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# UNIT 13 TOOLS AND TECHNIQUES FOR DATA COLLECTION

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## 13.1 INTRODUCTION

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Research is an original contribution to the existing knowledge that helps in advancement in the field of education. For conducting research, relevant data can be gathered by using appropriate tools and techniques. Tools and techniques in research can be chosen based on the nature of research which a researcher undertakes. In order to get relevant and appropriate data for an educational research, a researcher can select appropriate tool(s) such as, psychological tests and inventories, questionnaires, checklists, rating scales etc. and techniques, namely, observation, interview, sociogram, content analysis etc. Each tool and technique differ in its nature, characteristics, design, administration and interpretation. Also, each tool is specifically designed for collection of information related to specific type or nature of research. As there are many tools available to assess a specific variable, a researcher has to select one tool to assess a variable under his/her study. If in case of non-availability of tool, a researcher may modify or develop his/her own tool. A good research tool has some basic characteristics and every researcher needs to be aware of them. This unit will familiarize you with some data collection devices.

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## 13.2 OBJECTIVES

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After studying this unit, you will be able to:

- explain the meaning of tool and technique of research;

- describe characteristics of good research tools;
- discuss different types of tools used for data collection and
- discuss different types of techniques used for data collection.

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### 13.3 RESEARCH TOOLS AND TECHNIQUES: MEANING AND CONCEPT

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Data collection is one of the most important steps of research and data is collected with the help of a research tool(s). Research tools are instruments used to support in the assessment of a particular variable which is under study. So, we can say that, anything that is used to collect information related to a variable under study is called a research tool or a research instrument. The research instruments or research tools are used to measure or collect data for a variety of variables extending from physical working to psycho-social health. Research tools are measurable and observable for the purpose of data analysis and interpretation. Different types of tools are used to gather data, depending upon the nature of the or data. Some of these tools only identify the absence or presence of certain aspects of a situation. Few other tools gather information related to qualitative descriptions which comprises of contrast and comparisons between or among the elements that exist in that situation. Some other tools are used to collect data related to quantitative measures which are in scores or in scale measure.

When a researcher plans to collect data, either he/she develops a research tool according to the objectives framed for the study, or selects an already developed standardized tool.

Normally data can be collected through testing and non-testing procedures. Under testing procedure, the data is obtained through a test or a questionnaire or an inventory or a check list or a rating scale, these types of procedures/instruments are called **research tools**. Under non testing, the data are collected through observation or interview and these types of procedures are called **research techniques**. Different types of tools are used for different data collection techniques. For example, in observation technique one can use check list, rating scale, questionnaire etc. as research tools.

Research tools refers to the tools or means with the help of which a researcher assesses different variables under study in the data collection process. It is related not only to selection, designing, construction and assessment of tool but also to the conditions wherein the tool is administered. Research tools are very important and are needed to gather data from sample for further analysis and its interpretation of results to draw findings.

#### Check Your Progress 1

- Note:
- a) Write your answers in the space given below.
  - b) Compare your answers with those given at the end of the Unit.

1. Discuss the meaning of research tools.

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2. Do you think research tools are important? Justify your answer.

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### 13.4 CHARACTERISTICS OF A GOOD RESEARCH TOOL

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The characteristics of a research tool are:

1. **Objectivity:** A test is called objective when examiner's personal judgement does not affect the scoring. Objective judgements are accurate and hence tend to be reliable. It can be seen from two aspects:
  - **Objectivity of items:** It implies that the items should be as simple as possible away from the vague words like perhaps, sometimes, too much etc.
  - **Objectivity of scoring:** It means that the personal biasness of researcher should not affect scores. Emotional conditions, prejudices and attitude of researcher should not affect scores.
2. **Reliability:** Reliability refers to consistency in measurement. It is basically concerned with the consistency of responses on the test given to same individuals at different occasions. This means that even if an individual takes the same test twice, the scores are the same. To determine the reliability of a test, different measure of correlations such as Test-retest, Split half, Parallel forms etc. are used.
3. **Validity:** A good research tool is expected to measure what it is supposed to measure. If a test achieves this objective, then the test is called valid. Validity is basic, we may consider validity in terms of categories such as high, moderate or low validity. Furthermore, validity is specific, a test may be valid for one purpose but not valid for another. A data collection tool must be a valid one.
4. **Originality:** The tool should be original and non- plagiarised, free of errors and should include all the required details.
5. **Usability:** It is also known as practicability. The usability depends on the ease with which a tool can be administered, interpreted and scored without excessive expenditure of time, money and efforts.
6. **Sensitivity:** A tool should be sensitive enough to record/ assess/ measure even a small change. This will make the tool more accurate and the findings will be more precise or exact.

**Check Your Progress 2**

- Note: a) Write your answers in the space given below.  
b) Compare your answers with those given at the end of the Unit.

3. How do we know that a research tool is good?  
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4. Discuss two different aspects of objectivity.  
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5. Differentiate between reliability and validity.  
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**13.5 TOOLS FOR DATA COLLECTION**

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To collect appropriate and reliable data we can use various types of tools. The choice of a tool will depend on the nature of variable and type of data, which a researcher wants to collect in a particular situation. Data can be quantitative or qualitative in nature, about which you are going to study in the next unit. Let us now discuss about some of the tools one-by-one:

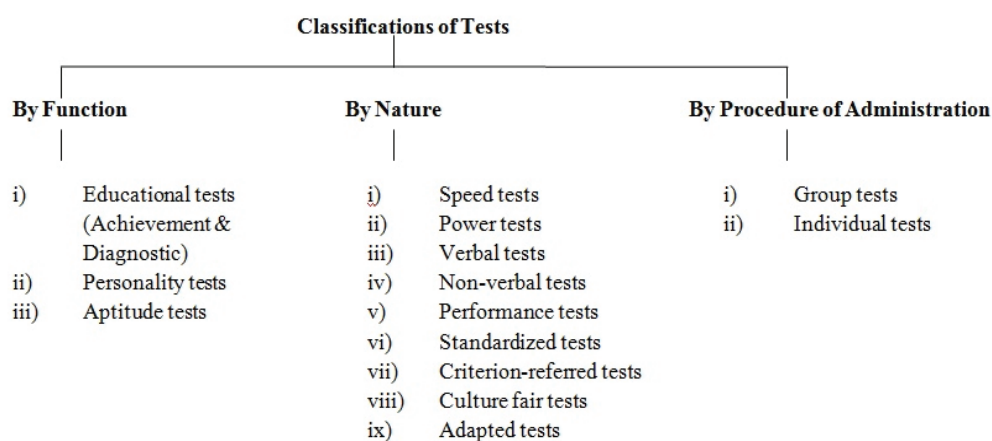
**13.5.1 Test**

A test is a systematic procedure for observing a person’s behaviour and describing it with the help of a numerical scale. Test is helpful in getting a quantitative data.

It is essentially an objective and standardized measure of a sample of behaviour. Psychological tests which are available in research cells or departments are standardized tests. Teacher made test are non-standardized test.

**Types of Tests**

Tests are classified in different ways based on their function, nature and procedure of administration and are presented here under:



Let us now understand the meaning of this classification and will also get information about these tests in details.

### A. Classification of the Tests as per their Function

(i) **Educational Tests** - Certain types of tests are developed for use in educational contexts. They include achievement tests and diagnostic tests. Achievement tests are designed to measure the effects of a specific programme of instruction or training. It measures the effects of relatively standardized sets of learning experiences. It generally represents a terminal evaluation of an individual's status on the completion of an instructional programme or training. An achievement test measures developed abilities/skills. Diagnostic tests on the other hand, are designed to analyze individual's specific strengths and weaknesses in a school subject and to suggest causes of his/her difficulties. In connection with the use of all diagnostic tests, one point deserves special emphasis. The diagnosis of learning disabilities is the prerequisite for a programme of remedial teaching.

(ii) **Personality Tests** - These tests most often refer to measures of affective aspects of behaviours such as emotional states, interpersonal relations, motivation, interests and attitudes. A personality test could be a self-report inventory, a situational test or another approach could be the application of projective technique.

(iii) **Aptitude Tests** - These measure the effects of learning under relatively (in comparison with achievement tests) uncontrolled and unknown conditions. They include general intelligence tests, multiple aptitude batteries, special aptitude tests (e.g. creativity tests) etc.

Intelligence tests are designed to measure the intelligence of an individual. Here, we must bear in mind that intelligence is not a single, unitary ability but a composite of several abilities. The term is commonly used to cover a combination of abilities required for survival and advancement within a peculiar culture. (e.g. Stanford Binet Test of Intelligence)

Multiple Aptitude Batteries yield a profile of test scores in set of relatively independent abilities identified through factor-analysis. One of the most widely used Multiple Aptitude Batteries is a Differential Aptitude Test (DAT). This DAT yields scores on eight abilities - Verbal Reasoning, Numerical Ability, Abstract Reasoning, Clerical Speed and Accuracy, Mechanical Reasoning, Space Relations, Spelling and Language Usage.



Creative Aptitude Batteries have been produced at the University of Southern California by J.P. Guilford & his colleagues, and 'Tests of Creative Thinking' by Paul Torrance.

### B. Classification of the Tests as per their Nature

- (i) **Speed Tests** are those tests which contain such items which are of somewhat equal difficulty value. To solve the tests the time limits are fixed. e.g. our usual school/college tests.
- (ii) **Power tests** are those tests which contain items of different difficulty value arranged in increasing order of difficulty value. For such tests time limit is not fixed, it is flexible.
- (iii) **Verbal Tests** include question answer pattern in the form of 'words'. Such verbal tests can be either paper pencil (written) tests or oral tests.
- (iv) **Non-verbal Tests** necessarily contain items in the figural or symbolic form i.e. other than 'words'. Raven's Progressive Matrices Test is a non-verbal test.
- (v) **Performance Tests** require action on part of the respondent as his/her response. Bhatia's Intelligence test is a performance test.
- (vi) **Standardized Tests** imply uniformity of procedure in administering and scoring the tests. Another important aspect of standardized tests is the establishment of norms, reliability and the validity of the tests.
- (vii) **Criterion Referenced Tests** have been contrasted with the usual norm-referenced tests in which an individual's score is interpreted by comparing it with the scores obtained by others in the group on the same test. Unlike in a norm-referenced test, in a criterion referenced test an individual's score is interpreted by comparing it with an external criterion.

### C. Classification of Tests as per the Procedure of Administration

- (i) **Group Tests** are designed as mass testing instruments. They permit the simultaneous testing/examination of large groups. The instruction and administration procedures are simplified so as to demand a minimum of training on the part of the test administrator/examiner
- (ii) **Individual Tests** are those which can be administered to one individual at a time. In view of the testing situation including response in the form of actual performance, the observer can record the entries in the performance sheet for one candidate at a time

Source : 13.5.1 is adopted from 'Tools and Techniques for Data Collection (Unit-13). MES-054- Methodology of Educational Research'. IGNOU (2006). New Delhi

### 13.5.2 Questionnaire

Questionnaires generally include a set of standardized items (question/statement form) that are based on a particular topic designed to collect data related to demographics, attitudes, behaviours or opinions. It is a kind of tool wherein factual data is collected from a very large sample. The main advantage of using a questionnaire is that it can be made with minimum cost and time and can

reach a widely scattered audience. With the use of technology ( Google forms, Survey monkey) , it is now only a single click . A questionnaire consists of several types of questions. Let's discuss them:

### Types of Questions in a Questionnaire

1. **Open ended questions:** There is no pre-determined set of answers because it calls for free response from the respondent in a space provided. No clues or preset answers are provided, hence the respondent has greater freedom to respond. The responses to these questions are difficult to analyze. It provides true and unexpected suggestions.

For example:

- Why did you choose a particular university/ college to pursue your graduation?
- What happened in mathematics class?

2. **Close ended questions:** There is a predetermined set of answers, because it provides the alternatives against each question have statement. The responses are limited in number. The responses are easy to analyze. Generally a questionnaire alternative response type questions ( i.e. select Yes/No ) and multiple choice type items (select right answer in the given choices)

#### Examples of Alternative Type Questions:

- (i) Are you happy with the faculty/teachers of this college? Yes ( ) No
- (ii) Have you ever chosen a course in journalism? Yes ( ) No
- (iii) Have you been honoured for your achievements? Yes ( ) No ( )

#### Example of Multiple-choice Questions:

1. What does ZPD stand for?
  - a) Zone of Psychosocial Distance
  - b) Zone of Proximal Development
  - c) Zone of Psychosocial Development
  - d) Zone of Proximal Distance

**Advantages:** The following are the advantages of Questionnaire:

1. It is easy to administer.
2. It collects data from every corner of the world.
3. It is economical in terms of time and money.
4. Respondents can answer questions at any time convenient to them and they can answer at their own pace.

**Limitations:** The following are the limitations of Questionnaire:

1. Questions have to be comparatively easy.

## Data Collection and Analysis

2. Generally, not possible to give assistance directly, if required by the respondents.
3. Some items may be misunderstood.
4. Only those who are literate can be the part of sample.
5. Wastage of time, money and efforts because there is no control over who all complete and send back the filled in questionnaire.
6. Deadline for returning the filled questionnaire is required.
7. Reminders to the respondents may be required.
8. Printing may be costly if it is lengthy.

### **When you develop the questionnaire, it is essential that you must ensure the following:**

1. The covering letter of the questionnaire is conscripted in a friendly manner and shows its importance and relevance to the respondents.
2. The title of the questionnaire must be well stated.
3. It should consist of statement of purpose.
4. Instructions/ directions are complete and clearly mentioned.
5. The respondents should be given assurance about the confidentiality of their responses.
6. It is neatly arranged, looks attractive and is free from typographical errors.
7. Technical terms are clarified. Also, the clarity in language must meet the level of understanding of the respondents.
8. It avoids questions which reflects annoying or embarrassing tone which may arouse aggression in the respondents.
9. Items are arranged in classes/ groups which elicits easy and accurate responses.
10. The questions are pin pointed and objective without any clues or suggestions.
11. Statements/ questions are in order from easy to difficult.
12. It does not try to find the information which may be available from other sources such as records and registers maintained in school/ institution.
13. Restricted to single question which deals with single aspect.
14. Double negatives descriptive adjectives and adverbs are avoided
15. It is worded in such a manner that it can be easily tabulated, interpreted and summarized



**Check Your Progress 3**

Note: a) Write your answers in the space given below.

b) Compare your answers with those given at the end of the Unit.

6. What is the meaning of tests?

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7. On what basis are tests classified?

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8. What is the difference between speed test and power test.

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9. What points will you keep in mind while developing a questionnaire?

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**13.5.3 Rating Scale**

This is one of the oldest method/tool of personality assessment. Rating is generally applied to expression of judgement regarding some event, character or an object. The opinion or judgement is usually expressed on a scale. Rating is a technique with the help of which such opinions/judgements can be quantified. Rating can be done by parents, teachers, interviewers, judges etc. It resembles checklists but are used when finer discriminations are needed. These scales provide an indication of the amount of a specific attribute and use either number or description. For example:

How satisfied are you with the relaxation therapy used during your stress reduction programme?

Extremely dissatisfied	Extremely satisfied
0    1    2    3    4    5    6    7    8    9    10	

**Characteristics of a Rating Scale**

1. These reflect valuable opinion about characteristics of one person by another person.

2. Make quantitative opinions about qualitative characteristics.
3. This is most commonly used tool to perform structured observations.
4. It provides flexibility to judge the presence of different characteristics among subjects.

### Types of Rating Scale

**1 Numerical Rating Scale:** Numerical rating scale is one of the simplest type of rating scale. The rater simply marks a numeric figure which shows the degree to which a trait is present. The statement consists of traits and values from 1-5 are given to each trait that is rated.

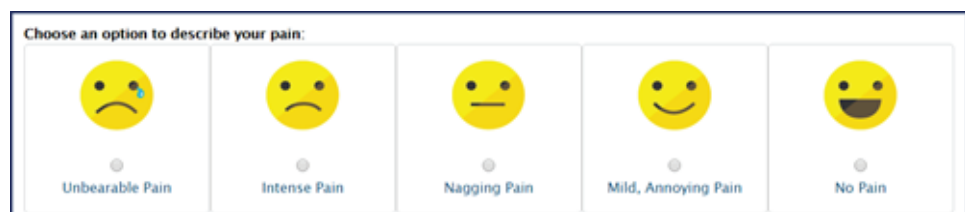
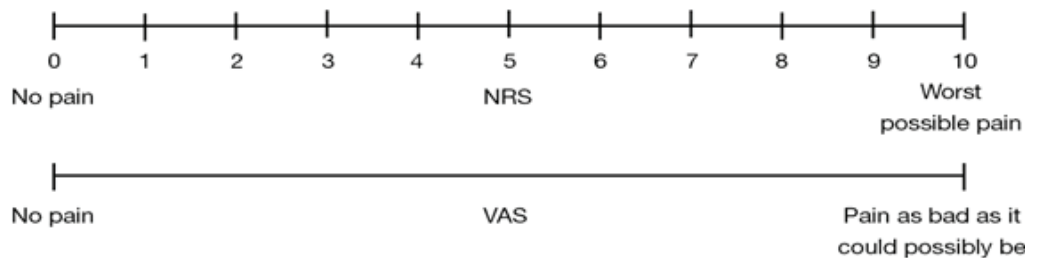
#### Example:

Tick the correct number showing the extent to which student-teacher exhibits skill of stimulus variation.

1. Unsatisfactory
2. Below average
3. Average
4. Above Average
5. Outstanding

### 2. Graphic Rating Scale /Visual Analog Scale

This scale is useful for assessing perception of physical stimuli such as shortness of breath, pain, sleep, etc. It is generally used in hospitals by doctors to conduct pain scale survey. Instead of using scale values, the ratings are made in a graphic form- a point anywhere along a band. Each attribute is followed by a horizontal line. The rating is made by placing a tick mark on the line. A set of classes identifies specific positions along the line, but the rater has a freedom to check in between these points.



Source: <https://www.questionpro.com/visual-analogue-scale-vas.html>

### Advantages

1. Rating scale is flexible and adaptable.
2. Can be used with a large sample size.
3. It assesses specific objectives of education which are important to teachers.
4. Evaluate processes such as demonstrating a skill, performing experiment in laboratory, teaching learning process etc.
5. It records qualitative and quantitative observations about observed performances.

### Limitations

- Common sources of errors such as ambiguity, attitude of researcher, logical errors etc. affects the validity.
- Many aspects of an individual may not be rated.
- Scale may become unscientific due to chances of subjectivity.
- Generosity error -The raters would not like to run down their own people by giving them low ratings. The result is that high ratings are given in almost all cases.

### 13.5.4 Inventory

Inventories are self-reporting assessment tools that examine one or more characteristics of an individual's behaviour. It can be of many types such as interest inventory, personality inventory etc.

An inventory is like a questionnaire. In the inventory, the statements are put in first person, for example, "I think I am comparatively more sincere than others". In the questionnaire, there is a question in a second person, for example "Do you think you are more sincere than other persons?"

### Advantages

1. Used in educational and vocational guidance.
2. Useful for teachers to find out the interest of learners/students.
3. Inventories are comparatively economic.
4. They are simple to construct.
5. Objectivity can be maintained.
6. Not much training is required to administer it.

### Limitations

1. These instruments may be of limited value because of individuals' inability or unwillingness to report their own reactions accurately or objectively.
2. It is difficult to standardize inventories, which limits its usage.

### 13.5.5 Checklist

A checklist comparatively simple, inexpensive and reliable method of evaluating

sample (s). It is used to record the presence or absence of the phenomena under study. The main purpose of the checklist is to call attention to various aspects of an object or situation, to see that nothing of importance is overlooked. It includes list of words, statements/ items which describes a person, object or a situation and requires same format of response for all items. It can be a simple list of aspects that can be marked as present or absent “YES” or “NO”.

They are more easily constructed in comparison to other tools and can be useful for evaluating personality, behaviour, skills, conditions, manifestations etc. We can also use checklist to know about the availability of resources in a school/ college like computers, printers, books, sports material, smart classrooms etc. Let’s see an example of checklist to know about students behaviour in a class.

**Table 13.1 : Checklist for Students Behaviour**

S.No.	Situation	Yes	No
1.	Took permission to talk		
2.	Attitude was good		
3.	Was Active		
4.	Was kind with others		
5.	Was attentive		
6.	Followed instructions		
7.	Cooperated peers in a group activity		
8.	Completed work		
9.	Participated in activities		

**Advantages**

1. Checklist is a simple method to record observation of any behaviour
2. Checklist is used in evaluation of activities.
3. It can be used in comparing individuals.
4. The chances of error in observation decreases.

**Limitations**

1. The degree of accuracy cannot be assessed.
2. It has limited use, as it does not indicate quality of performance.
3. Only the presence or absence of the ability, attribute, behaviour or performance parameter may be assessed.

***Activity for Practice***

- a) Try to make a checklist for yourself before going to market/ before examination/ before going to a vacation.
- b) Try to make a checklist to know about availability of facilities in a school.

### Check Your Progress 4

Note: a) Write your answers in the space given below.

b) Compare your answers with those given at the end of the Unit.

10. List characteristics of rating scale.

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11. Write advantages and limitations of checklist.

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12. In what ways inventory is different from questionnaire?

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## 13.6 TECHNIQUES FOR DATA COLLECTION

We can collect the requisite data for the research in hand by employing some techniques. Following techniques, if needed such as interview, schedules and observation schedules may be prepared for the purpose of data collection. Let us get information about these techniques of data collection in details.

### 13.6.1 Interview

Interview involves a verbal face-to-face or telephonic communication between the researcher and the respondent wherein the information is provided to the researcher. The conversation carried out during the interview has a definite objective. Interview is the most common tool used to collect data in qualitative and descriptive studies. The researcher tries to collect factual data related to perception, attitude, opinion etc.

#### Characteristics of Interview

1. Researcher and subject(s) will be strangers.
2. It can be modified as per the demand of the situation.
3. The information from the subject is recorded.
4. Every interview has a specific purpose.
5. Verbal answers for verbal questions are expected and recorded.

#### Types of Interviews

##### 1. Structured Interviews

The structured interviews are formal in nature because there is a restriction of sequence and wordings to be followed by the researcher. It has fixed and

closed ended questions. It is known as standardized interview. It increases the reliability and credibility of data. Also, the responses from the sample are recorded on a standardized schedule.

**Advantages**

1. It avoids irrelevant, objectiveless interaction.
2. Recording, coding and analysis of data is easy.
3. Data gathered from two different samples can be compared.
4. Attention is not diverted.

**Limitations**

1. The scope of exploration is limited.
2. It may not cover all the views or responses of the sample.
3. In depth information may not be possible.

**2. Unstructured Interviews**

In unstructured interviews, subjects are motivated to speak freely and initially very few questions are asked for rapport building. The researcher also freely asks the questions as per researchers wish or as and when required. The unstructured interview is informal in nature wherein sets of questions can be used, but there is no restriction of following the sequence and wordings. Also, researcher is at times free to explain or substantiate the question during the interview. Therefore, it is characterized by flexibility of approach to questioning.

**Advantages**

1. Data can be used in explorative and qualitative studies.
2. Less prone to researcher's biases.
3. Information obtained in an informal manner enhances reliability and credibility of data.

**Limitations**

1. Analysis is relatively challenging.
2. Information of two candidates cannot be compared.
3. Time consuming
4. Researcher needs to be skilled enough to analyse data.
5. Interpretation is based on researcher's subjective feelings.

**How to Conduct an Interview\*\***

As a technique of data collection a good interview requires

- i) **Preparing for interview** - The following factors need to be determined in advance of the actual interview. Clear conception of the purpose and of what information is needed. i.e. kind of interview - individual or group. A clear outline or schedule of the best sequence of questions.
- ii) **Conducting an interview (execution)** - The initial task of securing



confidence and co-operation of the subjects of respondents what is called - rapport building. It requires expertise and sensitivity that is almost an art. For securing desired information, questions should be asked in planned sequence and not in a rigid manner. Moreover, a questions need to be asked in a stimulating and encouraging manner with comments and necessary explanations and recordings. The recording device selected should be used without distracting the interviewee. Before an interview-based study is undertaken, the interviewer should undergo rigorous training in conducting and recording of data in an interview.

- iii) **Recording and interpreting responses** - It is best to employ, if possible, a recording device which would retain the actual wording of the responses. Audio recording can be done through smart phones. If the responses to questions in the interview have to be noted down, it can be done either simultaneously with the interview or immediately after it.

**\*\*Source :** Some parts of 13.6.1 is adopted from ‘Tools and Techniques for Data Collection (Unit-13)’. MES-054 : ‘Methodology of Educational Research’. IGNOU (2006). New Delhi

### 13.6.2 Observation

The observation is a technique of collection of comprehensive information in qualitative research through events that can be observed through senses, with or without any mechanical devices. The subject can be observed with the help of following:

- **Log (field diary):** A log is a day-to-day record of interactions and events in the field. It is a historical listing of how researchers have spent their time and can be further used for planning purposes. This is for:
  - \* reviewing what all work has been completed.
  - \* keeping track of responses.
- **Anecdotes:** Anecdotes opts for definite types of behaviours for observation beforehand. They generally focus on behaviour of particular interest. The researcher records the information in an objective and accurate manner.
- **Video Recording:** Video recordings are done by mechanical devices commonly known as video tapes. Presently, it can be done through smart phone as well. These are used to record complex behaviours that might get unnoticed by the researcher.

#### Types of Observation

1. **Participant Observation:** In this type of observation the researcher participates as one of the members of the group, where subject of the study can be directly observed. This helps the researcher to take direct note of all the characteristics of the subjects who are being studied.
2. **Non-Participant Observation:** In this type of observation the researcher does not participates as one of the members of the group where subject of the study is present. The researcher observes the subject of the study with his/her understanding and experience, but without taking part in the event under study.

**Stages in the Process of Observation:** As a good data collection technique observation needs –

- a) **Planning:** The factors one must consider in detail while planning to use observation as a research technique includes-
- Definition of specific activities.
  - An appropriate group of subjects or individuals to observe.
  - Scope of observation - individual or group.
  - Determination of length of each observation period.
  - Deciding about the instruments and the form of recording and physical position of the observer.
  - Determining the special conditions required for subjects.
  - Preparation of proper tools for recording observation.
  - Getting oneself trained in terms of expertise of an observer.
- b) **Execution of Observation :** An expert execution demands -
- Proper arrangement of special conditions for the subjects.
  - Assuming the proper physical position for observation.
  - Focusing attention on the specific activities or units of behaviour under observation.
  - Observing directly, the length and number of periods and intervals decided upon.
  - Handling well the recording instruments to be used.
  - Utilizing the training received in terms of expertness.
- c) **Recording and Interpreting Observations :** The two common procedures for recording observations are –
- **Simultaneous** - when the observer goes on recording his/her observations simultaneously with the occurrence of the phenomena observed, as in time sampling.
  - **Soon after the observation** - when the observer undertakes to record his/her observations not simultaneously with his/her actual observation process, but immediately after he/she has observed for a unit of time, while the details are still fresh in his/her mind.

### **Advantages**

1. Data can be collected where and when an event is taking place.
2. Natural responses are observed.
3. Validity of data is more.
4. Useful to sociological research.
5. Does not depend on sample's willingness to provide information.

### Limitations

1. More prone to researcher's subjectivity or biases.
2. It is time consuming.
3. Analysis of data is difficult.
4. Researcher has to face practical difficulties.
5. The people being observed become conscious and begin to behave in an unnatural manner.

#### Check Your Progress 5

Note: a) Write your answers in the space given below.

b) Compare your answers with those given at the end of the Unit.

13. What are the different types of Interviews and Observation.

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14. Write the steps for conducting an interview.

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15. What are the limitations of observation technique?

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### 13.7 LET US SUM UP

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In this unit you have learnt about various tools and techniques of data collection. You have also learnt that anything that is used to collect information related to a variable under study is called a research tool. The researcher selects the most appropriate tool for data collection which is further analysed to test the hypotheses. Some common and important tools and techniques of research which are regularly used in social science research are: Tests, Questionnaire, Interview, Observation, Rating scale, Inventory and Checklist. Some researchers use only one technique while some may use a number of them in combination. The choice of selecting a specific tool depends on the objectives, the variable under study, the type of information required, available resources, skill of using a particular tool and the socio and demographic attributes of the sample. All these research tools have some advantages or limitations as discussed in this unit. Questionnaires generally include a set of standardized items (question/statement form) that are based on a particular topic designed to collect data whereas interview

involves a verbal face to face or telephonic communication between the researcher and the respondent wherein the information is provided to the researcher. Observation is a useful technique of collecting authentic evidence in descriptive educational research.

Rating scale is a tool of research which is used to judge particular characteristics. A checklist is comparatively simple, inexpensive and a reliable method of evaluating sample (s). It consists of a list of response categories that is marked as checked if appropriate. Inventories are used in research while studying the inter-relationship between personality traits and variables like attitude, intelligence, achievement etc.

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## **13.8 REFERENCES AND SUGGESTED READINGS**

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## 13.9 ANSWERS TO CHECK YOUR PROGRESS

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- 1) Anything that is used to collect information related to a variable under study is called a research tool or a research instrument.
- 2) Yes, research tools are important. Research tools are important because there are an important part of data collection. Without collection of data a researcher cannot proceed further.
- 3) A tool is said to be good if it consists of characteristics like objectivity, reliability, validity, originality, usability, sensitivity.
- 4) The two different aspects of objectivity are: Objectivity of items and Objectivity of scoring.
- 5) **Reliability:**
  - a. Reliability is consistency in measurement.
  - b. The reliability of a tool can be established with the help of: Test-retest reliability, Split half reliability, Parallel forms etc.

**Validity:**

- a. A tool is said to be valid when it measures what it is supposed to measure and perform as it is designed to perform.
  - b. Validity of a tool can be established with the help of content validity, concurrent validity, face validity etc.
- 6) A test is a systematic procedure for observing a person's behaviour and describing it with help of a numerical scale.
  - 7) By function , by nature and by the procedure of administration.
  - 8) Speed Tests are those tests which contain such items which are of somewhat equal difficulty value. To solve the tests the time limits are fixed. Power tests are those tests which contain items of different difficulty value arranged in increasing order of difficulty value. For such tests time limit is not fixed, it is flexible.
  - 9) Refer 13.5.2
  - 10) Refer 13.5.3
  - 11) Refer 13.5.5
  - 12) Refer 13.5.4
  - 13) Types of Observation: Participant and Non-Participant  
Types of interviews: Structured and Unstructured
  - 14) As a technique of data collection good interview requires -
    - i) Preparing for Interview
    - ii) Conduct of Interview (execution)
    - iii) Recording and Interpreting Responses
  - 15) More prone to researcher's subjectivity. It is time consuming. Analysis of data is difficult. Researcher has to face practical difficulties.