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## UNIT 4 METHODS AND TOOLS OF DATA COLLECTION

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### Contents

- 4.0 Objectives
- 4.1 Introduction
- 4.2 Sources of Data
- 4.3 Observation
- 4.4 Interview
- 4.5 Questionnaire
- 4.6 Questioning: Features and Nuances
- 4.7 Secondary Data
- 4.8 Let Us Sum Up
- 4.9 Key Words
- 4.10 Suggested Readings

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### 4.0 OBJECTIVES

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Collecting data in an objective and scientific manner is the crux of research. Various methods and tools of data collection are employed in social science research, prominent ones are delineated in this unit. After reading this unit, you should be able to:

- describe various sources and types of data,
- comprehend different methods of data collection,
- understand the intricacies and characteristics of questioning in research; and
- differentiate between primary and secondary sources of data collection.

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### 4.1 INTRODUCTION

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The information gathered from different sources using various tools and techniques commonly include numerical figures, ratings, responses to open-ended questions, descriptive narrations and such other elements is called data [singular is datum]. Data can be quantitative and/or qualitative.

Quantitative data are obtained through close ended questions and hardly provide any depth or details. These type of data are either parametric or non-parametric. Parametric data undergo interval or ratio scale measurement. The score on psychological test or inventory is an illustration of interval scale measurement.

Non-parametric data are obtained by applying nominal or ordinal scales of measurement. These data are either counted or ranked.

Qualitative Data are verbal or symbolic. They include first hand information from people about their experiences, ideas, beliefs, detailed descriptions of observed behaviours, people, situations and events, and selected content or excerpts from documents, case histories, personal diaries and letters. In this unit, we will focus on prominent methods and tools of data collection.

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## 4.2 SOURCES OF DATA

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There are two main sources of collecting information- Primary source and Secondary source. The information which is gathered by the researcher (first hand information) for meeting the research objectives is called primary data being collected through primary sources. However, there are times when the information required by the researcher has already been collected and the researcher is required to search for the correct information from the already available material. The second type of data is called secondary data, collected through secondary sources. For example, use of census data to determine the ratio of unemployed youth to employed youth in a particular time period or collecting information about a group of patients from the hospital records are the example of secondary data whereas collecting information from the youth in a community to identify their aspirations is an example of primary data as the researcher is collecting information for the first time. Thus, the primary sources provide the first hand information whereas the secondary provide second hand data.

There are three main methods of obtaining data, (1) by asking questions and getting responses; (2) by observing the behaviours of individuals, groups or organizations; and (3) by examining existing records or data already gathered by others. The first two types of data are generally included in the primary or empirical data, while the third one largely is taken as secondary data.

The primary data can be collected through any of the following methods:

1. Observation
2. Interview
3. Questionnaire

Any one of the above or a combination of more than one method can be used to collect primary data. However, the choice of selection of a method depends upon:

- The objectives of the research study
- The nature of study
- Availability of resources
- Skills of the researcher
- The nature of respondents

There are specific ways and means of gathering and using secondary data. Let us examine these methods and tools of data collection one by one.

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### 4.3 OBSERVATION

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Observation is one of the significant methods to collect primary data. It is a purposeful, systematic and selective way of observing and listening to an interaction or phenomenon as it takes place. Sometimes it is used as the only method to collect data and at other times it complements interview method. There are some situations in which observation is the most appropriate method of data collection e.g. when the researcher wants to observe the intake of a particular medicine at varying intervals or he/she wants to observe the interaction taking place in a particular group. It is also appropriate in situations where full and/or accurate information cannot be collected by questioning because respondents are either concealing or aggravating information or are unaware of the answers because it is difficult for them to detach themselves from the situation or sometimes the respondents are so engrossed to observe their behavior in such situations.

**There are two types of observations:**

- Participant Observation
- Non participant observation

#### **Participant observation**

Participant observation is one when the researcher participates in the activities of the group being observed in the same manner as its members, with or without their knowing that they are being observed.

#### **Non Participant observation**

Non participant observation is one in which the researcher does not get involved in the activities of the group but remains a passive observer, watching and listening to its activities and drawing conclusions based on his/her observations.

#### **Advantages of Observation Method**

1. The natural behavior of the group is recorded.
2. Active participation of respondents is not required.
3. Many a times this method complements interview method.

#### **Disadvantages of Observation Method**

1. When individuals or groups become aware that they are being observed, they are likely to modify their behavior.
2. There is always a possibility of observer bias. Thus, the interpretation drawn from observation are likely to vary from observer to observer.
3. There is the possibility of incomplete observation and/or recording, which varies with the methods of recording since it is difficult to make a balance in observing and recording simultaneously.

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## 4.4 INTERVIEW

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Interviewing is a commonly used method of collecting information from people. Interviewing is the face to face interaction between two individuals with the specific objectives of the research in the researcher's mind. These two persons are the researcher and the subject. It can be flexible in nature depending on how much freedom is being exercised by the researcher in formulating questions around the issues being investigated. It is structured/rigid when the researcher is expected to strictly follow the pre-decided sequence and the subject answers most of the closed ended questions. It is unstructured when the subject does not have the fixed options to be filled in the survey form to the questions being put to him/her by the researcher.

### **Unstructured Interviews:**

Unstructured interviews provide comparatively more freedom to the researcher. Though the purpose/objectives are always kept in front but he/she has the freedom in terms of sequencing of questions.

The unstructured interviews are mostly in-depth in nature and can be recorded in detail by the researcher.

### **Structured Interviews**

In a structured interview, the researcher asks a pre-determined set of questions, using the same wording and sequence as specified in the tool of data collection.

### **Advantages of Interview Method:**

1. It is possible to collect face to face information.
2. In-depth information is obtained.
3. It is possible to structure the questions as per objectives.
4. Non response by the respondents is minimized.
5. It is possible to observe the body language of the respondent. The researcher can also use observation method while using Interview method.
6. The information obtained is more accurate and reliable.
7. Misunderstanding of questions can be minimized as the researchers are physically present to clarify the questions to the subjects.

### **Disadvantage of Interview Method:**

1. This method is very expensive whenever large sample is taken
2. The interviewer interviewing can be biased many a times.
3. The process is time consuming.
4. The information sometimes is concealed.
5. Under the process of interviewing systematic errors may be introduced.

### Check Your Progress I

**Note:** Use the space provided for your answer.

- 1) List the advantages of observation method.

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## 4.5 QUESTIONNAIRE

A questionnaire is a written structured form of questions which are mailed to the participants who are responsible for filling answers to all the questions. The only difference between an interview schedule and questionnaire is that in the former it is the interviewer/researcher who asks the questions and fills the schedule whereas in the later it is the respondent/subject who fills the survey form. This distinction is especially important in accounting for the respective strength and weaknesses of both the methods. Generally, questionnaire method is used for data collection when the sample size is comparatively large and the population is geographically wide spread.

The layout of the questionnaire is mostly structured and the questions are clear and easy to understand. The preference should be given to an interactive style of questioning, of raising questions. The researcher should avoid sensitive and ambiguous questions in constructing a questionnaire. However, if it is essential to include a sensitive question, it should preferably be prefaced by a accompanied by a cover letter which should explain the research topic introducing the objectives of the study and also explaining the respondents/subjects, the process of sampling and the reason of including him/her as part of the study. At the end of the letter, the utility of the research should also be included. The researcher also includes some interactive statements where he/she feels essential to explain the relevance of the questions. The idea is to give the respondent a feel as if someone is interacting with him in answering questions. The questionnaire should always be chosen when the resources are limited, the population is wide spread, the time available with the researcher is limited, the respondents are capable to answer the survey form and understand questions.

The choice between a questionnaire and an interview schedule is important and should be considered thoroughly on the basis of the strength and weaknesses of both the methods. The selection between interview schedule and a questionnaire is generally based on the following criteria:

- The nature of the investigation
- The geographical distribution of the study population
- The type of study population.

- Literacy level of the respondents.

### **Advantages of Questionnaire Method**

- It is less expensive.
- It offers greater anonymity.
- It gives greater freedom to the participants in expressing their thoughts
- It saves time.
- Accessibility to population widely spread geographically.

### **Disadvantages of Questionnaire Method**

- The mailed questionnaire can be used only for educated people, thereby restricting the types of populations
- The return rate of questionnaires is very low.
- The mailing address may not be correct which may omit some eligible respondents.
- The misunderstandings in interpreting the questions by the respondents cannot not be corrected.
- Questionnaires do not provide an opportunity to collect additional information while they are being completed.
- Researchers cannot be sure whether the person to whom the questionnaire was mailed, has himself/herself answered the questions or someone else filled it on his/her behalf.
- It is at the willingness of the respondent to answer the questions. Many questions at the end may remain unanswered.
- There is lack of depth or probing for a more specific answer.

### **Advantages of using Interview Schedule for Data Collection**

- The interview is more appropriate when it is possible to collect data through face to face interview with the respondent.
- It is useful for collecting in depth information.
- It is possible to supplement the information collected from the respondents by probing further which is possible only in interview method.
- It is possible to clarify the prevailing doubts in the respondents.

### **Disadvantages of using Interview schedule**

- Interviewing is time consuming and expensive
- The quality of data depends on the skill of the researcher.
- The reliability of quality of data goes down when the researcher is more than one since all of them are likely to have their own biases.

- The answers given by the researcher are many a times either exaggerated or concealed.

## **4.6 QUESTIONING: FEATURES AND NUANCES**

The two tools used for collecting data from the respondents in research study are the interview schedule (Interview Method), in which the subject and the researcher meet face to face and the interview is conducted by the researcher to seek answers in the survey form whereas the second tool is called questionnaire (Questionnaire Method), in which the information is filled by the respondent/subject either through mailed survey form or when a group of subjects are administered the survey form. The significant difference between the interview schedule and questionnaire remain that in the former it is the researcher who fills in the form where as in the latter it is the respondent who fills the form and sends it to the researcher. The advantages and the disadvantages of using both type of tools has already been discussed in the earlier section. There is not much difference in the forms of questions that are generally included in both the tools of data collection.

### **Forms of Questions**

The form and wording of question is extremely important in a research instrument as they have an effect on the type and quality of information obtained. The question should therefore be appropriate, relevant and free from problems. The questions may be of the following types.

### **Open ended or closed ended**

In an open ended question, the possible responses/available options are not given. Therefore, the investigator/respondent records the answers either verbatim or in a summary describing the respondent's answers. However, in close ended questions the possible answers are set out in the interview schedule/questionnaire and the respondent/investigator is required to tick the category that describes the respondent's answer. It is usually wise to provide a category at the end 'other/please explain' to accommodate any response not listed in the options.

The following examples depict closed ended as well as open ended question:

Closed ended question

- Your Marital status
1. Married
  2. Unmarried
  3. Divorced/Separated
  4. Widow/Widower

### **Open ended question**

What is your annual monthly income \_\_\_\_\_?

Closed ended as well as the open ended questions are required in both interview schedule and questionnaire, but their choice of including both the type of questions is dependent mainly on the nature of the study being undertaken,

the purpose of the study and type of population being studied. As a rule, close ended questions are extremely useful for factual information and open ended questions for seeking opinions, situations and perceptions.

The closed ended questions should be used where:

1. The answer categories are clear, distinct, discrete and relatively few in number
2. Variables to be measured are nominal or ordinal and internal variables cannot be measured through these questions.
3. Response categories are exhaustive and mutually exclusive
4. Questions are self-contained and require few instructions and
5. The sample has a lower educational level

On the other hand, the open ended questions should be used where:

1. Questions are complex and responses cannot be put in a few simple categories
2. Respondents unique views are to be elicited.
3. Investigations are preliminary, accurate, detailed and exhaustive and more important.
4. Ratio and internally scales variables are to be measured.

### **Direct & Indirect Questions**

Direct questions are personal questions which elicit information about the respondent himself/herself e.g. “Do you believe in seeking higher education for your children?” whereas indirect question will be “Do you believe in seeking higher education for the children?” In indirect questions you are seeking their views in general but with the intention that it will reflect their opinion for their own children, however the approach adopted is not direct whereas in the direct question the question is directly applied to them. The positioning of direct and indirect questions in the form is based on the objectives of research.

### **Contingency Questions**

Contingency questions are the frequently asked questions that are relevant to some respondents and are not applicable to the remaining respondents. These are special cases of closed ended questions and are applicable to only a subgroup of respondents. The relevance of the question to this subgroup is determined by the answers of respondents to the preceding question. For example, in a research study the preceding question was “Nature of your marriage 1. Arranged 2. Love Marriage”. The contingency question will be “If Love Marriage, please specify the reason for entering the love marriage”. Here the relevance of the second question is contingent upon his/her response to the preceding question. Only respondents whose marriage was love marriage will answer the second question. This question will not be applicable to the respondents whose marriage was arranged.



### Matrix Questions

The matrix question is a method for organizing a set of questions that have the same response patterns. The following is an example of matrix question:

As a retired woman you perform various roles. Please indicate the degree of satisfaction you get from performing each role:

Degree of Satisfaction				
S. No.	Roles	Fully Satisfied	Partially Satisfied	Dissatisfied
1.	Grand Mother			
2.	Mother			
3.	Daughter			
4.	Daughter in law			
5.	Neighbour			
6.	Friend			

### Considerations in formulating questions

The wording and tone of the questions are important because the information and its quality are largely dependent on these factors. It is, therefore, important to be careful in framing questions. The following are some of the considerations to be kept in mind while formulating questions:

- Always use simple and everyday language.
- Ask factual questions in the beginning of the form so that the researcher and the respondent become familiar with each other and the rapport between the two is established.
- The researcher should be careful in asking sensitive and personal questions. They should either be framed in indirect form or if it has to be a direct question, the context of including that question should either be explained to the respondent personally or should be clarified in writing when it is a mailed questionnaire.
- In the contingency questions, the preceding questions must contain guidelines in the options of responses and clearly specify which questions are to be answered by a particular subgroup and which are to be skipped.
- In the matrix questions, guideline should be there at the top of the main question emphasizing that all parts of the question are needed to be answered.
- In multiple choice questions, a clear instruction can be incorporated in the beginning of the question specifying that the respondent can tick mark all the responses (more than one choices) as he/she feels to appropriately express his/her opinion.

### The Order of Questions

The order of questions in a questionnaire or in an interview schedule is very important as it affects the quality of information, the interest and the willingness of the respondent in answering the questions and participating in the research

study. Therefore, the questions in the survey form should be arranged in a logical manner based on the identification details in the beginning followed by the sections based on the objectives of the research study. This helps the researcher as well as the respondent in gradually covering all the themes and objectives of the research study starting with the simple themes and gradually proceeding to complex and sensitive themes. This approach sustains the interest of the respondent and encourages him/her to answer all the questions without concealing or exaggerating information.

### **Questions to be avoided:**

There are some questions which are needed to be avoided while framing the tool of data collection. These include:

#### **Leading Questions**

A leading question is worded in such a manner that it appears to the respondent that the researcher expects a certain type of answer. For example, let us consider a question designed to elicit general opinion about the relationship between an adolescent and his parents and the question is directed to adolescents- “We should respect our parents” with the option for the answer being “Yes” or “No”. In answering “yes”, the respondents are not contradicting the researcher and the behavior is expected to be normatively correct. However, in this question a lead to answer has already been given by the researcher. These types of questions are needed to be avoided since these are likely to bias the response of the respondent.

#### **Threatening Questions**

Threatening questions refer to behaviors that are illegal or are normatively socially deviant which are usually not discussed in public. For example, the question that inquires about the respondent’s drug abuse habits, child abuse and his involvement, etc. These questions are very sensitive questions and should be handled either by the qualitative method or should be included only after a brief introduction to the question or only after establishing rapport with the respondent if it is a face to face interview. The main point to be taken into consideration by the researcher is to ensure that the respondent is comfortable in answering questions and does not feel embarrassed/offended in answering. For example, to know about respondent’s drinking habit the question can be asked “In the past one year, how often could you not control yourself from getting intoxicated while drinking?”

#### **Ambiguous Questions**

An ambiguous question is one that contains more than one meaning and that can be interpreted differently by different respondents. This will result in different answers making it difficult for the researcher in drawing valid and reliable conclusions from the data. For example “Are you satisfied with your employer?”

This question is ambiguous as it does not ask respondents to indicate with which aspects of work he/she is satisfied/dissatisfied. Is it with the working hours, perks or the leaves that he/she feels satisfied/dissatisfied?

### Double Barreled Questions

A double barreled question is a question within a question. The main type of problem with this type of question is that one does not know which particular question a respondent has answered. Some respondents may answer only one of them and others may answer both the questions. For example “How often and how much time do you spend with your friend for recreational activities?” This question has two parts: How often the respondent visits friends and how much time is being spent in each visit? In this question some respondents may answer the first part, whereas others may answer the second and the rest may answer both the parts. Incidentally this question is also ambiguous in that it does not specify “How often?” in terms of period of time; is it in a week, a fortnight or month or six months? These type of clarifications for the respondents is very essential in order to get uniformity of responses by the respondents of the study.

Therefore, it is very important opportunity to appropriately formulate questions in the tool of data collection and it is again and again emphasized that all the questions should be simple worded, easy to understand and should convey the same meaning to all the respondents. Therefore, it is always advised to conduct a pilot study after the tool has been completed. This should preferably be administered on the similar type of respondents for whom it is meant, but not the same population/sample twice, initially for pretesting and subsequently for actual process of conducting the interview. It is also very necessary to incorporate the instructions for the respondents about how to answer the questions like “Please circle the appropriate response” or “Put a tick mark before the response you feel is appropriate” These instructions are more detailed in the questionnaire as compared to the interview schedule where the interviewer is present for clarifying the questions.

#### Check Your Progress II

**Note:** Use the space provided for your answer.

- 1) Briefly describe the concept of ‘ambiguous questions.’

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### 4.7 SECONDARY DATA

As has already been mentioned in the beginning of the unit, the second method of data collection is from secondary sources. It is, required by the researcher to fulfill either some or all the objectives of the research study. The secondary sources broadly include:

### **Government or semi government publications**

There are many government and semi government organizations that collect data on a regular basis in a variety of areas and publish it for use of public, other interest areas or for the government organizations to add to the statistical purposes. Some common examples are census, vital statistical data on birth and death rate in countries, labor force survey, economic surveys, human index report, etc. In India, National Sample Survey Organization regularly undertakes sample survey on different categories of population and calls them rounds.

### **Earlier Research**

For some topics, an enormous number of research studies that have already been conducted by others can provide the researcher with the required information.

### **Personal Records**

Some people write historical and personal records that may provide the researcher with the required information.

### **Official Records**

Certain information is stored regularly by some organizations for their personal use. It may be extracted by the researcher for specific research purposes.

### **Mass Media**

The reports published in newspapers, magazines and other periodicals are in some cases good source of data for certain research studies.

### **Problems with using data from secondary sources**

When using data from secondary sources, the researcher need to be careful as there may be certain problems with the availability, format and quality of data. While using such data some of the issues that the researcher should keep in mind include:

#### **Validity and reliability of the data**

The validity and reliability of the data remains doubtful as it has been collected by someone else.

#### **Personal biases in the available data**

The use of information from personal diaries, newspapers and magazines may have the problem of personal bias as these writers are likely to exhibit less rigorousness and objectivity than one would expect in research reports.

#### **Availability of Data**

It is important to make sure that the required data are available before the researcher proceeds further with the study.

#### **Format**

It is again very important to ascertain that the data are available in the required format. For example, the researcher needs to analyze data in 15-25 years

category but the available data in the census is split as 15-20 and 20-25 years and so on. Therefore, it is important that the data available should be in the same format in which the analysis is needed to be done or the researcher should know beforehand how much modification is needed to be done before the data becomes suitable to be used by him/her.

**Check Your Progress III**

**Note:** Use the space provided for your answer.

1) What are some of the important sources of secondary data?

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**4.8 LET US SUM UP**

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In this unit, we elaborated upon the sources, methods and tools of data collection. Data are either quantitative or qualitative. Quantitative data are parametric or non-parametric. Sources of data can be primary (first hand) or secondary (second hand). Primary data are generally collected through observation, interview or questionnaire methods. Advantages and disadvantages of each of these methods are delineated. Asking appropriate questions is a challenging and skilled task in research. Detailed description of types of questions and their nuances have been provided in the unit. Sources, tools and techniques of collecting secondary data have also been discussed.

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**4.9 KEY WORDS**

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- Data** : Consists of all relevant informations, past and present, serving as bases for study and analysis. They are quantitative and qualitative. Quantitative data are numerical figures or ratings whereas descriptive narration, responses to open ended questions, field notes, etc. are qualitative data.
- Observation** : A technique of collecting data by observing activities of individuals in different settings, by talking to them, or studying their behaviours.
- Structured Observation** : The process of observing individuals in controlled situations.
- Questionnaire** : A series of questions dealing with psychological, social, educational or any other topic sent to an individual or a group, with the object of obtaining data with regard to the topic under study.

**Interview**

: An interview is in a sense oral questionnaire. Instead of writing the response, the respondent gives the needed information orally or face to face.

**Methods And Tools  
Of Data Collection**

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**4.10 SUGGESTED READINGS**

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