferable, but RRA does not depend only on the skills and experience of its team members to overcome the risks of coming to faulty conclusions due to lack of hard data. It is the combination of different viewpoints and the systematic use of cross-checking during an RRA that counts perhaps more

than individual skills. The presence on the team of 'authoritative' experts, with a wide range and depth of experience in their fields, can be an advantage as they bring new knowledge and experience to bear on local problems. However, such 'experts' also have to be willing to listen and learn from the activity. Frequently, those who are most qualified are also most likely to impose their own biases and interpretations on the work of the team. Experts who are not willing to learn something new during an appraisal can create more problems than they solve. In such circumstances it can be better to have a less experienced specialist who is willing to learn something new than a highly experienced expert who is sure that s/he knows everything already.

- *RRA Experience:* At least one member of the team should have experience in carrying out RRAs. This person can act as trainer in RRA techniques and as facilitator, guiding the rest of the team through the process of carrying out the RRA and making sure that the activity keeps on track.
- *Mix of Institutions:* The involvement of people from the institutions and agencies which will implement RRA recommendations is important. It can ensure that the subsequent involvement of different agencies is based on the same understanding of the local situation and a similar interpretation of local needs and priorities. Where many agencies are involved a few key personnel have to be selected either because of their skills or because they are likely to play a leading role in the future. Team members from different agencies can also contribute a range of perspectives to the RRA and improve the depth of understanding achieved. RRAs can provide an opportunity for people from different levels of the hierarchy of development agencies and institutions to work together. Involvement of such a range of people in an RRA can lead to a better understanding both of the conditions of 'target' communities and of the different priorities and problems of workers at different administrative and organizational levels i.e. regional planners and village extension workers.
- *Language Ability:* As many of the team as possible should be able to communicate directly with local people in their normal language. Use of translators and interpreters is clumsy and risky.

Advantages of RRA

- ✓ The approach is responsive and flexible to new learning and conditions on the ground.
- ✓ Achieves a complex understanding of processes and dynamics and connections between different disciplines, activities and sets of conditions.
- ✓ The analysis and interpretation of findings is carried out during the appraisal providing opportunities for cross-checking.

Weaknesses of RRA

- The findings will not be statistically 'sound', even if RRA teams can use 'quick and dirty' sampling methods to make sure that they cover a reasonable number of people or households in a particular area.
- Risk that the information gathered by an RRA is not very 'representative' but is a collection of 'particular cases' which do not tell researchers very much about general conditions.
- RRA is very dependent on the skills of the people carrying it out and having the right combination of experience and viewpoints on the team.

Some Principles that are shared by PRA and RRA

- Offsetting biases through different perspectives, methods and tools, sources of information, people from different background and places, background of team members - spatial, person, gender, age groups, interest groups, key informants, wealth groups, seasonal, professionals, disciplines.
- Rapid and progressive learning - flexible, interactive.
- Be gender sensitive at all times.
- Reversal of roles - learning from, with and by local people, eliciting and using their symbols, criteria, categories and indicators; and finding, understanding and appreciating local people's knowledge.
- Focused learning - not finding out more that is needed and not measuring when comparing is enough. We are often trained to make absolute measurements and to give exact numbers, but often relative proportions, trends, scores or ranking are all that is needed for decision making and planning of activities.
- Seeking for diversity and differences - people often have different perceptions of the same situation.
- Attitude - in order to make the PRA or RRA workshops as success, it is most important build a positive relationship with local women and men. Outsiders must have an attitude of respect, humility and patience, and a willingness to learn from the local people.

Potential Differences between RRA and PRS

RRA	PRA
Responding to needs of development workers and agencies	Responding to needs of communities and target groups
More emphasis on efficient use of time & achievement of objectives	More emphasis on flexibility to adapt to time frame of community
Communication and learning tools used to help outsiders analyze conditions and understand local people	Communication and learning tools used to help local people analyze their own conditions and communicate with outsiders
Focus of RRA decided by outsiders	Focus of PRA decided by communities
End product mainly used by development agencies and outsiders	End product mainly used by community
Enables development agencies and institutions to be more 'participatory'	Enables (empowers) communities to make demands on development agencies and institutions
Can be used purely for 'research' purposes without necessarily linking to subsequent action or intervention	Closely linked to action or intervention and requiring immediate availability of support for decisions and conclusion s reached by communities as a result of the PRA

9.4.6 OBSERVATIONAL METHOD

Observation is a fundamental way of finding out about the world around us. As human beings, we are very well equipped to pick up detailed information about our environment through our senses. However, as a method of data collection for research purposes, observation is more than just looking or listening. Research, simply defined, is 'systematic enquiry made public' (Stenhouse, 1975). Firstly, in order to become systematic, observation must in some way be selective. We are constantly bombarded by huge amounts of sensory information. Human beings are good at selectively attending to what is perceived as most useful to us. Observation harnesses this ability; systematic observation entails careful planning of what we want to observe. Secondly, in order to make observation 'public', what we see or hear has to be recorded in some way to allow the information to be analysed and interpreted. Observation is a systematic data collection approach. Researchers use all of their senses to examine people in natural settings or naturally occurring situations. Observation of a field setting involves -

- prolonged engagement in a setting or social situation;
- clearly expressed, self-conscious notations of how observing is done;
- methodical and tactical improvisation in order to develop a full understanding of the setting of interest;
- imparting attention in ways that is in some sense 'standardized';
- recording one's observations.

Use of Observational Method

There are a variety of reasons for collecting observational data. Some of these reasons include -

- When the nature of the research question to be answered is focused on answering a how- or what-type question.
- When the topic is relatively unexplored and little is known to explain the behavior of people in a particular setting.
- When understanding the meaning of a setting in a detailed way is valuable.
- When it is important to study a phenomenon in its natural setting.
- When self-report data (asking people what they do) is likely to be different from actual behavior (what people actually do). One example of this seen in the difference between self-reported versus observed preventive service delivery in health care settings.
- When implementing an intervention in a natural setting, observation may be used in conjunction with other quantitative data collection techniques. Observational data can help researchers evaluate the fidelity of an intervention across settings and identify when 'stasis' has been achieved.

Classification of Observational Method

Observational methods can be classified as follows –

Casual and Scientific Observation: An observation can be sometimes casual in nature or sometimes it may act scientifically. An observation with a casual approach involves observing the right thing at the right place and also at the right time by a matter of chance or by luck whereas a scientific observation involves the use of the tools of the measurement, but a very important point to be kept in mind here is that all the observations are not scientific in nature.

Natural Observation: Natural observation involves observing the behaviour in a normal setting and in this type of observation, no efforts are made to bring any type of change in the behavior of the observed. Improvement in the collection of the information and improvement in the environment of making an observation can be done with the help of natural observations.

Subjective and Objective Observation: All the observations consist of the two main components, the subject and the object. The subject refers to the observer whereas the object refers to the activity or any type of operation that is being observed. Subjective observation involves the observation of the one's own immediate experience whereas the observations involving observer as an entity apart from the thing being observed, are referred to as the objective observation. Objective observation is also called as the retrospection.

Direct and Indirect Observation: With the help of the direct method of observation, one comes to know how the observer is physically present in which type of situation is he present and then this type of observation monitors what takes place. Indirect method of observation involves studies of mechanical recording or the recording by some of the other means like photographic or electronic. Direct observation is relatively more straight forward as compared to the indirect observation.

Participant and Non Participant Observation: Participation by the observers with the various types of operations of the group under study refers to the participant type of observation. In participant observation, the degree of the participation is largely affected by the nature of the study and it also depends on the type of the situation and also on its demands. But in the non participant type of observation, no participation of the observer in the activities of the group takes place and also there occurs no relationship between the researcher and the group.

Undisguised participant observation is often used to understand the culture and behavior of groups of individuals. *Disguised* participant observation is often used when researchers believe individuals would change their behavior if they knew it was being recorded. Participant observation allows researchers to observe behaviors and situations that are not usually open to scientific observation. Participant observers may sometimes lose their objectivity or may unduly influence the individuals whose behavior they are recording.

Structured and Unstructured Observation: Structured observation works according to a plan and involves specific information of the units that are to be observed and also about the information that is to be recorded. The operations that are to be observed and the various features that are to be noted or recorded are decided well in advance. Such observations involve the use of especial instruments for the purpose of data collection that are also structured in nature. But in the case of the unstructured observation, its basics are diametrically against the structured observation. In such observation, observer has the freedom to note down what s/he feels is correct and relevant to the point of study and also this approach of observation is very suitable in the case of exploratory research.

Structured observations are set up to record behaviors that may be difficult to observe using naturalistic observation. Clinical and developmental psychologists often use structured observations. Problems in interpreting structured observations can occur when the same observation procedures are not followed across observations or observers, or when important variables are not controlled. Structured observation is more likely to be carried out by those operating from a 'positivist' perspective, or who at least believe it is possible to clearly define and quantify behaviors. Unstructured observation is more likely to be carried out by those operating from an 'interpretive' or 'critical' perspective where the focus is on understanding the meanings participants, in the contexts observed, attribute to events and actions. Positivist and critical researchers are likely to be operating from a 'realist' perspective, namely that there is a 'real world' with 'real impact' on people's lives and this can best be studied by looking at social settings directly.

Controlled and Un-controlled Observation: Controlled observations are the observations made under the influence of some of the external forces and such observations rarely lead to improvement in

the precision of the research results. But these observations can be very effective in the working if these are made to work in the coordination with mechanical synchronizing devices, film recording etc. Un-controlled observations are made in the natural environment and reverse to the controlled observation these observations involve no influence or guidance of any type of external force.

Covert and Overt Observation: Covert observations are when the researcher pretends to be an ordinary member of the group and observes in secret. There could be ethical problems or deception and consent with this particular method of observation. Overt observations are when the researcher tells the group s/he is conducting research (i.e. they know they are being observed).

Type of Obser-vational Method	Advantages	Disadvantages
Naturalistic Observation	• Particularly good for observing specific subjects. • Provides ecologically valid recordings of natural behavior. • Spontaneous behaviors are more likely to happen.	• Ethics: Where research is undisclosed consent will not be obtained, where consent is not obtained - details may be used which infringe confidentiality.
Structured Observation	• Allows control of extraneous variables. • Reliability of results can be tested by repeating the study. • Provides a safe environment to study contentious concepts such as infant attachment.	• The implementation of controls may have an effect on behavior. • Lack of ecological validity. • Observer effect. • Observer bias.
Unstructured Observation	• Gives a broad overview of a situation. • Useful where situation/subject matter to be studied is unclear.	• Only really appropriate as a 'first step' to give an overview of a situation / concept / idea.
Participant Observation	• Gives an 'insiders' view. • Behaviors are less prone to misinterpretation because researcher was a participant. • Opportunity for researcher to become an 'accepted' part of the environment.	• Observer effect. • Possible lack of objectivity on the part of the observer.
Non-Participant Observation	• Avoidance of observer effect	• Observer is detached from situation so relies on their perception which may be inaccurate

Recording Behavior in Observational Method

The goals of observational research determine whether researchers seek a comprehensive description of behavior record or a description of only selected behaviors. How the results of a study are ultimately summarized, analyzed, and reported depends on how behavioral observations are initially recorded.

Fieldnotes: Participant observers may use multiple methods to gather data. One primary approach involves writing fieldnotes. There are several guides for learning how to prepare fieldnotes -

- Researchers may be interested in creating or using a template to guide a researchers' observations.
- Templates or observational coding sheets can be useful when data is collected by inexperienced observers.
- Templates or observational coding sheets should only be developed after observation in the field that is not inhibited by such a template.
- Theories and concepts can be driven by templates and result in focused data collection.
- Templates can deflect attention from unnamed categories, unimagined and unanticipated activities that can be very important to understanding a phenomenon and a setting.

Qualitative Records of Behavior: Observation can provide rich qualitative data, sometimes described as 'thick description' (Geertz, 1973), for example, where the relevant phenomena have been carefully observed and detailed field notes have been recorded. Typically, the researcher would not approach the observation with pre-determined categories or questions in mind. Because of this openness, observation in qualitative research is often referred to as unstructured.

Quantitative Measures of Behavior: Researchers often obtain quantitative measures such as frequency or duration of occurrence when they seek to describe specific behaviors or events. Quantitative measures of behavior use one of the four levels of measurement scales: nominal, ordinal, interval, and ratio. The term 'systematic' observation is usually associated with observation undertaken from the perspective of quantitative research where the purpose is to provide reliable, quantifiable data. This usually involves the use of some kind of formal, structured observation instrument or schedule. The observation method being used will clearly identify - the variables to be observed, perhaps by means of some kind of behavioral checklist; who or what will be observed; how the observation is to be conducted; and when and where the observations will take place.

Analysis of Observational Data

Data Reduction: Observational data are summarized through the process of data reduction. Researchers quantify the data in narrative records by coding behaviors according to specified criteria, for example, by categorizing behaviors. Data are summarized using descriptive measures such as frequency counts, means, and standard deviations.

Observer Reliability: Inter-observer reliability refers to the extent to which independent observers agree in their observations. Inter-observer reliability is increased by providing clear definitions about behaviors and events to be recorded, by training observers, and by providing feedback about discrepancies. High inter-observer reliability increases researchers' confidence that observations about behavior are accurate (valid). Inter-observer reliability is assessed by calculating percentage of agreement or correlations, depending on how the behaviors were measured and recorded.

Influence of the Observer: If individuals change their behavior when they know they are being observed (reactivity), their behavior may no longer be representative of their normal behavior. Research participants may respond to demand characteristics in the research situation to guide their behavior. Methods to control reactivity include unobtrusive (non-reactive) measurement, adaptation (habituation, desensitization), and indirect observations of behavior. Researchers must consider ethical issues when attempting to control reactivity.

Observer Bias: Observer bias occurs when observers' biases determine which behaviors they choose to observe and when observers' expectations about behavior lead to systematic errors in identifying and recording behavior. Expectancy effects can occur when observers are aware of hypotheses for the outcome of the study or the outcome of previous studies. The first step in controlling observer bias is to recognize that it may be present. Observer bias may be reduced by keeping observers unaware (blind) of the goals and hypotheses of the study.

Advantages and Disadvantages of Observational Method

What and how you observe depends very much on your subject of study. Researchers who prefer more security from the beginning might consider systematic observation. This involves using an observation schedule whereby teacher and/or pupil behavior is coded according to certain predetermined categories at regular intervals. The strengths of systematic observation are –

- It is relatively free of observer bias. It can establish frequencies, and is strong on objective measures which involve low inference on the part of the observer.
- Reliability can be strong. Where teams of researchers have used this approach, 80% reliability has been established among them.
- Generalisability. Once you have devised your instrument, large samples can be covered.
- It is precise. There is no 'hanging around' or 'muddling through'.
- It provides a structure for the research.

The weaknesses are –

- There is a measure of unreliability. Qualitative material might be misrepresented through the use of measurement techniques.
- Much of the interaction is missed.
- It usually ignores the temporal and spatial context in which the data is collected.
- It is not good for generating fresh insights.
- The pre-specification of categories predetermines what is to be discovered and allows only partial description.
- It ignores process, flux, development, and change.

There has been lively debate about the pros and cons of systematic and unsystematic observation. In general, systematic observation is a useful technique and can be particularly strong where used in conjunction with more purely qualitative techniques.

9.4.7 SURVEY METHOD

Survey research is often used to assess thoughts, opinions, and feelings. Survey research can be specific and limited, or it can have more global, widespread goals. Today, survey research is used by a variety of different groups. Psychologists and sociologists often use survey research to analyze behavior, while it is also used to meet the more pragmatic needs of the media, such as, in evaluating political candidates, public health officials, professional organizations, and advertising and marketing directors. A survey consists of a predetermined set of questions that is given to a sample. With a representative sample, that is, one that is representative of the larger population of interest, one can describe the attitudes of the population from which the sample was drawn. Further, one can compare the attitudes of different populations as well as look for changes in attitudes over time. A good sample selection is key as it allows one to generalize the findings from the sample to the population, which is the whole purpose of survey research.

Surveys provide a means of measuring a population's characteristics, self-reported and observed behavior, awareness of programs, attitudes or opinions, and needs. Repeating surveys at regular intervals can assist in the measurement of changes over time. These types of information are invaluable in planning and evaluating government policies and programs. Unlike a census, where all members of a population are studied, sample surveys gather information from only a portion of a population of interest. The size of the sample depends on the purpose of the study. In a statistically valid survey, the sample is objectively chosen so that each member of the population will have a *known non-zero chance of selection*. Only then can the results be reliably projected from the sample

to the population. The sample should not be selected haphazardly or only from those who volunteer to participate.

Surveys are a good way of gathering a large amount of data, providing a broad perspective. Surveys can be administered electronically, by telephone, by mail or face to face. Mail and electronically administered surveys have a wide reach, are relatively cheap to administer, information is standardized and privacy can be maintained. They do, however, have a low response rate, are unable to investigate issues to any great depth, require that the target group is literate and do not allow for any observation. As surveys are self-reported by participants, there is a possibility that responses may be biased particularly if the issues involved are sensitive or require some measure of disclosure on trust by the participant. It is therefore vital that surveys used are designed and tested for validity and reliability with the target groups who will be completing the surveys.

Careful attention must be given to the design of the survey. If possible the use of an already designed and validated survey instrument will ensure that the data being collected is accurate. If you design your own survey it is necessary to pilot test the survey on a sample of your target group to ensure that the survey instrument is measuring what it intends to measure and is appropriate for the target group. Questions within the survey can be asked in several ways and include: closed questions, open-ended and scaled questions, and multiple choice questions. Closed questions are usually in the format of yes/no or true/false options. Open-ended questions on the other hand leave the answer entirely up to the respondent and therefore provide a greater range of responses. Additionally, the use of scales is useful when assessing participants' attitudes. A multiple choice question may ask respondents to indicate their favorite topic covered in the program, or most preferred activity. Other considerations when developing a survey instrument include - question sequence, layout and appearance, length, language, and an introduction and cover letter. Sensitive questions should be placed near the end of a survey rather than at the beginning.

Use of Survey

When determining the need for a survey, departments/agencies should first check that the required information is not already available. The option of collecting the required information using existing administrative records should also be explored. Using existing data or records provides considerable advantages in terms of cost, time and the absence of respondent burden. The major disadvantage is the lack of control over the data collected. If existing data are not available or suitable, a number of factors must then be considered when determining which type of survey, if any, is appropriate. For example -

Practicality

- Can the information be collected cost effectively and accurately via a survey?
- How complex and how sensitive is the topic?
- Do respondents have access to the required information?
- Will they be willing to supply the information?
- Will their responses to the questions be valid?

Resources

- Are the necessary financial, staff, computer or other resources available?

Timing

- When is the information required?
- Is enough time available to ensure that data of sufficient quality can be collected and analysed?
- When is the best time to conduct the survey? (For example, need to allow for seasonality, impact of school holiday periods etc).

Survey requirements

- Do you want to use this information to target program improvements? If so, you may need to identify the key sub-groups you wish to report on (for example, geographic areas, age groups, sex, industry and size of business) and obtain sufficient responses for each group to ensure results are accurate enough for your needs.

Accuracy

- What level of error can be tolerated? This depends on how and for what purposes you intend to use the survey results.

Frequency

- Is the survey to be repeated? How often?

Legislative powers

- Does the department/agency have authority to collect the information through either a compulsory or voluntary survey?

Ethical consideration

Ethical considerations must be observed during the survey exercise. This includes that data, where appropriate, are treated confidentially, and that where information is sought on the understanding that the respondent cannot be identified, that such anonymity is preserved. Other ethical considerations include -

- Do you need identifiable information (for example, names, addresses, telephone numbers) relating to respondents for follow-up research or matching with other data? If so, you need to clearly explain why you need such details and obtain the respondents' consent.
- Will respondents be adversely affected or harmed as a direct result of participating in the survey?
- Are procedures in place for respondents to check the identity and bonafides of the researchers?
- Is the survey being conducted on a voluntary basis? If so, respondents must not be misled to believe it is compulsory when being asked for their co-operation.
- Is it necessary to interview children under 14 years? If so, the consent of their parents / guardians / responsible adults must be obtained.

These factors must all be taken into consideration when developing an appropriate sample design (that is, sample size, selection method, etc.) and survey method.

Survey Process

The following is an outline of the general process to be followed once the need for a survey has been determined. Some steps will not be necessary in all cases and some processes can be carried out at the same time (for example, data collection and preparation for data entry and processing). A sample survey is cheaper and timelier than a census but still requires significant resources, effort and time. The survey process is complex and the stages are not necessarily sequential. Pilot testing of, at least, key elements such as the questionnaire and survey operations is an essential part of the development stage. It may be necessary to go through more than one cycle of development, testing,

evaluation and modification before a satisfactory solution is reached. The entire process should be planned ahead, including all critical dates. The time required from initial planning to the completion of a report or publication may vary from several weeks to several months according to the size and type of survey. Key steps in the survey process include –

Planning and Designing

1. Define the purpose, objectives and the output required. Experience has shown that well-defined output requirements at the outset minimize the risk of the survey producing invalid results.
2. Design collection methodology and sample selection method.
3. Develop survey procedures. Design and print test questionnaires and any other documentation (for example, instructions for interviewers and introductory letters).

Testing and Modifying

4. Pilot test all aspects of the survey if possible. As a minimum, a small-scale pre-test of questionnaires can reveal problems with question wording, layout, understanding or respondent reaction.
5. Analyze test results (completed questionnaires, response/consent rate etc). Obtain feedback from respondents and/or interviewers.
6. Modify procedures, questionnaires and documentation according to test evaluation.
7. Repeat steps 1–6 if necessary.

Conducting the Survey

8. Finalize procedures, questionnaires and documentation.
9. Select sample.
10. Train interviewers (if interviewer-based).
11. Conduct the survey (that is, mail out questionnaires or commence interviewing) including follow-up of refusals and non-contacts, supervision and checks of interviewers' work.

Processing and Analyzing

12. Prepare data entry, estimation and tabulation systems.
13. Code, enter and edit data.
14. Process data - calculate population estimates and standard errors, prepare tables.
15. Prepare report of survey results.
16. Prepare technical report. Evaluate and document all aspects of the survey for use when designing future surveys.

Data Collection Method in Survey

Commonly used methods for collecting quantitative data include telephone and face-to-face interviews, self-completion questionnaires (such as mail, email, web-based or SMS) or combinations of these. Each has advantages and disadvantages in terms of the cost, time, response/consent rate and the type of information that can be collected.

Self-completion Surveys via mail, email, the internet or SMS are generally the least expensive, particularly for a widespread sample. They allow respondents time to consider their answers, refer to records or consult with others (which can be helpful or unhelpful, depending on the survey's objectives). They also eliminate interviewer errors and reduce the incidence of selected people (or units) being unable to be contacted. A major disadvantage of self-completion surveys is the potentially high non-response. In such cases, substantial bias can result if people who do not complete the survey have different characteristics from those who do. However, response can be improved using techniques such as well-written introductory letters, incentives for timely return of questionnaires and follow-up for those initially not responding. In self-completion surveys there is no

opportunity to clarify answers or supplement the survey with observational data. In mail surveys the questionnaire usually has to be simple and reasonably short, particularly when surveying the general community. Internet and email-based surveys are commonly used for surveying clients or staff within organizations and allow more complex questionnaires to be used than mail surveys do.

Interviewer-based Surveys such as face-to-face or telephone surveys generally allow more data to be gathered than self-completion surveys and can include the use of more complex questionnaires. Interviewers can reduce non-response by answering respondents' queries or concerns. They can often pick up and resolve respondent errors. Face-to-face surveys are usually more expensive than other methodologies. Poor interviewers can introduce additional errors and, in some cases, the face-to-face approach is unsuitable for sensitive topics. Telephone surveys are generally cheaper and quicker than face-to-face surveys, and are well suited to situations where timely results are needed. However, non-response may be higher than for face-to-face surveys as it is harder for interviewers to prove their identity, assure confidentiality and establish rapport. Telephone surveys are not suited for situations where the respondents need to refer to records extensively. Also, the questionnaires must be simpler and shorter than for face-to-face surveys and prompt cards cannot be used.

Computer Assisted Telephone Interviewing (CATI) is a particular type of telephone survey technique that helps to resolve some of the limitations of general telephone-based surveying. With CATI, interviewers use a computer terminal. The questions appear on the computer screen and the interviewers enter responses directly into the computer. The interviewer's screen is programmed to show questions in the planned order. Interviewers cannot inadvertently omit questions or ask them out of sequence. Online messages warn interviewers if they enter invalid values or unusual values. Most CATI systems also allow many aspects of survey operations to be automated, e.g. rescheduling of call-backs, engaged numbers and 'no answers', and allow automatic dialing and remote supervision of interviewer/respondent interaction. A survey frame or list which contains telephone numbers is required to conduct a telephone survey. For general population surveys, such lists are not readily available or they have limitations that can lead to biased results. If the Electronic White Pages list is used to select a sample of households then the sample will not include households with silent numbers. In addition, it may exclude households with recent new connections or recent changes to existing numbers. Electoral rolls exclude respondents aged less than 18 years of age, migrants not yet naturalised and others ineligible to vote. Random Digit Dialing may address some of the under-coverage associated with an Electronic White Pages or electoral role list, but it is inefficient for sampling at a low geographic level and does not allow for communicating (via pre-approach letter, for example) with households prior to the commencement of telephone interviewing.

Combinations of Collection Methods such as interviewers dropping off a questionnaire to be mailed back or returning to pick it up, a mail survey with telephone follow-up, or an initial telephone call to obtain cooperation or name of a suitable respondent followed by a mail survey – are sometimes used to obtain higher response/consent rates to a survey.

If in-depth or purely qualitative information is required, alternative research methods should be considered. *Focus groups, observation and in-depth interviewing* are all useful when developing a survey or initially exploring areas of interest. They can also be a valuable supplement to survey data. However, results from such studies should not be considered representative of the entire population of interest.

Sources of Error

Whether a survey is being conducted by departmental/agency staff or by consultants, it is important to be aware of potential sources of error and strategies to minimize them. Errors arising in the collection of survey data can be divided into two types - *sampling error and non-sampling error*.

Sampling error occurs when data are collected from a sample rather than the entire population. The sampling error associated with survey results for a particular sub-group of interest depends mainly on the number of achieved responses for that sub-group rather than on the percentage of units sampled. Estimates of sampling error, such as standard errors, can be calculated mathematically. They are affected by factors such as -

- sample size - increasing the sample size will decrease the sampling error.
- population variability - a larger sampling error will be present if the items of interest vary greatly within the population.
- sample design - standard errors cannot be calculated if the probability of selection is not known (for example, quota sampling).

All other errors associated with collecting survey data are called *non-sampling errors*. Although they cannot be measured in the same way as sampling errors, they are just as important. The following table lists common sources of non-sampling error and some strategies to minimize them.

Table 9.1

Common Sources of Non-sampling Error and Strategies to Minimize Them

Source of error	Examples	Strategies to minimize error
Planning and interpretation	Inadequate definitions of concepts, terms or populations.	Ensure all concepts, terms and populations are defined precisely through consultation between data users and survey designers.
Sample selection	Inadequate list from which sample is selected; biased sample selection.	Check list for accuracy, duplicates and missing units; use appropriate selection procedures.
Survey methods	Inappropriate method (e.g., mail survey for a very complicated topic).	Choose an appropriate method and test thoroughly.
Questionnaire	Loaded, misleading or ambiguous questions, poor layout or sequencing.	Use plain English, clear questions and logical layout; test thoroughly.
Interviewers	Leading respondents, making assumptions, misunderstanding or misreporting answers.	Provide clear interviewer instructions and appropriate training, including exercises and field supervision.
Respondents	Refusals, memory problems, rounding answers, protecting personal interests or integrity.	Promote survey through public media; ensure confidentiality; if interviewer-based, use well-trained, impartial interviewers and probing techniques; if mail-based, use a well-written introductory letter.
Processing	Errors in data entry, coding or editing.	Adequately train and supervise processing staff; check a sample of each person's work.
Estimation	Incorrect weighting, errors in calculation of estimates.	Ensure that skilled statisticians undertake estimation.

Non-response occurs in virtually all surveys through factors such as refusals, non-contact and language difficulties. It is of particular importance if the characteristics of non-respondents differ from respondents. For example, if high-income earners are more likely to refuse to participate in an income survey, the results will obviously be biased towards lower incomes. For this reason, all surveys should aim for the maximum possible response/consent rate, within cost and time constraints, by using techniques such as call-backs to non-contacts and follow-up of refusals. The level of non-response should always be measured.

Bias can also arise from inadequate *sampling frames*, the lists from which respondents are selected. Household and business telephone listings and electoral rolls are often used as sampling frames, but they all have limitations. Telephone listings exclude respondents who do not have telephones and can

exclude those with 'silent' or unlisted numbers. Electoral rolls exclude respondents aged less than 18 years of age, migrants not yet naturalized and others ineligible to vote.

Issues for Selecting Survey Methods

Selecting the type of survey you are going to use is one of the most critical decisions in many social research contexts. There are very few simple rules that will make the decision to balance the advantages and disadvantages of different survey types. Here, is a number of questions which can be asked for decision.

- **Population Issues**

The first set of considerations has to do with the population and its accessibility.

Can the population be enumerated? For some populations, you have a complete listing of the units that will be sampled. For others, such a list is difficult or impossible to compile. For instance, there are complete listings of registered voters or person with active driver's licenses. But no one keeps a complete list of homeless people. If you are doing a study that requires input from homeless persons, you are very likely going to need to go and find the respondents personally. In such contexts, you can pretty much rule out the idea of mail surveys or telephone interviews.

Is the population literate? Questionnaires require that your respondents can read. While this might seem initially like a reasonable assumption for many adult populations, we know from recent research that the instance of adult illiteracy is alarmingly high. And, even if your respondents can read to some degree, your questionnaire may contain difficult or technical vocabulary. Clearly, there are some populations that you would expect to be illiterate. Young children would not be good targets for questionnaires.

Are there language issues? We live in a multilingual world. Virtually every society has members who speak other than the predominant language. Some countries (like Canada) are officially multilingual. And, our increasingly global economy requires us to do research that spans countries and language groups. Can you produce multiple versions of your questionnaire? For mail instruments, can you know in advance the language your respondent speaks, or do you send multiple translations of your instrument? Can you be confident that important connotations in your instrument are not culturally specific? Could some of the important nuances get lost in the process of translating your questions?

Will the population cooperate? People who do research on immigration issues have a difficult methodological problem. They often need to speak with undocumented immigrants or people who may be able to identify others who are. Why would we expect those respondents to cooperate? Although the researcher may mean no harm, the respondents are at considerable risk legally if information they divulge should get into the hand of the authorities. The same can be said for any target group that is engaging in illegal or unpopular activities.

What are the geographic restrictions? Is your population of interest dispersed over too broad a geographic range for you to study feasibly with a personal interview? It may be possible for you to send a mail instrument to a nationwide sample. You may be able to conduct phone interviews with them. But it will almost certainly be less feasible to do research that requires interviewers to visit directly with respondents if they are widely dispersed.

- **Sampling Issues**

The sample is the actual group you will have to contact in some way. There are several important sampling issues you need to consider when doing survey research.

What data is available? What information do you have about your sample? Do you know their current addresses? What are their current phone numbers? Are your contact lists up to date?

Can respondents be found? Can your respondents be located? Some people are very busy. Some travel a lot. Some work the night shift. Even if you have an accurate phone or address, you may not be able to locate or make contact with your sample.

Who is the respondent? Who is the respondent in your study? Let's say you draw a sample of households in a small city. A household is not a respondent. Do you want to interview a specific individual? Do you want to talk only to the 'head of household' (and how is that person defined)? Are you willing to talk to any member of the household? Do you state that you will speak to the first adult member of the household who opens the door? What if that person is unwilling to be interviewed but someone else in the house is willing? How do you deal with multi-family households? Similar problems arise when you sample groups, agencies, or companies. Can you survey any member of the organization? Or, do you only want to speak to the Director of Human Resources? What if the person you would like to interview is unwilling or unable to participate? Do you use another member of the organization?

Can all members of population be sampled? If you have an incomplete list of the population (i.e., sampling frame) you may not be able to sample every member of the population. Lists of various groups are extremely hard to keep up to date. People move or change their names. Even though they are on your sampling frame listing, you may not be able to get to them. And, it's possible they are not even on the list.

Are response rates likely to be a problem? Even if you are able to solve all of the other population and sampling problems, you still have to deal with the issue of response rates. Some members of your sample will simply refuse to respond. Others have the best of intentions, but can't seem to find the time to send in your questionnaire by the due date. Still others misplace the instrument or forget about the appointment for an interview. Low response rates are among the most difficult of problems in survey research. They can ruin an otherwise well-designed survey effort.

- **Question Issues**

Sometimes the nature of what you want to ask respondents will determine the type of survey you select.

What types of questions can be asked? Are you going to be asking personal questions? Are you going to need to get lots of detail in the responses? Can you anticipate the most frequent or important types of responses and develop reasonable closed-ended questions?

How complex will the questions be? Sometimes you are dealing with a complex subject or topic. The questions you want to ask are going to have multiple parts. You may need to branch to sub-questions.

Will screening questions be needed? A screening question may be needed to determine whether the respondent is qualified to answer your question of interest. For instance, you wouldn't want to ask someone their opinions about a specific computer program without first 'screening' them to find out whether they have any experience using the program. Sometimes you have to screen on several variables (e.g., age, gender, experience). The more complicated the screening, the less likely it is that you can rely on paper-and-pencil instruments without confusing the respondent.

Can question sequence be controlled? Is your survey one where you can construct in advance a reasonable sequence of questions? Or, are you doing an initial exploratory study where you may need to ask lots of follow-up questions that you can't easily anticipate?

Will lengthy questions be asked? If your subject matter is complicated, you may need to give the respondent some detailed background for a question. Can you reasonably expect your respondent to sit still long enough in a phone interview to ask your question?

Will long response scales be used? If you are asking people about the different computer equipment they use, you may have to have a lengthy response list (CD-ROM drive, floppy drive, mouse, touch pad, modem, network connection, external speakers, etc.). Clearly, it may be difficult to ask about each of these in a short phone interview.

- **Content Issues**

The content of your study can also pose challenges for the different survey types you might utilize.

Can the respondents be expected to know about the issue? If the respondent does not keep up with the news (e.g., by reading the newspaper, watching television news, or talking with others), they may not even know about the news issue you want to ask them about. Or, if you want to do a study of family finances and you are talking to the spouse who doesn't pay the bills on a regular basis, they may not have the information to answer your questions.

Will respondent need to consult records? Even if the respondent understands what you're asking about, you may need to allow them to consult their records in order to get an accurate answer. For instance, if you ask them how much money they spent on food in the past month, they may need to look up their personal check and credit card records. In this case, you don't want to be involved in an interview where they would have to go look things up while they keep you waiting (they wouldn't be comfortable with that).

- **Bias Issues**

People come to the research endeavor with their own sets of biases and prejudices. Sometimes, these biases will be less of a problem with certain types of survey approaches.

Can social desirability be avoided? Respondents generally want to 'look good' in the eyes of others. None of us likes to look like we don't know an answer. We don't want to say anything that would be embarrassing. If you ask people about information that may put them in this kind of position, they may not tell you the truth, or they may 'spin' the response so that it makes them look better. This may be more of a problem in an interview situation where they are face-to face or on the phone with a live interviewer.

Can interviewer distortion and subversion be controlled? Interviewers may distort an interview as well. They may not ask questions that make them uncomfortable. They may not listen carefully to respondents on topics for which they have strong opinions. They may make the judgment that they already know what the respondent would say to a question based on their prior responses, even though that may not be true.

Can false respondents be avoided? With mail surveys it may be difficult to know who actually responded. Did the head of household complete the survey or someone else? Did the CEO actually give the responses or instead pass the task off to a subordinate? Is the person you're speaking with on the phone actually who they say they are? At least with personal interviews, you have a reasonable chance of knowing who you are speaking with. In mail surveys or phone interviews, this may not be the case.

- **Administrative Issues**

Last, but certainly not least, you have to consider the feasibility of the survey method for your study.

Costs: Cost is often the major determining factor in selecting survey type. You might prefer to do personal interviews, but can't justify the high cost of training and paying for the interviewers. You may prefer to send out an extensive mailing but can't afford the postage to do so.

Facilities: Do you have the facilities (or access to them) to process and manage your study? In phone interviews, do you have well-equipped phone surveying facilities? For focus groups, do you have a

comfortable and accessible room to host the group? Do you have the equipment needed to record and transcribe responses?

Time: Some types of surveys take longer than others. Do you need responses immediately (as in an overnight public opinion poll)? Have you budgeted enough time for your study to send out mail surveys and follow-up reminders, and to get the responses back by mail? Have you allowed for enough time to get enough personal interviews to justify that approach?

Personnel: Different types of surveys make different demands of personnel. Interviews require interviewers who are motivated and well-trained. Group administered surveys require people who are trained in group facilitation. Some studies may be in a technical area that requires some degree of expertise in the interviewer.

Clearly, there are lots of issues to consider when you are selecting which type of survey you wish to use in your study. And there is no clear and easy way to make this decision in many contexts.

9.4.8 CASE STUDY METHOD

Case studies are in-depth investigations of a single person, group, event or community. Typically data are gathered from a variety of sources and by using several different methods (e.g. observations & interviews). The case study research method originated in clinical medicine (the case history, i.e. the patient's personal history). The case study method often involves simply observing what happens to, or reconstructing 'the case history' of a single participant or group of individuals (such as a school class or a specific social group), i.e. the idiographic approach. Case studies allow a researcher to investigate a topic in far more detail than might be possible if they were trying to deal with a large number of research participants (nomothetic approach) with the aim of 'averaging'.

The case study is not itself a research method, but researchers select methods of data collection and analysis that will generate material suitable for case studies such as qualitative techniques (unstructured interviews, participant observation, diaries), personal notes (e.g. letters, photographs, notes) or official document (e.g. case notes, clinical notes, appraisal reports). The data collected can be analyzed using different theories (e.g. grounded theory, interpretative phenomenological analysis, text interpretation (e.g. thematic coding) etc. All the approaches mentioned here use preconceived categories in the analysis and they are ideographic in their approach, i.e. they focus on the individual case without reference to a comparison group.

Case studies are widely used in psychology and amongst the best known were the ones carried out by Sigmund Freud. He conducted very detailed investigations into the private lives of his patients in an attempt to both understand and help them overcome their illnesses. Freud's most famous case studies include 'Little Hans' (1909a) and 'The Rat Man' (1909b). Even today case histories are one of the main methods of investigation in abnormal psychology and psychiatry. For students of these disciplines they can give a vivid insight into what those who suffer from mental illness often have to endure. Case studies are often conducted in clinical medicine and involve collecting and reporting descriptive information about a particular person or specific environment, such as a school. In psychology, case studies are often confined to the study of a particular individual. The information is mainly biographical and relates to events in the individual's past (i.e. retrospective), as well as to significant events which are currently occurring in his or her everyday life. In order to produce a fairly detailed and comprehensive profile of the person, the psychologist may use various types of accessible data, such as medical records, employer's reports, school reports or psychological test results. The interview is also an extremely effective procedure for obtaining information about an individual, and it may be used to collect comments from the person's friends, parents, employer,

work mates and others who have a good knowledge of the person, as well as to obtain facts from the person him or herself.

In a case study, nearly every aspect of the subject's life and history is analyzed to seek patterns and causes for behavior. The hope is that learning gained from studying one case can be generalized to many others. Unfortunately, case studies tend to be highly subjective and it is difficult to generalize results to a larger population.

Characteristics of Case Study Method

- Case study research is not sampling research. Selecting cases must be done so as to maximize what can be learned in the period of time available for the study.
- The unit of analysis is a critical factor in the case study. It is typically a system of action rather than an individual or group of individuals. Case studies tend to be selective, focusing on one or two issues that are fundamental to understanding the system being examined.
- Case studies are multi-perspectives analyses. This means that the researcher considers not just the voice and perspective of the actors, but also of the relevant groups of actors and the interaction between them. This one aspect is a salient point in the characteristic that case studies possess. They give a voice to the powerless and voiceless.
- Case study is known as a triangulated research strategy. Snow and Anderson (1991) asserted that triangulation can occur with data, investigators, theories, and even methodologies. Stake (1995) stated that the protocols that are used to ensure accuracy and alternative explanations are called triangulation. The need for triangulation arises from the ethical need to confirm the validity of the processes. In case studies, this could be done by using multiple sources of data (Yin, 1984). The problem in case studies is to establish meaning rather than location. Denzin (1984) identified four types of triangulation: Data source triangulation, when the researcher looks for the data to remain the same in different contexts; Investigator triangulation, when several investigators examine the same phenomenon; Theory triangulation, when investigators with different viewpoints interpret the same results; and Methodological triangulation, when one approach is followed by another, to increase confidence in the interpretation.

Characteristics of the case study method in legal research can be described shortly as follows -

- Any researcher can hold research into one single or more social unit such as a person, family, society and so on for the accomplishment of the aim of his/her study under this method. He/she can hold comprehensive and intensive study in different aspects of the unit so selected. Under this method, he/she can give the weight and consideration towards all the aspects of a person, group or society so selected for study. All aspects can be deeply and intensively studied.
- Any researcher does not only hold the study to find out how many crimes have been committed by a man but also deeply hold study into causes that forces or abets him to commit such crimes. In this example, one of the main objectives of the researcher could be to give suggestion to referring the criminals.
- Under this method, any researcher can endeavor to know the relationship of causal factors interlinked.
- Under this method, all the related aspects of the unit, which is in subject to study, can be directly or indirectly studied.
- Case study method helps to find out the useful data and enables to generalize the knowledge also.

- The main characteristics of the case study method includes continuing, completeness, validity, and data as it deals with the life of social unit or units or society as whole.

Application of Case Study Model

Yin (1994) presented at least four applications for a case study model.

To…

- explain complex causal links in real-life interventions;
- describe the real-life context in which the intervention has occurred;
- describe the intervention itself; and
- explore those situations in which the intervention being evaluated has no clear set of outcomes.

Sources of Information in Case Study

There are a number of different sources and methods that researchers can use to gather information about an individual or group. The six major sources that have been identified by researchers (Yin, 1994; Stake, 1995) are –

Direct Observation: This strategy involves observing the subject, often in a natural setting. While an individual observer is sometimes used, it is more common to utilize a group of observers.

Interviews: One of the most important methods for gathering information in case studies. An interview can involve structured survey-type questions, or more open-ended questions.

Documents: Letters, newspaper articles, administrative records, etc.

Archival Records: Census records, survey records, name lists, etc.

Physical Artifacts: Tools, objects, instruments and other artifacts often observed during a direct observation of the subject.

Participant Observation: Involves the researcher actually serving as a participant in events and observing the actions and outcomes.

Category of Case Study

There are several categories of case study.

Prospective: A type of case study in which an individual or group of people is observed in order to determine outcomes. For example, a group of individuals might be watched over an extended period of time to observe the progression of a particular disease.

Retrospective: A type of case study that involves looking at historical information. For example, researchers might start with an outcome, such as a disease, and then backwards at information about the individuals life to determine risk factors that may have contributed to the onset of the illness.

Explanatory: Explanatory case studies examine the data closely both at a surface and deep level in order to explain the phenomena in the data. On the basis of the data, the researcher may then form a theory and set to test this theory (McDonough and McDonough, 1997). Furthermore, explanatory cases are also deployed for causal studies where pattern-matching can be used to investigate certain phenomena in very complex and multivariate cases. Yin and Moore (1987) note that these complex and multivariate cases can be explained by three rival theories - a knowledge-driven theory, a problem-solving theory, and a social-interaction theory. The knowledge-driven theory stipulates that eventual commercial products are the results of ideas and discoveries from basic research. Similar notions can be said for the problem-solving theory. However, in this theory, products are derived from external sources rather than from research. The social-interaction theory, on the other hand, suggests that overlapping professional network causes researchers and users to communicate frequently with each other.

Exploratory: A case study that is sometimes used as a prelude to further, more in-depth research. This allows researchers to gather more information before developing their research questions and hypotheses. A pilot study is considered an example of an exploratory case study (Yin, 1984; McDonough and McDonough, 1997) and is crucial in determining the protocol that will be used.

Descriptive: Descriptive case studies set to describe the natural phenomena which occur within the data in question. The goal set by the researcher is to describe the data as they occur. McDonough and McDonough (1997) suggest that descriptive case studies may be in a narrative form. An example of a descriptive case study is the journalistic description of the Watergate scandal by two reporters (Yin, 1984). The challenge of a descriptive case study is that the researcher must begin with a descriptive theory to support the description of the phenomenon or story. If this fails there is the possibility that the description lacks rigor and that problems may occur during the project.

Intrinsic: A type of case study in which the researcher has a personal interest in the case.

Collective: Involves studying a group of cases.

Instrumental: Occurs when the individual or group allows researchers to understand more than what is initially obvious to observers.

According to McDonough and McDonough (1997) other categories include interpretive and evaluative case studies. Through interpretive case studies, the researcher aims to interpret the data by developing conceptual categories, supporting or challenging the assumptions made regarding them. In evaluative case studies, the researcher goes further by adding their judgment to the phenomena found in the data.

Intrinsic - when the researcher has an interest in the case; Instrumental - when the case is used to understand more than what is obvious to the observer; Collective - when a group of cases is studied. Exploratory cases are sometimes considered as a prelude to social research. Explanatory case studies may be used for doing causal investigations. Descriptive cases require a descriptive theory to be developed before starting the project. In all of the above types of case studies, there can be single-case or multiple-case applications.

Procedure of Case Study Method

In short, for the case study, the researchers recommend the above procedures in study –

- Design the case study protocol
  - Determine the required skills
  - Develop and review the protocol
- Conduct the case study
  - Prepare for data collection
  - Distribute questionnaire
  - Conduct interview
- Analyze case study evidence
  - Analytic strategy
- Develop conclusions, recommendations, and implications based on the evidence.

Each section begins with the procedures recommended in the literature, followed by the application of the recommended procedure in the study.

Advantages and Disadvantages of Case Studies

A good case study should always make clear which information is factual description and which is inference or the opinion of the researcher. The strengths of case studies are - Provides detailed (rich qualitative) information; Provides insight for further research; Permitting investigation of otherwise impractical (or unethical) situations.

Merits of case study method can be described briefly as follows -

- The case study helps to study and understand the human nature and conducts very intensively. As a result, any researcher can formulate a valid hypothesis.
- Any researcher can get actual and exemplary records of experience that may be useful as guidelines to others life as this method carries out intensive study of all aspects of a unit or a problem selected for research.
- This case study method is very useful in sampling as it efficiently and orderly classifies the units selected for research based on data and information so collected.
- Under the case study, any researcher can undertake one or more research method(s) under the existing circumstances. S/he can use various methods as interviews, questionnaires, report, sampling and similar other methods.
- As this method emphasizes historical analysis, this method is taken as a means of knowing and understanding the past life of a social unit. That is why; it can suggest the possible measures to be taken for having improvements in present life by the lesson of past life. In other words, it is said that the old is gold and morning show the day.
- Under this case study method, any researcher can find out new helpful things as it holds perfect study of sociological materials that can represent real image of experience.
- Under this case study method, any research may increase his/her analytical ability and skill of the study of practical experiences.
- This method makes possible the study, to bring positive changes in the society. As this method holds overall study of life of a social unit, the researcher can know and understand the changes occurred in our society and can suggest to make corrections in human behavior for the welfare, as well.
- As this case study method holds study of all aspects of a social unit, terms of past, present and future time, it gives the matured knowledge that could also be useful to his/her personal and public life.

- This case study method is also taken as indispensable and significant as regards to taking decision on many management issues. Case data are also very useful for diagnosis and thereby of practical case issues. It can be taken as an example to be followed in future.

Case studies can help us generate new ideas (that might be tested by other methods). They are an important way of illustrating theories and can help show how different aspects of a person's life are related to each other. The method is therefore important for a holistic point of view. Despite its merits as referred to in above, demerits of the case study method can be described shortly as follows –

- This case study method is a very vague process. There is no mechanism to control researcher. Generalization is almost impossible to a larger similar population.
- Under this case study method, letters and other documents can be used. A write up is generally prepared to impress and give undue influence to personal matters. It always depends on the personal feeling and thought. As a result, the study of the researcher may be worthless and meaningless by virtue of possible occurrence of distortion.
- Under this case study method, there is no limitation of study. The researcher always finds difficulties in deciding when s/he should stop to collect data for his/her study. He/she may find all things to be pertinent.
- This case study method is always based on several assumptions. However, sometimes, they may not be realistic. Under such circumstances, such data should be tested.
- Under this case study method, the result is drawn up on the basis of all post experiences. Collection of much data and information may lead to confusion to find out pertinent and specific information.
- This case study method is based on comparison with the post life. However, human value, attitude, behavior, reactions, circumstance are very wide and differ with each other. It is difficult to compare from one another.
- This case study method always collects post information and data of the society. However, there is no system of checking. Difficult to replicate.
- This case study method is time consuming, expensive and complex.

9.4.9 DIARIES METHOD

A diary is a type of self-administered questionnaire often used to record frequent or contemporaneous events or experiences. In diary surveys, respondents are given the self-administered form and asked to fill in the required information when events occur (event-based diaries) or at specified times or time intervals (time-based diaries). Data from diary studies can be used to make cross-sectional comparisons across people, track an individual over time, or study processes within individuals or families. The main advantages of diary methods are that they allow events to be recorded in their natural setting and, in theory, minimize the delay between the event and the time it is recorded. Diaries are used in a variety of domains. These include studies of expenditure, nutrition, time use, travel, media exposure, health, and mental health. Diary studies in user research are a longitudinal technique used in anthropology, psychology, and 'User Experience' research, primarily to capture data from participants as they live through certain experiences. There are two types of diary studies –

- Elicitation studies, where participants capture media that are then used as prompts for discussion in interviews. The method is a way to trigger the participant's memory.
- Feedback studies, where participants answer predefined questions about events. This is a way of getting immediate answers from the participants.

Using Diaries in Research

Biographers, historians and literary scholars have long considered diary documents to be of major importance for telling history. More recently, sociologists have taken seriously the idea of using personal documents to construct pictures of social reality from the actors' perspective. In contrast to these 'journal' type of accounts, diaries are used as research instruments to collect detailed information about behavior, events and other aspects of individuals' daily lives.

Self-completion diaries have a number of advantages over other data collections methods. First, diaries can provide a reliable alternative to the traditional interview method for events that are difficult to recall accurately or that are easily forgotten. Second, like other self-completion methods, diaries can help to overcome the problems associated with collecting sensitive information by personal interview. Finally, they can be used to supplement interview data to provide a rich source of information on respondents' behavior and experiences on a daily basis. Two other major areas where diaries are often used are consumer expenditure and transport planning research. For example, the UK Family Expenditure Survey (OPCS) uses diaries to collect data for the National Accounts and to provide weights for the Retail Price Index. In the National Travel Survey (OPCS) respondents record information about all journeys made over a specified time period in a diary. Other topics covered using diary methods are social networks, health, illness and associated behavior, diet and nutrition, social work and other areas of social policy, clinical psychology and family therapy, crime behavior, alcohol consumption and drug usage, and sexual behavior. Diaries are also increasingly being used in market research. Diary surveys often use a personal interview to collect additional background information about the household and sometimes about behavior or events of interest that the diary will not capture. A placing interview is important for explaining the diary keeping procedures to the respondent and a concluding interview may be used to check on the completeness of the recorded entries. Often retrospective estimates of the behavior occurring over the diary period are collected at the final interview.

Diary Design and Format

Diaries may be open format, allowing respondents to record activities and events in their own words, or they can be highly structured where all activities are pre-categorized. An obvious advantage of the free format is that it allows for greater opportunity to recode and analyze the data. However, the labor intensive work required to prepare and make sense of the data may render it unrealistic for projects lacking time and resources, or where the sample is large. Although the design of a diary will depend on the detailed requirement of the topic under study, there are certain design aspects which are common to most. Below are a set of guidelines recommended for anyone thinking about designing a diary.

- An A4 booklet of about 5 to 20 pages is desirable, depending on the nature of the diary.
- The inside cover page should contain a clear set of instructions on how to complete the diary. This should stress the importance of recording events as soon as possible after they occur and how the respondent should try not to let the diary keeping influence their behavior.
- Depending on how long a period the diary will cover, each page denoting either a week, a day of the week or a 24 hour period or less. Pages should be clearly ruled up as a calendar with prominent headings and enough space to enter all the desired information (such as what the respondent was doing, at what time, where, who with and how they felt at the time, and so on).
- Checklists of the items, events or behavior to help jog the diary keeper's memory should be printed somewhere fairly prominent. Very long lists should be avoided since they may be off-putting and confusing to respondents. For a structured time budget diary, an exhaustive list of

all possible relevant activities should be listed together with the appropriate codes. Where more than one type of activity is to be entered, that is, primary and secondary (or background) activities, guidance should be given on how to deal with competing or multiple activities.

- There should be an explanation of what is meant by the unit of observation, such as a 'session', an 'event' or a 'fixed time block'. Where respondents are given more freedom in naming their activities and the activities are to be coded later, it is important to give strict guidelines on what type of behavior to include, what definitely to exclude and the level of detail required. Time budget diaries without fixed time blocks should include columns for start and finish times for activities.
- Appropriate terminology or lists of activities should be designed to meet the needs of the sample under study, and if necessary, different versions of the diary should be used for different groups.
- Following the diary pages it is useful to include a simple set of questions for the respondent to complete, asking, among other things, whether the diary keeping period was atypical in any way compared to usual daily life. It is also good practice to include a page at the end asking for the respondents' own comments and clarifications of any peculiarities relating to their entries. Even if these remarks will not be systematically analyzed, they may prove helpful at the editing or coding stage.

Data Quality and Response Rates: In addition to the types of errors encountered in all survey methods, diaries are especially prone to errors arising from respondent conditioning, incomplete recording of information and under-reporting, inadequate recall, insufficient cooperation and sample selection bias.

Diary keeping period: The period over which a diary is to be kept needs to be long enough to capture the behavior or events of interest without jeopardizing successful completion by imposing an overly burdensome task. For collecting time-use data, anything from one to three day diaries may be used. Household expenditure surveys usually place diaries on specific days to ensure an even coverage across the week and distribute their field work over the year to ensure seasonal variation in earnings and spending is captured.

Reporting errors: In household expenditure surveys it is routinely found that the first day and first week of diary keeping shows higher reporting of expenditure than the following days. This is also observed for other types of behavior and the effects are generally termed 'first day effects'. They may be due to respondents changing their behavior as a result of keeping the diary (conditioning), or becoming less conscientious than when they started the diary. Recall errors may also extend to 'tomorrow' diaries. Respondents often write down their entries at the end of a day and only a small minority are diligent diary keepers who carry their diary with them at all times. Expenditure surveys find that an intermediate visit from an interviewer during the diary keeping period helps preserve 'good' diary keeping to the end of the period.

Literacy: All methods that involve self-completion of information demand that the respondent has a reasonable standard of literacy. Thus the diary sample and the data may be biased towards the population of competent diary keepers.

Participation: The best response rates for diary surveys are achieved when diary keepers are recruited on a face-to-face basis, rather than by post. Personal collection of diaries also allows any problems in the completed diary to be sorted out on the spot. Success may also depend on the quality of interviewing staff who should be highly motivated, competent and well-briefed. Appealing

to respondent's altruistic nature, reassuring them of confidentiality and offering incentives are thought to influence co-operation in diary surveys.

Coding, Editing and Processing: The amount of work required to process a diary depends largely on how structured it is. For many large scale diary surveys, part of the editing and coding process is done by the interviewer while still in the field. Following this is an intensive editing procedure which includes checking entries against information collected in the personal interview. For unstructured diaries, involving coding of verbatim entries, the processing can be very labor intensive, in much the same way as it is for processing qualitative interview transcripts. Using highly trained coders and a rigorous unambiguous coding scheme is very important particularly where there is no clear demarcation of events or behavior in the diary entries. Clearly, a well designed diary with a coherent pre-coding system should cut down on the degree of editing and coding.

Relative Cost of Diary Surveys: The diary method is generally more expensive than the personal interview, and personal placement and pick-up visits are more costly than postal administration. If the diary is unstructured, intensive editing and coding will push up the costs. However, these costs must be balanced against the superiority of the diary method in obtaining more accurate data, particularly where the recall method gives poor results.

Computer Software for Processing and Analysis: Although computer assisted methods may help to reduce the amount of manual preparatory work, there are few packages and most of them are custom built to suit the specifics of a particular project. Time-budget researchers are probably the most advanced group of users of machine readable diary data and the structure of these data allows them to use traditional statistical packages for analysis. More recently, methods of analysis based on algorithms for searching for patterns of behavior in diary data are being used (Coxon 1991). Software development is certainly an area which merits future attention. For textual diaries, qualitative software packages such as the 'Ethnograph' can be used to code them in the same way as interview transcripts (Fielding & Lee 1991).

Archiving Diary Data: In spite of the abundance of data derived from diary surveys across a wide range of disciplines, little is available to other researchers for secondary analysis (further analysis of data already collected). This is perhaps not surprising given that the budget for many diary surveys does not extend to systematic processing of the data. Many diary surveys are small scale investigative studies that have been carried out with very specific aims in mind. For these less structured diaries, for which a common coding scheme is neither feasible, nor possibly desirable, an answer to public access is to deposit the original survey documents in an archive. This kind of data bank gives the researcher access to original diary documents allowing them to make use of the data in ways to suit their own research strategy. However, the ethics of making personal documents public (even if in the limited academic sense) have to be considered.

Advantages and Criticism of Diary Studies

Advantages of diary studies are numerous. They allow –

- collecting longitudinal and temporal information;
- reporting events and experiences in context;
- determining the antecedents, correlates and consequences of daily experiences.

The criticism of diary studies are as - diary studies might generate inaccurate recall, especially if using the elicitation type of diary studies, because of the use of memory triggers, like for example taking a photo and then write about it later. There is low control, low participation and there is a risk of disturbing the action. In feedback studies there is also low control, and it can be troubling and disturbing to write everything down.

9.4.10 PRINCIPAL COMPONENT ANALYSIS (PCA)

Principal component analysis (PCA) is a procedure for identifying a smaller number of uncorrelated variables, called 'principal components', from a large set of data. PCA was invented in 1901 by Karl Pearson, as an analogue of the principal axis theorem in mechanics; it was later independently developed (and named) by Harold Hotelling in the 1930s. The goal of principal components analysis is to explain the maximum amount of variance with the fewest number of principal components. Principal components analysis is commonly used in the social sciences, market research, and other industries that use large data sets. Principal component analysis is appropriate when you have obtained measures on a number of observed variables and wish to develop a smaller number of artificial variables (called principal components) that will account for most of the variance in the observed variables. The principal components may then be used as predictor or criterion variables in subsequent analyses. It is a variable reduction procedure. It is useful when you have obtained data on a number of variables (possibly a large number of variables), and believe that there is some redundancy in those variables. In this case, redundancy means that some of the variables are correlated with one another, possibly because they are measuring the same construct. Because of this redundancy, you believe that it should be possible to reduce the observed variables into a smaller number of principal components (artificial variables) that will account for most of the variance in the observed variables.

Because it is a variable reduction procedure, principal component analysis is similar in many respects to exploratory factor analysis. In fact, the steps followed when conducting a principal component analysis are virtually identical to those followed when conducting an exploratory factor analysis. However, there are significant conceptual differences between the two procedures, and it is important that you do not mistakenly claim that you are performing factor analysis when you are actually performing principal component analysis. Principal components analysis is commonly used as one step in a series of analyses. You can use principal components analysis to reduce the number of variables and avoid multicollinearity, or when you have too many predictors relative to the number of observations. A consumer products company wants to analyze customer responses to several characteristics of a new shampoo: color, smell, texture, cleanliness, shine, volume, amount needed to lather, and price. They perform a principal components analysis to determine whether they can form a smaller number of uncorrelated variables that are easier to interpret and analyze. The results identify the following patterns –

- Color, smell, and texture form a 'Shampoo quality' component.
- Cleanliness, shine, and volume form an 'Effect on hair' component.
- Amount needed to lather and price form a 'Value' component.

Objectives of principal component analysis are –

- To discover or to reduce the dimensionality of the data set.
- To identify new meaningful underlying variables.

Traditionally, principal component analysis is performed on the symmetric Covariance matrix or on the symmetric Correlation matrix. These matrices can be calculated from the data matrix. The covariance matrix contains scaled sums of squares and cross products. A correlation matrix is like a covariance matrix but first the variables, i.e. the columns, have been standardized. We will have to standardize the data first if the variances of variables differ much, or if the units of measurement of the variables differ. To perform the analysis, we select the 'Table of Real' data matrix in the list of objects and choose to PCA.

9.4.11 ACTIVITY SAMPLING

Activity sampling is a technique whereby a number of successive observations are made over a period of time of one or a group of workers, machines or processes. Each observation records what is happening at that instant, with a rating if necessary. And the percentage of observations recorded for a particular activity or delay is a measure of the percentage of time during which that activity occurs. The activity sampling technique was devised for the purpose of getting information on the time spent by groups of workers or machines on various activities or delays. For this purpose the sample can be very useful, and in many cases it has been found most valuable as a method of reconnaissance prior to the use of more detailed work study techniques. Among the many applications of activity sampling are numbered the investigating work necessary in-

1. Improving the arrangement of duties and general organisation of work.
2. Indicating the directions in which improvements in methods and equipment should be sought, and assessing the vaue of the proposed changes.
3. Assessing the value of introducing group incentive schemes.
4. Assessing labour requirements to machine utilisation.
5. Examining the causes of unsatisfactory performance/efficiency figures or machine utilisation figures.

The activity sampling technique is conducted over a representative period of work by taking samples of activity of the operators and machines to be included and then analysed using statistical tolerance procedures. Certain types of work may be difficult to study using standard work measurement techniques, for example warehouses. A full production study would be time consuming and expensive. This technique, developed on statistical work by Tippett, allows 'snap' observations to be built into a picture of the whole. It is an ideal system for assessing machine efficiency in a large department, and can easily demonstrate the average stoppage rate. The technique is very similar to statistical quality control, where large numbers of products are inspected to give an expected confidence level of defect expectation.

Obviously, the accuracy of activity sampling will depend on the number of observations. Few and infrequent observations will provide a low level of accuracy, whilst many and frequent observations will give highly accurate but more expensive information. It is, therefore, particularly important that the observer knows the optimum number of observations necessary for a particular study.

This number can be calculated quite simply once an approximate picture of the situation is established, using the following formula.

$$N = \frac{4P(100-P)}{L^2}$$

Where, N = Number of observations; P = Approximate occurrence of factor as a percentage of N; L = Acceptable accuracy in occurrence of factor being studied.

This formula will give the accuracy of the study within 95% confidence limits.
For exmple, a worker is studied using activity sampling, and 32 observations are noted. Of these 75% showed that the worker was performing useful work. If we assume that we would like to check that the worker is performing at this level continuously, plus or minus 10%, ie. between 67.5% and 82.5%, how many observations would we need to provide 95% confidence in the result.
Solution: Here, P = 75%; L = 10%

$$\text{Hence, } N = \frac{4 \times 75(100-75)}{10 * 10}$$

$$N = \frac{300 * 25}{100}$$

$$N = 75$$

However, after performing 75 checks, the value of P was found to be only 70% so the extra data could be used to assess the new requirement for the number of checks.

$$N = \frac{4 * 70(100-70)}{10 * 10}$$

$$N = \frac{280 * 30}{100}$$

$$N = 28 * 3 = 84$$

Hence more checks would be required, ie. a total of 9.

Once these checks had been completed, a final calculation should be done to ensure that the number required had not changed.

It is normally used for collecting information on the percentages of time spent on activities, without the need to devote the time that would otherwise be required for any continuous observation. One of the great advantages of this technique is that it enables lengthy activities or groups of activities to be studied economically and in a way that produces statistically accurate data. Activity sampling can be carried out at random intervals or fixed intervals. Random activity sampling is where the intervals between observations are selected at random e.g. from a table of random numbers. Fixed interval activity sampling is where the same interval exists between observations. A decision will need to be made on which of these two approaches is to be chosen. A fixed interval is usually chosen where activities are performed by a person or group of people who have a degree of control over what they do and when they do it. Random intervals will normally be used where there are a series of automated tasks or activities as part of a process, that are have to be performed in a pre established regular pattern. If fixed interval sampling were to be used in this situation there is a danger that the sampling point would continue to occur at the same point in the activity cycle.

9.4.12 MEMO MOTION STUDY

Memo motion or spaced-shot photography is a tool of time and motion study that analyzes long

operations by using a camera. It was developed 1946 by Marvin E. Mundel at Purdue University, who was first to save film material while planning studies on kitchen work.

Mundel published the method in 1947 with several studies in his textbook 'Systematic Motion and Time Study'. A study showed the following advantages of Memo-Motion in regard to other forms of time and motion study –

- Single operator repetition work.
- Area studies, the study of a group of men or machines.
- Team studies.
- Utilisation studies.
- Work measurement.

As a versatile tool of work study it was used in the US to some extent, but rarely in Europe and other industrial countries mainly because of difficulties procuring the required cameras. Today Memo-Motion could have a comeback because more and more workplaces have conditions which it can explore.

9.4.13 PROCESS ANALYSIS

A step-by-step breakdown of the phases of a process, used to convey the inputs, outputs, and operations that take place during each phase. A process analysis can be used to improve understanding of how the process operates, and to determine potential targets for process improvement through removing waste and increasing efficiency. Inputs may be materials, labor, energy, and capital equipment. Outputs may be a physical product (possibly used as an input to another process) or a service. Processes can have a significant impact on the performance of a business, and process improvement can improve a firm's competitiveness. The first step to improving a process is to analyze it in order to understand the activities, their relationships, and the values of relevant metrics. Process analysis generally involves the following tasks-

- Define the process boundaries that mark the entry points of the process inputs and the exit points of the process outputs.
- Construct a process flow diagram that illustrates the various process activities and their interrelationships.
- Determine the capacity of each step in the process. Calculate other measures of interest.
- Identify the bottleneck, that is, the step having the lowest capacity.
- Evaluate further limitations in order to quantify the impact of the bottleneck.
- Use the analysis to make operating decisions and to improve the process.

Process Analysis Tools

When you want to understand a work process or some part of a process, these tools can help -

- Flowchart: A picture of the separate steps of a process in sequential order, including materials or services entering or leaving the process (inputs and outputs), decisions that must be made, people who become involved, time involved at each step and/or process measurements.
- Failure Mode Effects Analysis (FMEA): A step-by-step approach for identifying all possible failures in a design, a manufacturing or assembly process, or a product or service; studying the consequences, or effects, of those failures; and eliminating or reducing failures, starting with the highest-priority ones.
- Mistake-proofing: The use of any automatic device or method that either makes it impossible for an error to occur or makes the error immediately obvious once it has occurred.
- Spaghetti Diagram: A spaghetti diagram is a visual representation using a continuous flow line

tracing the path of an item or activity through a process. The continuous flow line enables process teams to identify redundancies in the work flow and opportunities to expedite process flow.

Process Flow Diagram

The process boundaries are defined by the entry and exit points of inputs and outputs of the process. Once the boundaries are defined, the process flow diagram (or *process flowchart*) is a valuable tool for understanding the process using graphic elements to represent tasks, flows, and storage. The following is a flow diagram for a simple process having three sequential activities-

The symbols in a process flow diagram are defined as follows-

- Rectangles - represent tasks.
- Arrows - represent flows. Flows include the flow of material and the flow of information. The flow of information may include production orders and instructions. The information flow may take the form of a slip of paper that follows the material, or it may be routed separately, possibly ahead of the material in order to ready the equipment. Material flow usually is represented by a solid line and information flow by a dashed line.
- Inverted triangles - represent storage (inventory). Storage bins commonly are used to represent raw material inventory, work in process inventory, and finished goods inventory.
- Circles - represent storage of information *(not shown in the above diagram)*.

In a process flow diagram, tasks drawn one after the other in series are performed sequentially. Tasks drawn in parallel are performed simultaneously. In the above diagram, raw material is held in a storage bin at the beginning of the process. After the last task, the output also is stored in a storage bin. When constructing a flow diagram, care should be taken to avoid pitfalls that might cause the flow diagram not to represent reality. For example, if the diagram is constructed using information obtained from employees, the employees may be reluctant to disclose rework loops and other potentially embarrassing aspects of the process. Similarly, if there are illogical aspects of the process flow, employees may tend to portray it as it should be and not as it is. Even if they portray the process as they perceive it, their perception may differ from the actual process. For example, they may leave out important activities that they deem to be insignificant.

Process Performance Measures

Operations managers are interested in process aspects such as cost, quality, flexibility, and speed. Some of the process performance measures that communicate these aspects include-

- Process capacity - the capacity of the process is its maximum output rate, measured in units produced per unit of time. The capacity of a series of tasks is determined by the lowest capacity task in the string. The capacity of parallel strings of tasks is the sum of the capacities of the two strings, except for cases in which the two strings have different outputs that are combined. In such cases, the capacity of the two parallel strings of tasks is that of the lowest capacity parallel string.
- Capacity utilization - the percentage of the process capacity that actually is being used.
- Throughput rate (also known as *flow rate*) - the average rate at which units flow past a specific point in the process. The maximum throughput rate is the process capacity.
- Flow time (also known as *throughput time* or *lead time*) - the average time that a unit requires to flow through the process from the entry point to the exit point. The flow time is the length of

the longest path through the process. Flow time includes both processing time and any time the unit spends between steps.

- Cycle time - the time between successive units as they are output from the process. Cycle time for the process is equal to the inverse of the throughput rate. Cycle time can be thought of as the time required for a task to repeat itself. Each series task in a process must have a cycle time less than or equal to the cycle time for the process. Put another way, the cycle time of the process is equal to the longest task cycle time. The process is said to be in balance if the cycle times are equal for each activity in the process. Such balance rarely is achieved.
- Process time - the average time that a unit is worked on. Process time is flow time less idle time.
- Idle time - time when no activity is being performed, for example, when an activity is waiting for work to arrive from the previous activity. The term can be used to describe both machine idle time and worker idle time.
- Work In process - the amount of inventory in the process.
- Set-up time - the time required to prepare the equipment to perform an activity on a batch of units. Set-up time usually does not depend strongly on the batch size and therefore can be reduced on a per unit basis by increasing the batch size.
- Direct labor content - the amount of labor (in units of time) actually contained in the product. Excludes idle time when workers are not working directly on the product. Also excludes time spent maintaining machines, transporting materials, etc.
- Direct labor utilization - the fraction of labor capacity that actually is utilized as direct labor.

Process Bottleneck

The process capacity is determined by the slowest series task in the process; that is, having the slowest throughput rate or longest cycle time. This slowest task is known as the *bottleneck*. Identification of the bottleneck is a critical aspect of process analysis since it not only determines the process capacity, but also provides the opportunity to increase that capacity. Saving time in the bottleneck activity saves time for the entire process. Saving time in a non-bottleneck activity does not help the process since the throughput rate is limited by the bottleneck. It is only when the bottleneck is eliminated that another activity will become the new bottleneck and presents a new opportunity to improve the process. If the next slowest task is much faster than the bottleneck, then the bottleneck is having a major impact on the process capacity. If the next slowest task is only slightly faster than the bottleneck, then increasing the throughput of the bottleneck will have a limited impact on the process capacity.

Starvation and Blocking

Starvation occurs when a downstream activity is idle with no inputs to process because of upstream delays. *Blocking* occurs when an activity becomes idle because the next downstream activity is not ready to take it. Both starvation and blocking can be reduced by adding buffers that hold inventory between activities.

Process Improvement

Improvements in cost, quality, flexibility, and speed are commonly sought. The following lists some of the ways that processes can be improved.

- Reduce work-in-process inventory - reduces lead time.
- Add additional resources to increase capacity of the bottleneck. For example, an additional machine can be added in parallel to increase the capacity.
- Improve the efficiency of the bottleneck activity - increases process capacity.
- Move work away from bottleneck resources where possible - increases process capacity.

- Increase availability of bottleneck resources, for example, by adding an additional shift - increases process capacity.
- Minimize non-value adding activities - decreases cost, reduces lead time. Non-value adding activities include transport, rework, waiting, testing and inspecting, and support activities.
- Redesign the product for better manufacturability - can improve several or all process performance measures.
- Flexibility can be improved by outsourcing certain activities. Flexibility also can be enhanced by postponement, which shifts customizing activities to the end of the process.

In some cases, dramatic improvements can be made at minimal cost when the bottleneck activity is severely limiting the process capacity. On the other hand, in well-optimized processes, significant investment may be required to achieve a marginal operational improvement. Because of the large investment, the operational gain may not generate a sufficient rate of return. A cost-benefit analysis should be performed to determine if a process change is worth the investment. Ultimately, net present value will determine whether a process 'improvement' really is an improvement.

9.4.14 LINK ANALYSIS

Link analysis is a data analysis technique used in network theory that is used to evaluate the relationships or connections between network nodes. These relationships can be between various types of objects (nodes), including people, organizations and even transactions. Link analysis is essentially a kind of knowledge discovery that can be used to visualize data to allow for better analysis, especially in the context of links, whether Web links or relationship links between people or between different entities. Link analysis has been used for investigation of criminal activity (fraud detection, counterterrorism, and intelligence), computer security analysis, search engine optimization, market research and medical research.

Link analysis is literally about analyzing the links between objects, whether they are physical, digital or relational. This requires diligent data gathering. For example, in the case of a website where all of the links and backlinks that are present must be analyzed, a tool has to sift through all of the HTML codes and various scripts in the page and then follow all the links it finds in order to determine what sort of links are present and whether they are active or dead. This information can be very important for search engine optimization, as it allows the analyst to determine whether the search engine is actually able to find and index the website. In networking, link analysis may involve determining the integrity of the connection between each network node by analyzing the data that passes through the physical or virtual links. With the data, analysts can find bottlenecks and possible fault areas and are able to patch them up more quickly or even help with network optimization.

Link analysis has three primary purposes –

- Find matches for known patterns of interests between linked objects.
- Find anomalies by detecting violated known patterns.
- Find new patterns of interest (for example, in social networking and marketing and business intelligence).

9.4.15 TIME AND MOTION STUDY

Time and motion study, or motion and time study, is a basic set of tools used by industrial engineers to increase operational efficiency through work simplification and the setting of standards, usually in combination with a wage-incentive system designed to increase worker motivation. Originally

developed to drive productivity improvement in manufacturing plants, motion and time study is also now used in service industries. Motion and time study is associated with the so-called scientific management movement of the late nineteenth and early twentieth century's in the United States, primarily with the work of industrial engineers Frederick Winslow Taylor (1856–1915), Frank B. Gilbreth (1868– 1924), and Lillian Gilbreth (1878–1972). Some time studies had been conducted before Taylor, particularly by French engineer Jean Rodolphe Perronet (1708–1794) and English economist Charles Babbage (1791–1871), both analyzing pin manufacturing. However, modern motion and time study was developed as part of the scientific management movement championed by Taylor and eventually became known as Taylorism .

The foundation of Taylorism is a system of task management in which responsibilities are clearly divided between managers and workers. Managers and engineers engage in planning and task optimization, primarily through motion and time study, while workers are responsible for carrying out discrete tasks as directed. The Gilbreths sought to find the best method to perform an operation and reduce fatigue by studying body motions, attempting to eliminate unnecessary ones and simplify necessary ones to discover the optimal sequence of motions. The Gilbreths developed the technique of micromotion study, in which motions are filmed and then watched in slow motion. Taylor incorporated early research from the Gilbreths in his 'The Principles of Scientific Management' (1911), and subsequent industrial engineers further developed the Taylorist system. Taylorism played a key role in the continuous productivity improvement generated by the Fordist model of work organization. The Fordist model, which is based on the supply-driven, mass production of standardized goods using semiskilled workers, achieved efficiency improvements via scale economies and detailed division of labor, both accomplished through the Taylorist separation of conception from execution, in which managers plan tasks that workers execute. Taylor argued that such a division of labor between management and workers was a form of 'harmonious cooperation' that ultimately removed antagonisms from the workplace and benefited both managers and workers. However, this process of separating conception from execution is often understood as a form of de-skilling, and Taylorism has been rejected by unions, who have denounced it as a form of speedup that harms workers and hence quality and productivity.

Debates about the effect of motion and time study on workers continue today in discussions of post-Fordism, particularly lean production, which employs motion and time study to set standards and achieve continuous improvement in work processes, but in a context of demand-driven production without large buffers of in process inventory. Some workers and commentators argue that motion and time study under lean production is simply a form of work intensification that is detrimental to workers, while others argue that under lean production workers are able to contribute to problem solving and standard setting and thus prefer motion and time study under lean production to that under Fordism.

Underlying each system is a theory of worker motivation - that workers need to be coerced (in the Fordist model) or that workers want to do their best and are interested in more intellectual activity (in the post-Fordist model). In reality, there is more likely a distribution of different motivations across workers, and worker well-being is likely to depend more on the interaction between individual orientations toward work and how a given set of methods such as motion and time study are applied in a particular work context. Because it's the method that determines the time needed for any activity, the whole emphasis has changed over the years. The 21st century equivalent of the time and motion study is more literally a method and time study. This is a more far-reaching philosophy and approach to managing a business. When everyone is focused on better and leaner processes the

methods improve, time is reduced and more value is added. This - with continuous improvement - means activities become more streamlined and Lean. Lean means that anything wasteful is shown the bin (movement, time, materials, space). When improvements and Lean initiatives are identified and implemented, workers can often benefit from less stressful working conditions, less fatigue - potentially better rewards, maybe in the form of different hours, increased pay and job satisfaction. It can be a win-win situation.

Time and Motion Study Basics

In summary, it goes like this –

- Look closely at what you're doing.
- Spot opportunities to be more efficient.
- Make a change to the way you work to do it.
- See if it produces the expected results.
- Rinse and repeat.
- Small changes, big benefits - Small savings quickly mount up. At the same time, we spend a lot of time in our lives doing stuff that is not very useful.
- Pay attention - Pay attention to what you do and how you do it.
- Start by thinking, in broad terms, about how you spend your time over the course of a typical working week.
- Rescue Time, which tracks the applications and websites you use, may give you more objective data about how you spend your time. Simply writing things down may be enough.
- Spot opportunities for improvement - You already have data about the amount of time spent from your observations.
- Make a positive change.
- Evaluate results.

Productivity is often linked with 'time and motion'. The evidence of time and motion studies was used to put pressure on workers to perform faster. Not surprisingly these studies had a bad press as far as workers were concerned. Productivity is about the effective and efficient use of all resources. To manage the resources of a business it is essential that you –

- understand exactly what needs to be done to meet customer demand;
- establish a plan that clearly identifies the work to be carried out;
- define and implement the methodologies that need to be used to complete all activities and tasks efficiently;
- establish how long it will actually take to complete each activity and task;
- determine what resources you need to meet the plan;
- provide the necessary resources and initiate the plan;
- constantly monitor what is actually happening against the plan; and
- identify variances and take the relevant actions to correct them or modify the plan.

9.4.16 EXPERIMENTAL METHOD

The prime method of inquiry in science is the experiment. The key features are control over variables, careful measurement, and establishing cause and effect relationships. An experiment is an investigation in which a hypothesis is scientifically tested. In an experiment, an independent variable (the cause) is manipulated and the dependent variable (the effect) is measured; any extraneous variables are controlled. An advantage is that experiments should be objective. The views and opinions of the researcher should not affect the results of a study. This is good as it makes the data more valid, and less bias.

There are three types of experiments need to know –

1. Laboratory / Controlled Experiments: This type of experiment is conducted in a well-controlled environment – not necessarily a laboratory – and therefore accurate measurements are possible. The researcher decides where the experiment will take place, at what time, with which participants, in what circumstances and using a standardized procedure. Participants are randomly allocated to each independent variable group.
   Strength: It is easier to replicate (i.e. copy) a laboratory experiment. This is because a standardized procedure is used. They allow for precise control of extraneous and independent variables. This allows a cause and effect relationship to be established.
   Limitation: The artificiality of the setting may produce unnatural behavior that does not reflect real life, i.e. low ecological validity. This means it would not be possible to generalize the findings to a real life setting. Demand characteristics or experimenter effects may bias the results and become confounding variables.
2. Field Experiments: Field experiments are done in the everyday (i.e. real life) environment of the participants. The experimenter still manipulates the independent variable, but in a real-life setting (so cannot really control extraneous variables).
   Strength: Behavior in a field experiment is more likely to reflect real life because of its natural setting, i.e. higher ecological validity than a lab experiment. There is less likelihood of demand characteristics affecting the results, as participants may not know they are being studied. This occurs when the study is covert.
   Limitation: There is less control over extraneous variables that might bias the results. This makes it difficult for another researcher to replicate the study in exactly the same way.
3. Natural Experiments: Natural experiments are conducted in the everyday (i.e. real life) environment of the participants, but here the experimenter has no control over the IV as it occurs naturally in real life.
   Strength: Behavior in a natural experiment is more likely to reflect real life because of its natural setting, i.e. very high ecological validity. There is less likelihood of demand characteristics affecting the results, as participants may not know they are being studied. Can be used in situations in which it would be ethically unacceptable to manipulate the independent variable, e.g. researching stress.
   Limitation: They may be more expensive and time consuming than lab experiments. There is no control over extraneous variables that might bias the results. This makes it difficult for another researcher to replicate the study in exactly the same way.

Experiment Terminology

- Ecological validity: The degree to which an investigation represents real-life experiences.
- Experimenter effects: These are the ways that the experimenter can accidentally influence the participant through their appearance or behavior.
- Demand characteristics: The clues in an experiment that lead the participants to think they know what the researcher is looking for (e.g. experimenter's body language).
- Independent variable (IV): Variable the experimenter manipulates (i.e. changes) – assumed to have a direct effect on the dependent variable.
- Dependent variable (DV): Variable the experimenter measures.
- Extraneous variables (EV): Variables, which are not the independent variable, but could affect the results (DV) of the experiment. EVs should be controlled where possible.
- Confounding variables: Variable(s) that have affected the results (DV), apart from the IV. A confounding variable could be an extraneous variable that has not been controlled.

Research Biases

We have got a hypothesis which is the first step in doing an experiment. Before we can continue, we need to be aware of some aspects of research that can contaminate our results. In other words, what could get in the way of our results in this study being accurate. These aspects are called research biases, and there are basically three main biases we need to be concerned with.

- Selection Bias – occurs when differences between groups are present at the beginning of the experiment.
- Placebo Effect – involves the influencing of performance due to the subject's belief about the results. In other words, if I believe the new medication will help me feel better, I may feel better even if the new medication is only a sugar pill. This demonstrates the power of the mind to change a person's perceptions of reality.
- Experimenter Bias – the same way a person's belief's can influence his/her perception, so can the belief of the experimenter. If I'm doing an experiment, and really believe my treatment works, or I really want the treatment to work because it will mean big bucks for me, I might behave in a manner that will influence the subject.

Controlling for Biases

After carefully reviewing our study and determining what might effect our results that are not part of the experiment, we need to control for these biases. To control for selection bias, most experiments use what's called 'Random Assignment', which means assigning the subjects to each group based on chance rather than human decision. To control for the placebo effect, subjects are often not informed of the purpose of the experiment. This is called a 'Blind' study, because the subjects are blind to the expected results. To control for experimenter biases, we can utilize a 'Double-Blind' study, which means that both the experimenter and the subjects are blind to the purpose and anticipated results of the study. We have our hypothesis, and we know what our subject pool is, the next thing we have to do is standardize the experiment. Standardization refers to a specific set of instructions. The reason we want the experiment to be standardized is twofold. First, we want to make sure all subjects are given the same instructions, presented with the experiment in the same manner, and that all of the data is collected exactly the same or all subjects. Second, single experiments cannot typically stand on their own. To really show that are results are valid, experiments need to be replicated by other experimenters with different subjects. To do this, the experimenters need to know exactly what we did so they can replicate it.

9.4.17 STATISTICAL METHODS

Statistical methods are the methods of collecting, summarizing, analyzing, and interpreting variable(s) in numerical data. Statistical methods can be contrasted with deterministic methods, which are appropriate where observations are exactly reproducable or are assumed to be so. Data collection involves deciding what to observe in order to obtain information relevant to the questions whose answers are required, and then making the observations. Sampling involves choice of a sufficient number of observations representing an appropriate population. Experiments with variable outcomes should be conducted according to principles of experimental design. Data summarization is the calculation of appropriate statistics and the display of such information in the form of tables, graphs, or charts. Data may also be adjusted to make different samples more comparable, using ratios, compensating factors, etc.

Statistical analysis relates observed statistical data to theoretical models, such as probability distributions or models used in regression analysis. By estimating parameters in the proposed model and testing hypotheses about rival models, one can assess the value of the information collected and the extent to which the information can be applied to similar situations. Statistical prediction is the application of the model thought to be most appropriate, using the estimated values of the parameters. More recently, less formal methods of looking at data have been proposed, including exploratory data analysis.

9.5 METHODS OF SECONDARY DATA COLLECTION

Secondary data is the data that is collected from the primary sources which can be used in the current research study. Collecting secondary data often takes considerably less time than collecting primary data where you would have to gather every information from scratch. It is thus possible to gather more data this way.

Secondary data can be obtained from two different research strands –

- Quantitative: Census, housing, social security as well as electoral statistics and other related databases.
- Qualitative: Semi-structured and structured interviews, focus groups transcripts, field notes, observation records and other personal, research-related documents.

Secondary data is often readily available. After the expense of electronic media and internet the availability of secondary data has become much easier.

Published Printed Sources: There are varieties of published printed sources. Their credibility depends on many factors. For example, on the writer, publishing company and time and date when published. New sources are preferred and old sources should be avoided as new technology and researches bring new facts into light.

Books: Books are available today on any topic that you want to research. The use of books start before even you have selected the topic. After selection of topics books provide insight on how much work has already been done on the same topic and you can prepare your literature review. Books are secondary source but most authentic one in secondary sources.

Journals/periodicals: Journals and periodicals are becoming more important as far as data collection is concerned. The reason is that journals provide up-to-date information which at times books cannot and secondly, journals can give information on the very specific topic on which you are researching rather talking about more general topics.

Magazines/Newspapers: Magazines are also effective but not very reliable. Newspapers on the other hand are more reliable and in some cases the information can only be obtained from newspapers as in the case of some political studies.

Published Electronic Sources: As internet is becoming more advance, fast and reachable to the masses; it has been seen that much information that is not available in printed form is available on internet. In the past the credibility of internet was questionable but today it is not. The reason is that in the past journals and books were seldom published on internet but today almost every journal and book is available online. Some are free and for others you have to pay the price.

e-journals: e-journals are more commonly available than printed journals. Latest journals are difficult to retrieve without subscription but if your university has an e-library you can view any journal, print it and those that are not available you can make an order for them.

General Websites: Generally websites do not contain very reliable information so their content should be checked for the reliability before quoting from them.

Weblogs: Weblogs are also becoming common. They are actually diaries written by different people. These diaries are as reliable to use as personal written diaries.

Unpublished Personal Records: Some unpublished data may also be useful in some cases.
Diaries: Diaries are personal records and are rarely available but if you are conducting a descriptive research then they might be very useful. The Anne Frank's diary is the most famous example of this. That diary contained the most accurate records of Nazi wars.
Letters: Letters like diaries are also a rich source but should be checked for their reliability before using them.

Government Records: Government records are very important for marketing, management, humanities and social science research.

Census Data/population statistics: Health records; Educational institutes' records etc.

Public Sector Records: NGOs' survey data; Other private companies records.

9.6 METHODS OF LEGAL RESEARCH

In pursuing research for disclosing facts or proving a hypothesis true or false, various kinds of methods can be applied for the successful research. The following research methods collectively or individually can be applied for the successful research as the main methods.

Observation: Information can be received by observing, visiting and viewing the place, society, events or the things pertinent to the study or research. Observation can be taken as primary and reliable source of information. If a researcher is careful, s/he can get the points that may play the significant role in his/her research or study. Observation is a method that is common in the research of legal and social science. Observation should be guided by a specific research purpose, the information receive from the observation should be recorded and subjected to checks on the trail of reliability.

Questionnaire: In questionnaire method, a researcher develops a form containing such questions pertinent to his/her study. Generally, the researcher prepares yes/ no questions or short answer questions. In questionnaire method, researcher distributes such forms to the people to whom s/he deems appropriate. The people, to whom the questionnaires have been distributed, should answer that what they have known by filling out the form and return it to researcher.

Sampling: When the subject of research is vague, comprehensive and when each indicator cannot be taken by virtue of financial constraint, time and complexity, etc. then the researcher can randomly collect data/sample depending on the reason. This is called as sampling method. For instance, in a demographic research, part of population represent various groups can be taken into consideration. That is why, it is said that sample is a method that saves time and money.

Interviews: A researcher can receive information sought by him/her asking people concerned through interview. It is a direct method of receiving information. Interview can be generally held asking questions in face-to-face contact to the person or persons and sometimes through telephone conversation. This method is common in the research of legal and social science. In this method, the researcher has to use less skill and knowledge to receive information s/he had sought. Interview is known as an art of receiving pertinent information. Interview can be taken as a systematic method by which a person enters more or less imaginatively into the life of a stranger.

Case Study: Case study is taken as one of the important and reliable methods for legal research. Case study can be defined as a method of research where facts and grounds of each legal issue are dealt with by taking individual case. Case study is a method of exploring and analyzing of life of a social unit such as a person, a family, an institution, a cultural group or even entire community. Case study is a way of organizing social data so as to preserve the utility character of the social object being studied. Keeping in view to the matters as referred to in above, we can state here that the case study is a method of legal research to explore and analyze the fact and data of a social unit and to organize social data for prescription of useful character and society.

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