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BLOCK I: PROJECT PLANNING

UNIT 1: OBJECTIVES OF THE STUDY

Highlights of the Unit

- Objectives
- Introduction
- Proposed topics for inclusion
- Objectives of a research study

1.0 OBJECTIVES

The main objectives of this manual are:

- To furnish as a guideline to carry out research-based project work
- To facilitate learners in conducting step by step process for scientific project work

1.1 INTRODUCTION

The PGDAEM-Project work highlights guidelines for selection of project topics, setting objectives, preparation of schedules, questionnaires, conducting research surveys, structure interviews, etc. analysis and interpretation of data, process documentation, report writing etc.

1.2 OBJECTIVES OF A RESEARCH STUDY

1.2.1 How to frame objectives?

Research is defined as an investigation of a problem in which there is an attempt to find a solution to a particular problem. The outcome of research may lead either to find an appropriate solution or lead to an innovation that may have significance for many attributes. Hence, framing the right objectives in tune with the research problem assumes significance in getting the desired results. Framing of an appropriate objective will also help a researcher in judicious use of the resources and time while collecting the data for research and preparing a questionnaire or schedule. Framing objectives must address the research problem selected for the study and help in drawing meaningful conclusions at the end. Any deviation in framing the objectives will lead to distorted results and it will also lead to wastage of time and resources.

A research objective is a statement that indicates the direction to the clear, concise, and declarative statement that provides direction to investigate the variables. In general, the objectives of a research are framed to measure the variables, their relationship, and description of a research problem which eventually will lead to finding a solution.

1.3.2 Characteristics of objectives:

- A research objective is tangible statement what the study is trying to achieve by conducting particular research.
- The research objective is a direction to find a solution to the problems

- The research objective helps summarize the findings of the study
- The research objective is measurable and logical.

Framing of objectives can be divided into the following sections:

a. Research aims
b. Research objectives
c. Research questions
d. Research hypotheses

Table-1.1: Commonly used terms related to research aims

Research aim	A statement indicating the purpose of a research project. Usually, a research project will have only one broad aim
Research objectives	Specific statements indicating key issues to be focused in a research project. Usually, a research project will have several specific research objectives
Research questions	An alternative to research objectives, where key issues to be focused in a research project
Research hypotheses	A prediction of a relationship between two or more variables, usually the effect of an independent variable on a dependent variable. The independent variable is the variable assumed to have a causal influence on the outcome of interest, which is the dependent variable.

Source: David R Thomas and Ian Hodges "Developing Research Aims and Objectives", Sage Publications, 2010.

1.4 HOW TO FRAME RESEARCH OBJECTIVES

Objectives are framed based on the theme/problem of the research study. The theme of the study is converted into a series of statements elaborating it, which are called objectives. The intricacies of the research theme are explained in detail by framing multiple objectives. Issues like which project plan to investigate the direction in which research problem is addressed to draw meaningful conclusions and statements leading to suggestions/strategies/policy implications. Generally, three to four research objectives are framed. The objectives framed should follow chronology or a particular sequence with clarity in defining the right path in finding solutions for a particular research problem.

1.4.1 Framing quality Objectives: After finalizing the research theme, objectives should address the following issues-

- A small introductory note as to why you are selecting a particular problem for a research study such as the importance of the study, related statistics and a review of similar studies.
- Elaborate the approach for the study, who will be the stakeholders, expected outcome, etc. in achieving the desired results.

Once you have a logical and reasonable goal, you have to frame three to four objectives that would help in achieving the particular goal. This is an easy way to frame objectives that would provide a detailed strategy for accomplishing the desired results.

The following example of a set of research objectives may be followed:

Title of the research topic - "Marketing of Organic Produce – A case study of Sikkim"

For the above research topic, the following objectives may be framed

1. To study the status of organic farming in Sikkim
2. To analyze the economic performance of organic farming in terms of productivity, cost and returns, income, employment, and asset position.
3. To study the factors influencing the adoption of organic farming
4. To study the comparative economics of marketing the produce under organic and inorganic farming
5. To study the impact of organic farming concerning the quality of produce and price premium
6. To study the farmers' awareness regarding the certification process for marketing organic produce
7. To study the constraints in the adoption of organic farming

Unit 2: REVIEW OF LITERATURE

Highlights of the Unit

- Objectives
- Introduction
- Purpose of Review of Literature
- Steps in Writing a Review of Literature

2.0 OBJECTIVES

The objectives of this unit are:
1. To orient the learners about the conceptual understanding and significance of the review of the literature.
2. To guide the learners in searching and writing a review of the literature.

2.1 INTRODUCTION

A literature review is an abstract/summary or highlights of the past studies conducted by research scholars written on themes relevant to a research problem selected for the study. The goal and perspective of the review acts as a guide for conducting research. The researcher may have an agreement with the findings presented in the review or may contradict their findings not for any reason but to reveal that there are several methods or approaches to conduct research. A review will enhance the quality of research by enlightening the researcher about the situation such as analytical tools, kind of stakeholders covered for the study, scope for further study, etc. The literature review will throw light on kind of hypothesis or report structure that researcher is going to prepare.

2.2 PURPOSE OF REVIEW OF LITERATURE

Review of literature
- It is survey of studies relevant to research theme selected for the study.
- It helps researcher in understanding how the whole study has been summarized by covering important findings of the study from relevant and quality research studies.
- It triggers initiation of the study and it serves as a very crucial starting point as they summarize and compare the research in a specific theme area.
- It helps in applying new analytical tools relevant to the theme of the research topic selected for the study.
- It strengthens knowledge of researcher to acquire skills in conducting full-fledged study.
- It analyses information gathered by identifying gaps in similar studies conducted in the past and generates scope for further research in selected theme for the study.

2.3 STEPS IN WRITING A REVIEW OF LITERATURE

1. **Choose studies related to the research problem:** One can select a study or an article relevant to research topic, prepare an abstract without distorting the findings of study.
2. **Review the kinds of literature online**
   - Several sources for collecting research studies for review in the present day of ICT, The researcher may leverage several websites of uploaded information.
   - The use of appropriate keywords is very crucial to save time and energy.
   - The researcher can refer to references quoted at the end of the research articles which lead to find other studies relating to the research topics.
   - The researcher may also include contradicting studies for exploring further scope for research.
3. **Selection of appropriate studies or research articles closely related to the research theme**
   - Select articles with topics narrowly related to the research theme.
   - Focus your theme narrowly and search literature accordingly.
   - You may sub-divide the topic and search for the literature and review them under different headings.
   - Don't review too old literature and irrelevant ones.
   - Select an appropriate search engine for collecting the articles.

Unit 3: METHODOLOGY

Highlights of the Unit

- Objectives
- Introduction
- Description of the study area
- Sampling design

3.0 OBJECTIVES

The objectives of this unit are:

- To orient, the learners about the elements of the methodology followed in a research/project work.
- To guide the learners in a scientific and systematic practice of methodology followed during research work.

3.1 INTRODUCTION

The methodology for a study presents the description of the study area such as sampling design, nature and method of data collection, concept and analytical tools used presented under the following heads:

- Description of the study area
- The sampling design
- Nature and sources of data
- Analytical tools used
- Definition of terms and concepts used

3.2 DESCRIPTION OF THE STUDY AREA

In this section, the geographical characteristics of the selected area (State/ Districts/ Blocks) need to be elaborated covering climatic description such as longitude, latitude, temperature, rainfall, cropping pattern and source of irrigation, etc.

3.3 SAMPLING DESIGN

In this section, the procedure for sampling design should be explained in detail covering the criteria for selection of study area (State/ Districts/ Blocks), selection of stakeholders/beneficiaries and the method of sampling followed. The researcher may follow the sampling method depending on the research problem. Following are some of the sampling methods which may be used for a research study.

a. Simple Random Sampling
b. Stratified Random Sampling
c. Purposive Sampling

d. Cluster Sampling
e. Multi-stage Sampling
f. Systematic Sampling
g. Quota Sampling

3.3.1 Simple Random Sampling: A simple random sample is one in which each element of the population has an equal and independent chance of being included in the sample i.e. a sample selected by randomization method is known as a simple random sample and this technique is called simple random sampling.

Advantages:

- ❖ It requires minimum knowledge of the population.
- ❖ It is free from subjectivity and free from personal error.
- ❖ It provides appropriate data for our purpose.
- ❖ The observations of the sample can be used for the inferential purpose.

Disadvantages:

- ❖ The representativeness of a sample cannot be ensured by this method.
- ❖ This method does not use knowledge about the population.
- ❖ The inferential accuracy of the finding depends upon the size of the sample.

3.3.2 Stratified Sampling: It is an improvement over the earlier method. When employing this technique, a researcher divides his population into strata based on some characteristics and from each of these smaller homogeneous groups (strata) draws at random a predetermined number of units. A researcher should choose those characteristic or criterion which seems to be more relevant in his research work.

Stratified sampling may be of three types:

- ❖ Disproportionate stratified sampling.
- ❖ Proportionate stratified sampling.
- ❖ Optimum allocation stratified sampling

Advantages:

- ❖ It is more precisely, a good representative of the population.
- ❖ It is an improvement over the earlier method.
- ❖ It is an objective method of sampling.
- ❖ Observations can be used for the inferential purpose.

Disadvantages:

- ❖ A serious disadvantage of this method is that it is difficult for a researcher to decide the relevant criterion for stratification.
- ❖ Only one criterion can be used for stratification but generally, it seems more than one criterion relevant for stratification.
- ❖ It is a costly and time-consuming method.
- ❖ The selected sample may be represented regarding the used criterion but not for the other.
- ❖ There is a risk in generalization.

3.3.3 Purposive Sampling: The purposive sampling is selected by some arbitrary method because it is known to be representative of the total population or it is known that it will produce well-matched groups. The idea is to pick out the sample about some criterion, which is considered important for a particular study. This method is appropriate when the study places special emphasis upon the control of certain specific variables.

Advantages:

- Use of the best available knowledge concerning the sample subjects.
- Better control of significant variables.
- Sample group data can be easily matched.
- Homogeneity of subjects used in the sample.

Disadvantages:

- The reliability of the criterion is questionable.
- Knowledge of the population is essential.
- Errors in classifying sampling subjects.
- Inability to utilize inferential parametric statistics.
- Inability to make generalizations concerning total population.

3.3.4 Cluster Sampling: To select the intact group as a whole is known as Cluster sampling. In Cluster sampling, the sample units contain groups of elements (clusters) instead of individual members or items in the population. Rather than listing all elementary school children in a given city and randomly selecting 15 percent of these students for the sample, a researcher lists all of the elementary schools in the city selects at random 15 percent of these clusters of units and uses all of the children in the selected schools as the sample.

Advantages

- It may be a good representative of the population.
- It is an easy method.
- It is an economical method.
- It is practicable and highly applicable in education.
- Observations can be used for an inferential purpose.

Disadvantages

- Cluster sampling is not free from error.
- It is not comprehensive.

3.3.5 Multi-Stage Sampling: This sample is more comprehensive and representative of the population. In this type of sampling, primary sample units are inclusive groups and secondary units are sub-groups within these ultimate units to be selected which belong to one and only one group. Stages of the population are usually available within a group or population, whenever stratification is done by a researcher. The Individuals are selected from different stages for constituting the multi-stage sampling.

Advantages:
- It is a good representative population.
- Multi-stage sampling is an improvement over the earlier methods.
- It is an objective procedure of sampling.
- The observations from the multi-stage sample may be used for an inferential purpose.

Disadvantages:
- It is a difficult and complex method of sampling.
- It involves errors when we consider the primary and secondary stages.
- It is again a subjective phenomenon.

3.3.6 Systematic Sampling: Systematic sampling is an improvement over simple random sampling. It requires complete information about the population. There should be a list of information of all the individuals of the population in any systematic way. Now we decide the size of the sample.

Let sample size = n
and population size = N

Now we select each N/nth individual from the list and thus we have the desired size of sample which is known as a systematic sample. Thus for this technique of sampling, the population should be arranged in any systematic way.

Advantages:
- This is a simple method of selecting a sample.
- It reduces the field cost.
- Inferential statistics may be used.
- The sample may be comprehensive and representative of the population.
- Observations of the sample may be used for drawing conclusions and generalizations.

Disadvantages:
- This is not free from error, since there is subjectivity due to different ways of the systematic list by different individuals.
- Knowledge of the population is essential.
- Information about each individual is essential.
- This method can't ensure representativeness.
- There is a risk in concluding the observations of the sample.

3.3.7 Quota Sampling: This is a combination of judgment sampling and probability sampling. The population is classified into several categories: based on judgment or assumption or previous knowledge, the proportion of the population falling into each category is decided. Thereafter a quota of cases to be drawn is fixed and the observer is allowed to sample as he likes. Quota sampling is very arbitrary and likely to figure in Municipal surveys.

Advantages:
- It is an improvement over the judgment sampling.

- It is an easy sampling technique.
- It is most frequently used in social surveys.

Disadvantages:

- It is not a representative sample.
- It is not free from error.
- It influences regional geographical and social factors.

Research design is a plan by which research samples may be selected from a population and under which experimental treatments are administered and controlled so that their effect upon the sample may be measured. Therefore, a second step in the establishment of an experimental design is to select the treatments that will be used to control sources of learning change in the sample subjects.

UNIT 4: DATA COLLECTION METHODS

Highlights of the Unit

- Nature and sources of data
- Tools used for data collection

4.0 OBJECTIVES

- To understand the types of data
- To explore the sources of data
- To have a hands on experience of the tools of data collection

4.1. INTRODUCTION

For evaluating the objectives of the study, necessary field-level data (primary data) and data from published sources (secondary source) need to be collected.

4.1.1 Secondary data: A secondary source of data is the source from where information already available is collected and is readily available for reference. Such data are cheaper and more quickly obtainable than the primary data and may also be available when primary data cannot be obtained at all. In general, secondary data should be collected from the published materials such as Government publications, research journals, books, monographs, scientific research articles, annual reports, etc.

Advantages of Secondary data

1. It is economical, saves efforts and expenses.
2. It is time-saving.
3. It helps to make primary data collection more specific as with the help of secondary data. We can make out what are the gaps and deficiencies and what additional information needs to be collected.
4. It helps to improve an understanding of the problem.
5. It provides a basis for comparison for the data collected by the researcher.

Disadvantages of Secondary Data: Secondary data is something that rarely fits into the framework of making research factors. Reasons for its non-fitting are:

(i) **Unit of secondary data collection -** Suppose you want information on disposable income, but the data is available on gross income. The information may not be the same as we require.

(ii) Class boundaries may be different when units are the same.

Thus, before collecting secondary data from different sources, there is a need for evaluation of the available secondary data in terms of the following factors:

1. **Availability-** It has to be seen that the kind of data one needs is available or not. If it is not available then you have to go for primary data.
2. **Relevance-** It should meet the requirements of the problem. For this we have two criteria:

a. Units of measurement should be the same.
b. Concepts used must be the same and the currency of data should not be outdated.

3. **Accuracy -** To find how accurate the data is, the following points must be considered:
   a. Specification and methodology used;
   b. The margin of error;
   c. Dependability of the source.
4. **Sufficiency-** Adequate data should be available.

A researcher should select one of the methods mentioned above for collecting the data taking into consideration the nature of investigation, objective and scope of the inquiry, financial resources, available time and the desired degree of accuracy.

4.1.2 Primary data: Primary data is the set of information collected from the field surveyor from stakeholders/beneficiaries. Primary data can be collected either through experiments or through the survey. There are several ways of collecting appropriate data which differ considerably in the context of costs, time and other resources at the disposal of the researcher.

4.2 TOOLS USED FOR DATA COLLECTION

If a researcher has taken up a project, he has to consider both quantitative and qualitative parameters and needs to capture the data with the help of which he will have to draw the results for a logical conclusion. A researcher has to select from available tools, which provide data he seeks for testing the hypothesis. It may happen that the existing research tools do not suit the purpose in some situations, so he should modify or construct his tools. Tools may vary in complexity, interpretation, design and administration. Each tool is suitable for collection of a certain type of information. But in the case of a survey, primary data can be collected in any one or more of the following ways:

4.2.1 Questionnaires: Questionnaires are defined as "A questionnaire is a systematic compilation of questions that are submitted to a sampling of the population from which information is desired." It is a list of questions related to one topic. **Barr, Davis & Johnson** A questionnaire is a form prepared and distributed to obtain a response to certain questions. It is a device for securing answers to questions by using a form that the respondent will fill by himself. It is a systematic compilation of questions. It is an important instrument used to gather information from widely scattered sources. It is normally used where one cannot personally see all of the people from whom he desires response or where there is no particular reason to see them personally.

Characteristics of a Good Questionnaire:

1. It deals with significant topic seeking data that cannot be obtained from sources like books, reports and records.
2. Its significance is carefully stated on the questionnaire itself or its covering letter.
4. It is as short as possible, only long enough to get the essential data.

5. It is attractive, objective with no clues, hints or suggestions well-arranged, duplicated or printed.
6. Directions are clear and complete, important terms are clarified.
8. Questions are presented in order from simple to complex.
9. Avoid double negatives, adverbs, double-barreled questions or descriptive adjectives.
11. The questions should carry an adequate number of alternatives to easily tabulate summarize and interpret.

Merits of Questionnaire Method:

1. It is very economical.
2. It is a time-saving process.
3. It covers research on wide areas suitable for a special type of response.
5. It is the most reliable in special cases.

Demerits of Questionnaire Method:

1. It can get only limited responses.
2. Lack of personal contact.
3. The greater possibility of wrong answers useless in many problems..
4. Chances of receiving an incomplete response are high.
5. Sometimes answers may be illegible.

Guidelines for designing a questionnaire

The first and foremost aspects to be considered while preparing a questionnaire are:

1) A good questionnaire should not be too lengthy.
2) Simple language should be used and the question shouldn't be difficult to answer.
3) A good questionnaire requires sensible language, editing, assessment and redrafting.
4) **Identify the information required-** This will depend upon the nature of the problem, the purpose of the study and the hypothesis framed. The target audience must be focused.
5) **Identify the kind of interviewing technique-** interviewing can be done through telephone, mails, personal interview or electronic interview.
6) **Decide the matter /content of individual questions-** Trough observation, verify with objectives, scope for cross checking, collect authentic information.
7) **Overcome the respondents' inability and unwillingness to answer-** The respondents may be unable to answer the questions because of the following reasons-
   a.The respondent may not be fully informed.
   b. The respondent may not remember or unable to express or articulate.
   A respondent may be unwilling to answer due to the following reasons-
   c. There may be sensitive information that may cause embarrassment or harm the respondent's image.
   d. The respondent may not be familiar with the genuine purpose.
   e. The question may appear to be irrelevant to the respondent.

f. The respondent will not be willing to reveal traits like aggressiveness (for instance - if he is asked "Do you hit your wife, sister", etc.)

To overcome the respondent's unwillingness to answer:

- Place sensitive topics at the end of the questionnaire.
- Preface the question with a statement.
- Use the third person technique (e.g. – Farmer X used excessive pesticide to increase food productivity. It harms health. Is farmer X right in his approach? Different people will have different opinions depending upon the situation)
- Categorize the responses rather than asking a specific response figure (e.g. – category for income levels 0-25000, 25000-50000, 50000, and above)

8) **Decide on the structure of the question-** Questions can be of two types:

   (i) Structured questions- These specify the set of response alternatives and the response format. These can be classified into multiple-choice questions (having various response categories), dichotomous questions (having only 2 response categories such as "Yes" or "No"), and scales.

   (ii) Unstructured questions- These are also known as an open-ended questions. No alternatives are suggested and the respondents are free to answer these questions in any way they like.

9) **Determine the question language/ phrasing-** If the questions are poorly worded, then either the respondents will refuse to answer the question or they may give incorrect answers. Thus, the words of the question should be carefully chosen. Ordinary and unambiguous words should be used. Avoid implicit assumptions, generalizations and implicit alternatives. Avoid biased questions. Define the issue in terms of whom the questionnaire is being addressed to, what information is required, when is the information required, why the question is being asked, etc.

10) **Properly arrange the questions-** To determine the order of the question, take decisions on aspects like opening questions (simple, interesting questions should be used as opening questions to gain co-operation and confidence of the respondents), type of information (basic information relates to the research issue, classification information relates to social and demographic characteristics and identification information relates to personal information such as name, address, contact number of respondents), difficult questions (complex, embarrassing, dull and sensitive questions could be difficult), effect on subsequent questions, logical sequence, etc.

11) **Recognize the form and layout of the questionnaire-** This is very essential for a self-administered questionnaire. The questions should be numbered and pre-coded. The layout should be such that it appears to be simple, orderly, and not clattered.

12) **Reproduce the questionnaire-** Paper quality should be good. The questionnaire should appear to be professional. The required space for answers to the question should be sufficient. The font type and size should be appropriate. Vertical response questions should be used, for example: Are you a member of the FPO?

g. Yes
h. No

13) **Pre-test the questionnaire:** The questionnaire should be pre-tested on a small number of respondents to identify the likely problems and to eliminate them. Every dimension of the questionnaire should be pre-tested. The sample respondents should be similar to the target respondents of the survey.
14) **Finalize the questionnaire-** Check the final draft questionnaire. Ask yourself how much will the information obtained from each question contribute to the study. Make sure that irrelevant questions are not asked. Obtain feedback from the respondents on the questionnaire.

4.2.2 Interview Method: The interview is a two-way method that permits an exchange of ideas and information. "Interviewing is fundamentally a process of social interaction."

- **W. J. Goode & P.K. Hatt**.

"Interview may be regarded as a systematic method by which a person enters more or less imaginatively into the inner life of a comparative stranger". - **P.V. Young**

In an interview, a rapport is established between an interviewer and the interviewee. Not only is the physical distance between them annihilated, the social and cultural barrier is also removed and a free mutual flow of ideas to and fro takes place. Both create their respective impression upon each other.

The interview brings them both on the same level and an emotional attachment supervenes between them. In an interview, all the formalities are laid down and the gate is opened for delivering into the intellectuals, emotional, and sub-conscious stirrings of the interviewee. Thus here the 'depth' of the subject (man) is gone to the very bottom of his emotional pool and may check his truthfulness of responses.

Characteristics of an Interview Method

1. An interviewer can probe into causal factors determine attitudes and discover the origin of a problem.
2. It is appropriate to deal with young children and illiterate persons.
3. It makes cross-questioning possible to deal with delicate, confidential and even intimate topics.
4. It helps an investigator to gain an impression of the person concerned.
5. It has flexibility.
7. Sincerity, frankness, truthfulness and insight of the interviewee can be better judged through cross-questioning.
8. It gives no chance to the respondents to modify their earlier answers.
9. It is not only applicable in survey methods, but also historical, experimental, case studies and clinical studies.

Merits of Interview:

1. It is a kind of direct research.

2. One can carry out the deep research.
3. Knowledge of the past and future will be known through this method.
4. Knowledge of special features can be acquired by a researcher.
5. Mutual encouragement is possible among the researcher and the stakeholders.
6. Knowledge of historical and emotional causes.
8. Examination of known data is possible through this method.

Demerits of Interview:

1. May provide misleading information.
2. Defects due to interviewee (low level of intelligence or maybe emotionally unbalanced).
3. Result may be affected due to prejudice and biases of an interviewer.
4. Result may be affected due to the difference in the mental outlook of an interviewee and an interviewer.
5. An interviewer may give misleading information.
6. Mob behavior may have an impact on the response of the stakeholders.

4.2.3 Schedule: When a researcher is using a set of questionnaires for interview purposes it is known as schedule. "Schedule is the name usually applied to set of questions, which are asked and filled by an interviewer in a face to face situation with another."

- **W.J. Goode & P. K. Hatt.**

By a schedule, we cannot, however, obtain information about many things at once. It is best suited to the study of a single item thoroughly.

According to **Thomas Carson Macormie**, "A schedule is nothing more than a list of questions, which it seems necessary to test the hypothesis."

Thus schedule is a list of questions formulated and presented with a specific purpose of testing an assumption or hypothesis. In the schedule method, the interview occupies a central place and plays a vital role. Success in the use of a schedule is largely determined by the ability and tact of the interviewer rather than by the quality of the questions posed. Because an interviewer poses the questions and notes down the answers all by himself, the quality of questions has not any great significance.

Characteristics of a Schedule

1. A schedule is presented by an interviewer. The questions are asked and the answers are noted down by him.
2. The list of questions is a mere formal document and need not be attractive.
3. A schedule can be used in a very narrow sphere of social research.
4. It aids to delimit the scope of the study and concentrate on the circumscribed elements essential to the analysis.
5. It aims at delimiting the subject.
6. In a schedule, the list of questions is pre-planned and noted down formally; the interviewer is always armed with the formal document detailing the questions. Hence, an interviewer need not depend upon the memory.

Points to be kept in mind while designing a schedule:

1. Interviewer should not frame long, complex, defective questions.
2. Unrelated and unnecessary questions should not be asked.
3. Schedule should not contain personal and upsetting questions.
4. The questions should be simple, clear and relevant to the topic.
5. Questions should be suitable to the respondent's intelligence level.
6. Impersonal, indirect and unambiguous questions should be included in the schedule.

Merits of a Schedule:

1. Higher percentage of response.
2. Possible to observe personality factors.
3. Through the interview, personal contact is possible.
4. It is possible to give a human touch to a schedule.
5. Clearing doubts is possible because of the face-to-face interaction.
6. It is possible to know about the defects of the interviewee.

4.2.4. Observation Technique: This is the most commonly used technique of evaluation research. It is used for evaluating the cognitive and non-cognitive aspects of a person. It is used in the evaluation of performance, interest, attitude, values towards their life problems and situations. It is the most useful technique for evaluating the behaviors of children. It is a technique of evaluation in which behaviors are observed in natural situations. "It is a thorough study based on visual observation. Under this technique, group behaviors and social institutions' problems are evaluated". **C. Y. Young**

The cause-effect relationship and study of events in their original form are known as observation. Observation seeks to ascertain what people think and do by watching them in action as they express themselves in various situations and activities. Observation is recognized as the most direct means of studying people when one is interested in their overt behavior. In questionnaires and interviews people may write the answer as they think, they do, but this is often different from what they do. These restrictions are missing in observation, so observation is a more natural way of gathering data. The artificiality and formality of questionnaires and interviews are replaced by reality and informality in observation. Data obtained through observation are more real and true than the data collected by any other method. It also forms an important part of the survey procedure.

Characteristics of Observation technique

According to **Jahoda,** it has many characteristics;

1. It serves as a formulated research purpose.
2. It is planned systematically rather than occurring haphazardly.
3. It is systematically recorded and related to a more general proposition.
4. It is subjected to checks and controls concerning validity, reliability, and precision.
5. It is a direct technique to study an object, an event, or a problem.
6. It is based mainly on visual –audio scene.
7. It employs own experiences.
8. It establishes a cause-effect relationship.

9. It is an objective technique of data collection.
10. It is both an objective and a subjective evaluation technique.
11. It is a formal as well as informal technique.
12. It is a quantitative as well as qualitative technique for data collection.

Merits of Observation technique:

1. It is a reliable and valid technique for collecting data and information.
2. It gives first-hand data through this method.
3. Record of observation is also available immediately.
4. It is a simple, broad, and comprehensive method.
5. It is the oldest technique of data collection and getting direct information.

Demerits of Observation technique:

1. It has limited scope for its use because all the events cannot be observed directly.
2. It is a subjective method.
3. It is a very time-consuming process.
4. Costly hence, energy-consuming also.
5. Presence of an observer influences behavior of the person i.e. subject becomes conscious.
6. In the case of covert behavior, which cannot be observed, it is not useful.
7. Observers should be trained and experienced.

4.2.5 Rating Scale: Rating is a term applied to express opinion or judgment regarding some situation, object, or character. Opinions are usually expressed on a scale of values; rating techniques are devices by which such judgments may be quantified. "Rating is an essence and direct observation." - **Ruth Strong**

"A rating scale ascertains the degree, intensity and frequency of a variable." - **Von Dallen**

Rating techniques are more commonly used in scaling traits and attributes. A rating method is a technique by which one systematizes the expression of opinion concerning a trait. The rating is done by parents, teachers, a board of interviewers, judges, and even by self as well. A special feature of the rating scale is that attitudes are not evaluated based on the opinion of the subjects but the basis of opinion and judgment of the experimenter himself. In rating, scale data are collected by; Verbal behavior, facial expression, personal documents, clinical type interview, projective techniques, and immediate experience as emotions, thoughts, and perceptions.

Merits of Rating Scale:

1. Writing reports to parents.
2. Filling out admission blanks for colleges.
3. Finding out students' needs.
4. Making recommendations to employers.
5. Supplementing other sources of undertaking about the child.
6. Stimulating effect upon the rates.

Demerits of Rating Scale:

1. Difference in rating abilities.
2. Difference in reliability as subjects for rating.
3. Agreement among raters of one type of contact only.
4. Average superior to single.
5. Impact of emotions.
6. Limits of self-rating.
7. Over rating.
8. Limits of rating of specific qualities.
9. Limits of justifications.

4.2.6 Case Study: The case study method is progressively popular among researchers (Thomas, 2011; Hyatt, Kenny & Dickson-Swift, 2014). It is typically seen in social and life sciences. A case study can be defined as an intensive study about a person, a group of people or a unit, which is aimed to generalize over several units'. A case study has also been described as an intensive, systematic investigation of an individual, group, community or some other unit in which the researcher examines in-depth data relating to several variables. Case studies portray real-life situations involving decision-making by participants on either a set of questions or through an open-ended discussion in the classroom. The case study approach is a great tool in stimulating learning in training programs.

Steps were undertaken while using a case study approach

- This method of research allows a researcher to undertake a complex and broad topic or phenomenon and narrow it down into a manageable research question(s).
- By collecting qualitative or quantitative data sets about the phenomenon, a researcher gains more in-depth insight into the phenomenon than would be obtained using only one type of data.
- Often there are several similar cases to consider, such as an educational or social service program that is delivered from several locations. Although similar, they are complex and have unique features. In these circumstances, evaluation of several, similar cases will provide a better answer to a research question than if only one case is examined, hence the multiple-case study.
- Stake asserts that the cases are grouped and viewed as one entity, called the quintain. 'We study what is similar and different about the cases to understand the quintain better'.

Merits of Case Study:

- The most important advantage of using a case study is that it simplifies complex concepts.
- Case studies expose to real-life situations which otherwise is difficult.
- It truly helps in adding the participants to real-life situations through discussions on the concrete subject.

- It improves analytical thinking, communication, developing a tolerance for different views on the same subject, ability to defend one's point of view with logic and enhances teamwork of the participants making them efficient over time.
- To study a specific phenomenon for a more in-depth understanding of the case as a unit through comparison of similarities and differences of the individual cases embedded within the quintain.
- The many solutions that come out of the case act as a ready reference when participants face similar problems at the workplace.
- Evidence arising from multiple-case studies is often stronger and more reliable than from single-case research.
- Multiple-case studies allow for a more comprehensive exploration of research questions and theory development.

Demerits of Case Study:

- The sheer volume of data is difficult to organize, data analysis and integration strategies.
- There is also sometimes a temptation to veer away from the research focus.
- It might be difficult to find an appropriate case study to suit all the subjects.
- Case studies contain the study of observations and perceptions of one person. There are chances that the person presenting the case study may completely present it in one manner missing out on other aspects completely.
- Managing time is a criterion in a training program. Case studies generally consume more time as compared to other instruments. For shorter duration programs case studies may not be the best option.
- Since there is no single right answer, the problem arises invalidation of the solutions because there is more than one way to look at things.
- It is best suited to advance training programs when compared to basic level training programs and a certain level of maturity of participants is required as they have to participate in the case discussion.

BLOCK II: EXECUTION OF THE PROJECT

UNIT 1: ANALYSIS AND INTERPRETATION OF THE DATA

Highlights of the Unit

- Objectives
- Introduction
- Data collection
- Processing and analysis of data
- Interpretation of the results/ findings

1.0 OBJECTIVES

The main objectives of this unit are:

1. To enlighten learners basic components of execution of research/project work.
2. To facilitate learners in systematic and step by step execution of the research project.

1.1 INTRODUCTION

During data collection, the execution of the project is an important step in research work. If the execution of the project goes well, the data to be collected would be adequate and dependable. A researcher should, therefore, ensure that the project is executed in a systematic manner and on time.

1.2 DATA COLLECTION

If the survey is to be conducted through structured questionnaires, data can be readily processed. In such a situation, questions, as well as the possible answers, may be coded. If the data is to be collected through interview, arrangements should be made for proper selection and training of the interviewer/s. The training may be given with the help of an instruction manual that clearly explains the job of an interviewer at each step. Occasional field checks should be made to ensure that the interviewers are doing their assigned job sincerely and efficiently. A careful watch should be kept for unanticipated factors to keep the survey as much realistic as possible. This, in other words means that steps should be taken to ensure that the survey is under statistical control so that the collected information is under the pre-defined standards of accuracy. If some of the respondents do not cooperate, suitable methods should be designed to tackle the problem. One method of dealing with the non-response problem is to make a list of the non-responsive respondents and take a small sub-sample of them and then with the help of experts, vigorous efforts can be made for securing response.

1.3 PROCESSING AND ANALYSIS OF DATA

- After the data have been collected, it has to be analyzed statistically.
- The analysis of data requires several closely related operations such as the

establishment of categories, application of these categories to raw data through coding, tabulation and then drawing statistical inferences.

- The unwieldy data should necessarily be condensed into a few manageable groups and tables for further analysis.
- Thus a researcher should classify the raw data into some purposeful and usable categories. Coding operation is usually done at this stage through which the categories of data are transformed into symbols that may be tabulated and counted.
- Editing is the procedure that improves the quality of the data for coding. With coding, the stage is ready for tabulation.

1.3.1 Editing: Editing of data is a process of examining the collected raw data (especially in surveys) to detect errors and for omissions or to correct these when possible. Editing involves scrutiny of the completed questionnaires and/or schedules. Editing is done to assure that the data are accurate, consistent with other facts gathered, uniformly entered, as complete as possible and have been well arranged to facilitate coding and tabulation.

Editing can be done at two stages i.e. field editing and central editing. Field editing means a review of the filled-up questionnaires by the investigator for completing (translating or rewriting) what the latter has written in abbreviated and/or illegible form at the time of recording the respondents' responses. This type of editing is necessary for a view of the fact that individual writing styles can often be difficult for others to decipher. This sort of editing should be done as soon as possible after the interview preferably on the same or the next day. While doing field editing an investigator must refrain from correcting errors of omission by simply guessing what the informant would have said if the question had been asked.

Central editing should take place when all the forms or schedules have been completed. This type of editing implies that all forms should get thorough editing by a single editor in a small study and by a team of editors in case of a large inquiry. Editor(s) may correct the obvious errors such as an entry in the wrong place, entry recorded in months when it should have been recorded in weeks and the like. In case of inappropriate or missing replies, an editor can sometimes determine the proper answer by reviewing other information in the schedule. At times, the respondent can be contacted for clarification. The editor must strike out the answer if the same is inappropriate and has no basis for determining the correct answer or the response. In such a case, an editing entry of 'no answer is called for. All the wrong replies, which are quite obvious must be dropped from the final results, especially in the context of mail surveys.

Editors must keep in view several points while editing the information of the questionnaire or schedule: (a) he should be familiar with the instructions given to the interviewers and coders, as well as with the editing instructions provided to them for the purpose. (b) While crossing out an original entry for one or the other reason, he should just draw a single line on it so that the same may remain legible. (c) He should make entries (if any) on the form in some distinctive color and that too in a standardized form. (d) They should initial all answers which they change or supply. (e) Editor's initials and the date of editing should be placed on each completed form or schedule.

1.3.2 Coding: Coding refers to the process of assigning numerals or other symbols to answers so that responses can be put into a limited number of categories or classes. Such classes should be appropriate to the research problem under consideration. They must also possess the characteristic of exhaustiveness (i.e. there must be a class for every data item) and also that of mutually exclusive, which means that a specific answer can be placed in one and only one cell in a given category set. Another rule to be observed is that of unidimensionality, which means that every class is defined in terms of only one concept.

Coding is necessary for efficient analysis and through it, several replies may be reduced to a small number of classes that contain critical information required for analysis. Coding decisions should usually be taken at the stage of designing the questionnaire. This makes it possible to pre-code the questionnaire, which in turn, is helpful for computer tabulation of the data from the original questionnaires. But in the case of manual coding, some standard methods may be used. One such standard method is to code along the margin with a colored pencil. The other method can be to transcribe the data from the questionnaire to a coding sheet. Whichever method is followed, one should see that the coding errors are altogether eliminated or reduced to the minimum level.

1.3.3 Tabulation: Tabulation is a part of the technical procedure wherein the classified data are put in the form of tables. The mechanical devices can be made use of at this juncture. A great deal of data, especially in large inquiries is tabulated by computers. Computers not only save time but also make it possible to study a large number of variables affecting a problem simultaneously. When a mass of data has been pooled, it becomes necessary for a researcher to arrange the same in some kind of concise and logical order. This procedure is referred to as tabulation. Thus tabulation is the process of summarizing raw data and displaying the same in compact form (i.e. in the form of statistical tables) for further analysis. In a broader sense, tabulation is an orderly arrangement of data in columns and rows. Tabulation is essential because of the following reasons:

1. It conserves space and reduces explanatory and descriptive statements to a minimum.
2. It facilitates the process of comparison.
3. It facilitates the summation of items and the detection of errors and omissions.
4. It provides a basis for various statistical computations.

Tabulation can be done manually, mechanically or through electronic devices. The choice depends on the size and type of study, cost considerations, availability of time, and tabulating machines/computers. Manual tabulation is usually preferred in case of small inquiries where the number of questionnaires is small and they are of relatively short length.

Tabulation may also be classified as simple and complex tabulation. The former type of tabulation gives information about one or more groups of independent questions, whereas the latter type of tabulation shows the division of data in two or more categories and as such is designed to give information concerning one or more sets of inter-related questions. Simple tabulation generally results in one-way tables which furnish answers to questions about a single characteristic of the data only. Whereas, complex tabulation usually results in two-way tables (which give information about two inter-related characteristics of data), three-way tables (giving information about three inter-related characteristics of data) or still higher-order tables also known as manifold tables which provide information about several inter-related characteristics of data. Two-way tables, three-way tables or manifold tables are all examples of what is sometimes described as cross-tabulation.

General accepted principles of tabulation specifically for constructing statistical tables

1. Each table should have a clear, concise and adequate title to make the table intelligible without reference to the text and this title should always be placed just above the body of the table.
2. Each table should be given a distinct number to facilitate easy reference.
3. The column headings (captions) and the row headings (stubs) of the table should be clear and brief.
4. The units of measurement under each heading or sub-heading must always be indicated.
5. Explanatory footnotes, if any concerning the table should be placed directly beneath the table along with the reference symbols used in the table.
6. Source/s from where the data in the table have been obtained must be indicated just below the table.
7. Usually, the columns are separated from one another by lines which makes the table more readable and attractive. Lines are always drawn at the top and bottom of the table and below the captions.
8. There should be thick lines to separate the data of one class from those in another class and the lines separating the sub-divisions of the classes should be comparatively thin.
9. The columns may be numbered to facilitate reference.
10. Those columns whose data are to be compared should be kept side by side. Similarly, percentages and/or averages must also be kept close to the data.
11. It is generally considered better to approximate figures before tabulation as the same would reduce unnecessary details in the table itself.
12. To emphasize the relative significance of certain categories, different kinds of type, spacing, and indentations may be used.
13. All column figures must be properly aligned. Decimal points and (+) or (–) signs should be in perfect alignment.
14. Abbreviations should be avoided to the extent possible and ditto marks should not be used in the table.
15. Miscellaneous and exceptional items, if any should usually be placed in the last row of

the table.

16. The table should be made as logical, clear, accurate and simple as possible. If the data happens to be very large, they should not be crowded in a single table, for that would make the table unwieldy and inconvenient.
17. Summation of rows should normally be placed in the extreme right column and that of columns should be placed at the bottom.
18. The arrangement of the categories in a table may be chronological, geographical, alphabetical or according to the magnitude to facilitate comparison. Above all, tables must suit the needs and requirements of an investigation.

1.3.4 Analysis of the Data: The analysis is generally carried out after tabulation based on the computation of various percentages, coefficients etc., by applying various well-defined statistical formulae. In the process of analysis, relationships or differences supporting or conflicting with original or new hypotheses should be subjected to tests of significance to determine with what validity data can be said to indicate any conclusion(s). For instance, if there are two samples of weekly wages, each sample being drawn from different locations of the same city giving two different mean values, then the problem may be whether the two mean values are significantly different or the difference is just a matter of chance. Through the use of statistical tests, we can establish whether such a difference is a real one or is the result of random fluctuations. If the difference happens to be real, the inference will be that the two samples come from different universes and if the difference is due to chance, the conclusion would be that the two samples belong to the same universe. Similarly, the technique of analysis of variance can help us in analyzing whether three or more varieties of seeds grown in certain fields yield significantly different results or not. In brief, a researcher can analyze the collected data with the help of various statistical measures.

1.3.5 Hypothesis Testing: After analyzing the data as stated above, the researcher is in a position to test the hypotheses, if any, he had formulated earlier. Do the facts support the hypotheses or they happen to be contrary? This is the usual question thatshould be answered while testing hypotheses. Various tests such as the Chi-square test, t-test, F-test, have been developed by statisticians for this purpose. The hypotheses may be tested through the use of one or more of such tests, depending upon the nature and objective of the research inquiry. Hypothesis-testing will result in either accepting the hypothesis or in rejecting it. If a researcher had no hypotheses to start with, generalizations established based on data may be stated as hypotheses to be tested by subsequent researchers in times to come.

1.4 INTERPRETATION OF THE RESULTS/ FINDINGS

After collecting and analyzing the data, a researcher has to draw inferences followed by report writing. This has to be done very carefully. Otherwise misleading conclusions may be drawn and the whole purpose of doing research may get violated. It is only through interpretation that the researcher can expose relations and processes that underlie his findings. In the case of hypotheses testing studies, if hypotheses are tested and upheld several times, a researcher may arrive at generalizations. But in case the researcher had no hypothesis to start with, he would try to explain his findings based on some theory. This may at times result in new questions leading to further researches. All this analytical information and consequential inference(s) may well be communicated, preferably through research report, to the consumers of research results who may be either an individual or a group of individuals, or some public/private organization. The process of interpretation may quite often trigger off new questions, which in turn, may lead to further researches.

UNIT 2: PREPARATION OF THE PROJECT REPORT

Highlights of the Unit

- Introduction
- Preparation of the final outline
- Precautions in Writing Research Reports
- References

2.0 OBJECTIVES

- To familiarize the learner about the preparation of the outline of a project report
- To clarify the precautions in writing research reports

2.1 INTRODUCTION

Finally, a researcher has to prepare a report of what has been done by him. Research reports are the product of slow, painstaking, accurate inductive work. The general steps followed in writing a report are (a) logical analysis of the subject matter (b) preparation of the final outline (c) preparation of the rough draft; (d) rewriting and refining (c) preparation of the final bibliography and (f) writing the final draft. Though all these steps are self-explanatory, yet a brief mention of each one of these will be appropriate for better understanding.

2.1.1 Logical analysis of the subject matter: It is the first step which is primarily concerned with the development of the subject. There are two ways to develop a subject - Logically and Chronologically.

Logical development is made based on mental connections and associations between samples with another using analysis. Logical treatment often consists of developing the material from the simplest possible to the most complex structures.

Chronological development is based on a connection or sequence in time of occurrence. The directions for doing or making something usually follow a chronological order.

2.2 PREPARATION OF THE FINAL OUTLINE

It is the next step in writing a research report. "Outlines are the framework upon which detailed written works are constructed. They are an aid to the logical organization of the material and a reminder of the points to be stressed in the report." The layout of the report should be as follows: (i) Preliminary pages (ii) Main text, and (iii) End matter.

(i) **Preliminary pages -** In its preliminary pages, a report should carry title and date followed by acknowledgment, foreword, table of contents, list of tables, graphs and charts, abbreviations if any given in the report.

(ii) **Main text:** The main text of the report should have the following parts:

a) **Introduction:** It should contain a clear statement of the objectives of the research and an explanation of the methodology adopted in accomplishing the research. The scope of the study along with various limitations should as well be stated in this part.

b) **Summary of findings:** After the introduction, there would appear a statement of findings and recommendations in non-technical language. If the findings are extensive, they should be summarized.

c) **Main report:** The main body of the report should be presented in a logical sequence and segregated into readily identifiable sections.

d) **Conclusion:** Towards the end of the main text, the researcher should again put down the results of his research clearly and precisely. It is the final summing up.

(iii) **End report:** Appendices should be enlisted in respect of all the technical data. Bibliography i.e., list of books, journals, reports, etc. consulted should also be given at the end. Indices should also be given especially in a published research report.

2.3 PREPARATION OF THE DRAFT:

This follows a logical analysis of the subject and preparation of the final outline. This step is of utmost importance for a researcher. He writes down the work done in the context of the research study, the procedures followed by him in collecting the material for his study, limitations faced by him, the techniques of analysis followed, the broad findings, generalizations and some suggestions he wishes to state regarding the concerned research problem.

Rewriting and refining the final draft: This step happens to be the most difficult part of all formal writings. Usually, this step requires more time than writing the rough draft. Careful revision makes a difference between mediocre and a good piece of writing. During rewriting and refining, one should check the report for weaknesses in logical development or presentation. A researcher should also “see whether or not the material, as it is presented, has unity and cohesion; does the report stand upright, firm and exhibits a definite pattern?” In addition, a researcher should give due attention to the fact that whether the rough draft had been consistent or not.

2.4 PRECAUTIONS IN WRITING RESEARCH REPORTS

A research report is a channel for communicating research findings to the readers of the report efficiently and effectively keeping in view the following precautions:

1. The length of the report is determined long enough to cover the subject, short enough to maintain interest as a means to learning more and more about less and less.
2. A research report can be avoided, if is dull; but sustain a reader’s interest.
3. Abstract terminology and technical jargon should be avoided in a research report.
4. The report should convey as simply as possible written in an objective style in simple

language, avoiding expressions such as "it seems”, "there may be" and the like.

5. A report should provide readily available findings of the data to readers to acquire quick knowledge of main findings with charts, graphs, and statistical tables in addition to summary of important findings.
6. A report layout should be well thought appropriate to follow objectives of research problem.
7. A report should be prepared strictly free from grammatical mistakes following the techniques of composition of report-writing with use of quotations, footnotes, documentation, proper punctuation and use of abbreviations etc.
8. A report should present logical analysis of subject matter reflecting structure wherein different pieces of analysis relating to research problem fit well.
9. A research report should show originality with an attempt to solve some intellectual problem and to add to the store of knowledge.
10. The concluding part of the report should state policy implications relating to the problem under consideration for a desirable forecast of the probable future of the subject concerned indicating the kind of research in that particular field.
11. Appendices should be enlisted in respect to all the technical data in the report.
12. A bibliography of sources consulted is a must for a good report.
13. The index considered as an essential part of good report must be prepared and appended at the end.
14. A report should be attractive, neat and clean, whether typed or printed.
15. Calculated confidence limits and constraints experienced in conducting research study may also be stated in the report.
16. Objectives of the study, nature of the problem, the methods to be employed and the analysis techniques should be clearly stated at the beginning of the report.
17. The report should be written in a concise and objective style in simple language, avoiding vague expressions such as 'it seems,' 'there may be and alike.
18. Charts and illustrations should be used only if they present more clearly and forcibly.

2.5 REFERENCES

Next is bibliography generally appended to a research report with a list of books, journals or other sources, which in some way pertinent to the research conducted. It should contain all the works which a researcher consulted, arranged alphabetically into two parts; the first part, the names of books and pamphlets, and the second part, the names of magazine and newspaper articles. Generally, this pattern is considered convenient and satisfactory from reader’s point of view, though it is not the only way of presenting a bibliography. The citation of bibliography should be in following order:

For books and research articles the order may be as mentioned below:

1. Name of author, last name first.
2. Title underlined to indicate italics.
3. Place, publisher and date of publication.

4. Number/issue of volumes.

Example: Kothari, C.R., Quantitative Techniques, New Delhi, Vikas Publishing House Pvt. Ltd., 1978.

For magazines and newspapers the order may be as mentioned below:

1. Name of the author, last name first.
2. Title of article, in quotation marks.
3. Name of periodical underlined to indicate italics.
4. The volume and/or issue number.
5. Date of the issue.
6. Pagination.

Example: Robert V. Roosa, “Coping with Short-term International Money Flows”, The Banker, London, September 1971, p. 995.

The above examples are for bibliography citation, but one should remember that they are not the only acceptable forms, whatever method one selects, must remain consistent.

2.6 FURTHER READINGS:

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