CHAPTER 3

PLAN AND PROCEDURE

“A good plan, violently executed now, is better than a perfect plan next week”. There is a need for from first to last understanding of all research method with particular reference to their strength; restrictions, applicability and appropriateness for an inappropriate method can only have to unsatisfactory results and disillusionment”. Anything to be done properly must be planned beforehand. This thing assists the research scholar to continue in a straight line without perplexing with associated events. A well thought out plan of action in advance follows by a systematic completing brings out rewarding results. The research cannot be considered as the chaotic assignment but it requires happening in a explicit direction done with definite intension of talking a specified problem and tries to find the resolution in a systematic manner on research.

In research study, the investigator requires to describe the procedure she uses for compilation of data for this study. She is required to argue and clarify the procedure of administrating the tools and its scoring technique. The chapter is confined to the discussion of these points under the following steps:

1. Population
2. Sampling
3. Methodology
4. Tools used
5. Collection of data

In this chapter, the scholar has highlighted the outline the research work carried out based on the application and utilization of the inquiry-based teaching model in the secondary school located in different locations in Haryana state.
3.1 POPULATION

In statistics, the population may be defined as the whole assembly about which several information are required to be established. The geometric population necessitate consist of the people with finite numbers. In opting for a population for study, the population size will be defined on the basis of the research question or purpose of the study in requisites of locality and constraints to a fussy mature group, sexual characteristics or activity. The population must be completely defined so that those to be incorporated and expelled are evidently spelt out (enclosure and elimination decisive factor).

Figure 3.1 Population

In this research study, the population consists of the all students studying in the secondary school located in the both urban and rural areas in Haryana. Hence the research scholar has considered the students which are studying in the rural area, or urban area of Haryana state.

In epidemiological research, the word population does not converse always with its demographic denotation of the entire crowd of community living within convinced geographic or political margins. The students studying in the secondary school of Jind & Rohtak district of Haryana constituted the population for the intention of the current study. The study was confirmed to both Urban & Rural secondary school
3.2 SAMPLE

The sample is any segment of the entirely discrete population. The students studying in particular school from Rohtak and Jind district is a sample of all students in the research at the instant. To mark specific conclusions, the sample has to be descriptive. A representative sample is one in which all contributors of the population has an equivalent and regularly restricted unintentional role is being preferred.

3.2.1 Sampling techniques

In statistics and survey methodology, sampling is concerned with the selection of a subset of individuals from within a statistical population to estimate characteristics of the whole population. The three main advantages of sampling are that the cost is lower, data collection is faster, and the accuracy and quality of the data can be easily improved. There exists a number of sampling techniques used in the research work. The Convenience sampling is one of them Convenience sampling is a non-probability sampling technique where subjects are selected because of their convenient accessibility and proximity to the researcher. The subjects are selected just because they are easiest to recruit for the study and the researcher did not consider selecting subjects that are representative of the entire population.
In all forms of research, it would be ideal to test the entire population, but in most cases, the population is just too large that it is impossible to include every individual. This is the reason why most researchers rely on sampling techniques like convenience sampling, the most common of all sampling techniques. The research scholar prefers this sampling technique because it is fast, inexpensive, easy and the subjects are readily available.

Convenience sampling can be used by almost anyone and has been around for generations. One of the reasons that it is most often used is due to the numerous advantages it provides. This method is extremely fast, easy, readily available, and cost effective, causing it to be an extremely attractive option to most researchers.

The most obvious criticism about convenience sampling is sampling bias and that the sample is not representative of the entire population. This may be the biggest disadvantage when using a convenience sample because it leads to more problems and criticisms.

Systematic bias stems from sampling bias. This refers to a constant difference between the results from the sample and the theoretical results from the entire population. It is not rare that the results from a study that uses a convenience sample differ significantly with the results from the entire population. A consequence of having systematic bias is obtaining skewed results.

Another significant criticism about using a convenience sample is the limitation in generalization and inference making about the entire population. Since the sample is
not representative of the population, the results of the study cannot speak for the entire population. This results to a low external validity of the study.

### 3.2.2 Sample size

The key requirements for calculating the sample size have been dealt from a methodical research scholar’s viewpoint circumventing the employment of standoffish procedures and mathematical verbiage in a foregoing anxiety of the periodical. The population is an entire set of citizens with a wholehearted set of features, and a sample is a section of the population.

The conventional principles which are being used in defining the populace are geographic, for illustration, “the school of Haryana”. In this research study, the decisive factor for population is experimental, demographic and time related. Experimental and demographic features define the immense population, the huge set of student in the state to which the consequences of the study are wide-ranging. The study population is the division of the plank population accessible for study. The study sample is the sample preferred from the study population.

The sample is an indispensable impassiveness of the technical procedure. A sample is a slight segment of a population. Classically, the population is specific gargantuan, making a survey or an entire catalog of all the values in the general population unrealistic or implausible. The sample signifies a clause of controllable size. Samples are unruffled and statistics are calculated from the samples so that one can make explanation or extrapolations from the sample to the general public.
One can make sway extrapolations about the population from which it is drawn, conflicting to some prevailing assessment. The sample is not preferred hysterically. They are elected in a precisely disorganized way. So that probability or the operation of the opportunity can be demoralized. According Good, (1952) “A sample is a miniature of the population”. To be accurate, sample must be illuminating of a population and must be sufficient in number. There are two essential requirements of sampling practice to fulfill. First, it is physically unfeasible to work with the total population in a well-organized exploration. Second, it is requirement to save times, service and money.

3.2.3 Selecting Criteria for Experimental & Control Group

In the sample used in this research study, it has consisted of different two types of the groups as given below:

- **Traditional Group** - Individuals who did not receive guidance, selected from the control pool, which are characteristically alike to the participant group.

- **Experimental Group** – Individuals who received the training with inquiry-based teaching model and used to determine the impact of a inquiry-based teaching model whereby individuals are randomly assigned to the participant and control groups by the researcher prior to training.

Typically, scientists do not have the time or finances to choose an entirely randomized sampling, otherwise known as the compilation of data from a division of the population. Instead, scientists have to rely on a certain form of data collection called convenience sampling. This type of sampling has a few drawbacks, but still remains an admired way to collect statistical data for many different areas of study.

The convenience sampling can be used in any field of research, including education, psychology, sociology, and political science, as well as in biological fields of study, when attempting to assess trends in human development or to gain a better understanding of changes in biology. Often times this type of sampling is used by researchers who wish to quickly show a trend and gain funding for a larger, more comprehensive sampling that reflects a more accurate range of data.

The basic reason for using the convenience sampling in this study because it is also used for preliminary studies, as well as for research that doesn’t can be represented in a
smaller portion of the population, such as number of students in different schools located in different area such like urban and rural etc. The researcher scholar is realistically unable to accurate receive a random sampling of the population. For example, mostly schools do not allow the scholars to teach their students in board classes’ exams like 10th & 12th for avoiding the teacher change but may allow them to teach them other classes like 7th & 9th class for short time duration. This method of sampling allows for the researcher to gather data even when facing obstacles. By analyzing the data, they can extrapolate trends and compensate for some of the lack in their data.

The research scholar has designed their experimental and traditional groups of size 60 students each with the help of convenience sampling based on factors such as student strength, authority permission and distance etc.

![Sampling Diagram](image)

**Figure 3.5 Sampling**

### 3.2.4 Sample used

It was decided to select the sample from the secondary school of Jind district of Haryana state. The study was done on basis of experimental method. The survey had consisted of following as given below:

- Total 120 students
- 60 students from the rural area
- Other 60 students from the urban area.
- 30 boy students belonged to rural area
• 30 girl students belonged to rural area
• 30 boy students belonged to urban area
• 30 girl students belonged to urban area.

Name of the secondary school of Jind District is given as below:

• Indus Sr. Sec School School Jind
• Shiv Sr. Sec School Gatoli Julana

The detail of the sampling used in this study is described in the table 3.1.

Table 3.1 List of schools

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Name of school</th>
<th>Location</th>
<th>Total</th>
<th>Boy</th>
<th>Girl</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Indus Public School Jind</td>
<td>Urban</td>
<td>60</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>Shiv Sr Sec School Gatoli Julana</td>
<td>Rural</td>
<td>60</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

Figure 3.6 Sampling used

The study has been done on the basis of the Inquiry-based teaching model and the data has been collected with the help of Achievement test.
3.3 RESEARCH METHODOLOGY

The methodology may be defined as incidents which provide the logical scrape proposal that elucidate how the researcher functioning his or her research. The research methodologies endow with the way to mapping out the research effort in consequence to construct a tangible strategy in time hurdle.

In The “Dictionary of Qualitative Inquiry” (2001), the author Thomas A Schwandt classifies the tactic as a theory of how investigation should carry on. It involves psychotherapy of hypotheses, the ideologies, and events in a scrupulous method or strategy to the inquiry. The methodologies illuminate and exemplify the different kind of problems that are noteworthy investigating; what comprises a research problem.

![Figure 3.7 Research track](image_url)

The accurate research methodology guides the research scholar in the precise way. The whole research sketch is oriented on the perception of precise methodology. The first stage of work gives the profundity idea of surroundings the correct research objective, followed by the literature point of problem sight and finally accomplished output by this investigation. On the other hand the research methodology acts as the nerve core because...
the total research is enclosed by it and to perform a superior research work, the interior and exterior atmosphere has to pursue the accurate methodology method.

3.3.1 Methodology Used

The methodology can appropriately state to the speculative examination of the methods suitable to the meadow of study or to the organisation of methods and ideologies particular to an outlet of knowledge. In this intellect, one may express of protestations to the attitude of a physical survey or of the methodology of modern intellectual sensibility. The decision about the methods of research depends upon the problem designated and kind of the data essential for the purposes. The selection of the passable methods, tools and techniques is a very unwieldy task and must be moved with cautions, care and profound consideration in respects of time, cost, ability, experience and need of the exploration. The purpose of this study is to deliberate about the usages of Inquiry-based teaching in the secondary school & it discuss academic achievement in the social studies subject. The survey approach to scholastic problem is one of most commonly used approaches. It is used in studying local as well as state, national and international aspect of education. It involves explanation, arrangement, evaluation and simplification, all concentrating towards proper sympathetic and solution of momentous educational difficulties. The research work is divided into different phases. Each phase of the research work has own impact on the objectives of our work. Our research work is carried out in following phases as given below:

- The review of literature is being done through the comparative study.
- The data collection is being done with the help of Achievement test.
- The data analysis is being done using Statistical techniques.

In this way, our research work is being carried out in predefined steps & every phase is being planned properly. Without proper planning, these phases can collapse into each other and disturb the whole research process.

3.4 TOOLS USED

Having selected the sample, the subsequent step is to select the appropriate techniques or tool for variety of data; the scholar need self-possessed tool to gather new facts or to
regulate new fields. The selection of the tools for a precise study depends upon the several discussions such as meanings of the study, accessibility of apposite tests, personal competence of the detective, to administrator, mark and understands the result of the questionnaire.

Taking all these factors into considerations the scholar employs Social Science Academic achievement test for students studying the Social science subject in the secondary schools located at urban and rural area of Haryana state.

3.4.1 Achievement Test

Achievement test plays noteworthy role in the school stage, and presented achievement tests are widely used at both the straightforward and subsidiary school levels. There are hundreds of available achievement tests accessible for use. In addition, in recent years, a number of states and districts have initiated their own testing and evaluation systems or have constricted with publishers to extend assessments to their specifications. Hence, it is momentous to understand the strengths and liabilities of these tests.

![Figure 3.8 Type of Achievement Test](image)

Figure 3.8 Type of Achievement Test
A standardized achievement test has convinced unique features, including a fixed set of test items well thought-out to compute an evidently demarcated achievement prefecture, specific guidelines for running and including the test, and norms based on affectionate groups of articles like those for whom the test was intended. However, no two tests are precisely alike. Much of the criticism of standardized tests can be related to misappropriations of results. Too often consistent tests are conventional to provide functions for which they were never envisioned or for which they are inadequately well-matched. Standardized achievement tests are regularly used in the form of survey test batteries. A battery consists of a succession of individual tests all standardized on the same nationalized illustration of students. Achievement batteries are used most often at the elementary school level.

While achievement test batteries conventionally are projected as survey tests, test publishers have taken stages to make the test results of achievement batteries supplementary beneficial to classroom teachers. Some test batteries encompass of an incorporated series of survey tests and group-administered logical tests covering the same areas of fundamental skills.

In addition to achievement batteries, there are many single subject achievement tests designed to compute achievement in specific areas. The preponderance of these can be classified as tests of course content or reading tests. Sets of objectives and related test items are conserved by most great test publishers and by other administrations. These item banks are used for computer cohort of adapted tests. Because of the increased number of children with powerlessness in the consistent classroom, classroom teachers need to grow to be familiar with some of the individual tests that are presented for measuring accomplishment. These tests are directed to one student at a time and the questions are routinely answered verbally or by pointing, although some writing may be necessary.

An achievement test assesses a learner's understanding of a detailed course or study programme. It can be linked with expertise tests, which measure a learner's glassy of language, analytical tests, which recognize areas learners’ preconditions to work on, and a prognostic test, which tries to imagine a learner's ability to complete a course or take an assessment.
3.4.2 Evaluating Achievement Test

The achievement test is one of the basic & useful tools which can be used for measuring the academic achievement of the individual student. The Achievement test can be applied at any level or grade of the education. Its results define the accurate level of the student performance in the particular subject. Hence designing of the achievement test is the most critical stage of the academic.

If the assessment processes or criterion are dissimilar for criterion-referenced tests, a detach explanation is accessible. The following criteria present a helpful agenda for assessing norm-referenced achievement tests and items:

- **Relevance**: The questions must be relevant to the course contents. It should be not be out of syllabus.
- **Balance**: The questions must be cover & involve all content areas and cognitive processes specified in the test blueprint.
- **Efficiency**: This refers to the number of items per unit of testing time. The more information about a student’s achievement level obtained in a specific amount of time, the better.
- **Specificity**: Items should be written to evaluate learning objectives only, not reading or writing capability, all-purpose cleverness, or test enchanting capability.
- **Difficulty**: A difficulty rank represents the quantity of examinees replying appropriately to the questions. The quantity specialists advise an excellent mean involvedness for a norm-referenced achievement assessment to be intermediary between a superlative mark and a probability score.
- **Variability**: If grades are to be based upon a customary curvature, a wide range or widen of scores is indispensable. Very straightforward or complicated items do not donate to unpredictability.
- **Reliability**: This is a generally test statistic demonstrating score steadiness, and is the solitary the majority imperative statistic for a norm-referenced achievement test. Reliability indexes variety from 0.0 to 1.00 with a .70 considered to be the smallest amount value adequate. The elevated score unpredictability, high unfairness, and temperate complicatedness levels are connected with high steadfastness.
These factors must be considered in designing of the achievement test.

### 3.4.3 Major steps involved

There are multiple steps required to design the academic achievement test for each class or grade. There are following steps involved in designing the achievement test as given below:

**1st Step: Planning of test:**
First step finalize the objectives of the Test & determines the maximum time and maximum marks also.

**2nd Step: Grounding of a blueprint for the test**
The following imperative issue to be considered in blueprint for the test is:

- **Weightage to objectives:** This specifies what objectives are to be tested and what weightage has to be given to each intention. For example following objectives are following weightage as given below:

<table>
<thead>
<tr>
<th>S. No</th>
<th>Objectives</th>
<th>Marks</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Knowledge</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>Perceptive</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>Purpose</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>4</td>
<td>Psychoanalysis</td>
<td>8</td>
<td>32</td>
</tr>
<tr>
<td>5</td>
<td>Creation</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>6</td>
<td>Assessment</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>25</td>
<td>100</td>
</tr>
</tbody>
</table>

- **Weightage to content:** This indicates the different characteristics of the content to be tested and the weightage to be given to these different characteristics.
Table 3.3 Content wise mark distribution

<table>
<thead>
<tr>
<th>S. No</th>
<th>Content</th>
<th>Marks</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Section - 1</td>
<td>15</td>
<td>60</td>
</tr>
<tr>
<td>2</td>
<td>Section - 2</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>25</td>
<td>100</td>
</tr>
</tbody>
</table>

- **Weightage to form of questions**: This indicates the form of the questions to be included in the test and the weightage to be given for each form of questions.

Table 3.4 Scoring pattern

<table>
<thead>
<tr>
<th>S. No</th>
<th>Form of questions</th>
<th>No. of Questions</th>
<th>Marks</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Objective type</td>
<td>14</td>
<td>7</td>
<td>28</td>
</tr>
<tr>
<td>2</td>
<td>Short answer type</td>
<td>7</td>
<td>14</td>
<td>56</td>
</tr>
<tr>
<td>3</td>
<td>Essay type</td>
<td>1</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>22</td>
<td>25</td>
<td>100</td>
</tr>
</tbody>
</table>

- **Weightage to difficulty level**: This indicates the total mark and weightage to be given to different level of questions.

Table 3.5 Type of questions

<table>
<thead>
<tr>
<th>S. No</th>
<th>Level of questions</th>
<th>Marks</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Easy</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>Normal</td>
<td>15</td>
<td>60</td>
</tr>
<tr>
<td>3</td>
<td>complicated</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>25</td>
<td>100</td>
</tr>
</tbody>
</table>
3rd Step: Groundwork of the blueprint

Blue print is a three-dimensional table giving the assignment of the objectives, contented and structure of questions.

Following notation represents as given below:

- O – Objective Type,
- SA – Short Answer Type,
- E – Essay Type

The number outside the bracket indicates the marks and those inside indicates the number of questions.

<table>
<thead>
<tr>
<th>Objectives Form of Qtn</th>
<th>Knowledge</th>
<th>Understanding</th>
<th>Application</th>
<th>Analysis</th>
<th>Synthesis</th>
<th>Evaluation</th>
<th>Grant Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content</td>
<td>O SA E O SA E O SE E OSA E O SA E O SA E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub Topic- 1</td>
<td>2 (4) 1 (2) 2 (4) 2 (1) 4 (1) 2 (1) 2 (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Sub Topic – 2</td>
<td>1 (2) 1 (2) 2 (1) 4 (2) 2 (1) 4 (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Total Marks</td>
<td>3 0 0 2 0 0 2 4 0 0 4 0 4 0 2 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>Grand Total</td>
<td>3 2 6 8 4 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4th Step: Writing of questions

The paper setters engrave items according to the blueprint. The complicatedness level has to be well thought-out while lettering the items. It should also ensure whether all the questions integrated can be replied within the time allotted. It is prudent to organize the questions in the categorization of their complicatedness level.

There can be following type of questions as given below:

- Objective type
- Short answer type
- Essay Type

To summarize the steps for constructing a test blueprint to achieve a valid achievement test:

1. List significant course content or topics.
2. Categorize proper cognitive levels using Bloom’s Taxonomy of Educational Objectives for each of the course objectives.
3. Determine the amount of items for
   a. the whole test
   b. All sections

It also presents suggestions for interpreting the outcomes of achievement tests.

3.4.4 Reliability and validity

The achievement test must be reliable and validated. A reliable and validated test can provide the accurate result and exact scenario of the data interpreted. There exist a lot of the tools. The cronbach’s alpha is one of popular way of measuring the reliability of the achievement test.

Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability. A "high" value for alpha does not imply that the measure is unidimensional. If, in addition to measuring internal consistency, you wish to provide evidence that the scale in question is unidimensional, additional analyses can be performed. Exploratory factor analysis is one method of checking dimensionality. Technically speaking, Cronbach's alpha is not a statistical test - it is a coefficient of reliability (or consistency).
Cronbach's alpha can be written as a function of the number of test items and the average inter-correlation among the items. Below, for conceptual purposes, we show the formula for the standardized Cronbach's alpha:

$$\alpha = \frac{N \cdot \bar{c}}{\bar{v} + (N - 1) \cdot \bar{c}}$$

Here \(N\) is equal to the number of items, \(c\)-bar is the average inter-item covariance among the items and \(v\)-bar equals the average variance.

One can see from this formula that if you increase the number of items, you increase Cronbach's alpha. Additionally, if the average inter-item correlation is low, alpha will be low. As the average inter-item correlation increases, Cronbach's alpha increases as well (holding the number of items constant).

In this research work, the reliability has been calculated with help of the SPSS software. The output of the tests is represented as below:

$$\alpha = 0.9$$

Hence the designed achievement test is valid for the data collection and interpretation.

### 3.5 SCORING PROCEDURE

The exam is defined as the evaluation method which has been proposed to extent test-takers awareness, ability, capability, corporeal, or association in many other topics.
A test score may be contingent with regards to a norm or criterion, or infrequently both. The norm may be established separately, or by arithmetical investigation of a large amount of participants.

There may be following types of test scores as given below:

- **Raw Scores**: On the score sheet of any homogeneous test, the raw score is maximum probable to be the leading one listed. The raw score is accurately what it sounds like: the raw data which is the quantity of items a student answered appropriately on a given test section. Without a basis of assessment raw scores are impractical. For example, if a test indicates a student answered 50 questions correctly but doesn't say how many total questions were given, the student's performance can't be measured.

- **Standard Scores**: Standard scores signify how close to the average, or mean, the student's scores fall. Normally represented by a solitary number, standard scores can be inferred by knowing which number signifies the mean. Any number higher than the mean is measured above average and any number lower than the mean is considered below average. A common reporting method is the Standard Nine (Stanine), which gives a number score of 1 through 9, with the numbers 4, 5 and 6 being the mean. Standard scores can also be reported as Normal Curve Equivalents (NCE), which have a mean of 50, and Standard Age Scores (SAS) that have a mean of 100.

- **Norm-Referenced Scores**: Common norm-referenced tests like the Woodcock-Johnson, the California Achievement Test and the Stanford Achievement Test, use data to compare a student's performance to that of his peers. Scores can be reported in percentile ranks and age and grade-equivalencies. Percentile rank shows what percentage of students performs higher or lower than the student's score. Age and grade-equivalencies are the age or grade level at which the student performs. For example, a test may indicate the student reads at a fifth-grade level. Many researchers warn that grade and age-equivalency scores are unreliable because children acquire skills more rapidly when they are younger. So, a six month delay affects young children more than adolescents or adults.
• **Criterion-Referenced Scores**: Most curriculum-based assessments, in-class quizzes and exit exams, like the California High School Exit Examination are criterion-referenced tests. These are sometimes referred to as "achievement tests" because they score a student's performance on a predetermined set of skills or standards. Generally, raw scores from criterion-referenced tests are converted into a percentage, and performance is valued relative to 100.

For example, if a student answered 40 out of 50 questions correctly on a criterion-referenced test, the score would be converted to 80 percent correct. Student progress can be tracked by how much improvement is made to this percentage over time.

<table>
<thead>
<tr>
<th>SR. NO</th>
<th>TYPE OF QUESTIONS</th>
<th>SCORING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Multi-choice question</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Medium length answer question</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Lengthy answer question</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Map</td>
<td>4</td>
</tr>
</tbody>
</table>

### 3.6 COLLECTION OF DATA

The data collection phase is a confident part of all type of the research scholarship. Throughout this phase, the erroneous data collection makes the wickedest impact on the consequences of a research study and eventually generates invalid results. For the purpose of the data collection, the quantitative or qualitative methods may be applied by the research scholar. The research data may be characterized into primary and secondary classes. The primary data are being created by the researcher using data gathering techniques. The secondary data are being created by others and these data includes datasets and case resources etc.
3.6.1 Primary data

Before collecting the data, the tests were made for the data collection. The investigator had visited the selected school of Jind district. First of all investigator had taken permission from the institutions. After receiving the permission, investigator had collected the data. The Academic Achievement Test had been conducted to the students. Before giving the Academic Achievement Test, proper report file had been prepared. The students were assured that present Academic Achievement Test was meant for the research purpose and would not affect them in any way. The achievement tests have been organized at following schools:

- Indus Secondary School Jind which is located in urban area. Total 60 student including 30 boys and 30 girls students are instructed to face the examination through both modes
- Shiv Secondary School Village Gatoli Julana which is located in rural area. Total 60 student including 30 boys and 30 girls students are instructed to face the examination through both modes

3.6.2 Secondary data

The secondary data may be defined as the compilation of data that have been earlier collected from other existing resources. This data are cheaper and supplementary hurriedly accessible than the primary data. The scholar has collected the secondary data from following resources as given below:

- Various schools located in Haryana schools
- Technical reports generated by various bodies ie government, semi government and private business organizations.
- Newspapers and Magazines such as Economic Times, Financial Express etc.
- Research papers related to the academic achievement.

The secondary data consists of very useful facts regarding the problem taken in the research work. It helps the researcher to evaluate the problem in different views.

3.7 DATA ANALYSIS

The data analysis plays enormously noteworthy responsibility in deriving the beneficial
conclusion that makes the directly impact on judgment building procedure. It may be defined as the evolution of inspecting, crackdown, transforming, and modeling data with the objective of accenting constructive information, suggesting conclusions, and sustaining decision making. This approach consists of numerous facets and approaches encircling miscellaneous techniques under the diversity of domains.

Data Analysis is the procedure of scientifically concerning arithmetic and/or rational procedure to illustrate and exemplify, concentrate and recapitulate, and appraise data. a variety of systematic procedures provide a way of drawing inductive inferences from data and discriminating the signal (the confrontation of attention) from the noise (arithmetical fluctuations) nearby in the data.

While data analysis in qualitative research can comprise numerical procedures, many times analysis becomes an ongoing iterative process where data is continuously collected and analyzed almost simultaneously. Indeed, researchers commonly investigate for prototypes in observations through the whole data compilation stage. The appearance of the investigation is unconquerable by the specific qualitative approach taken and the form of the data.

The data analysis techniques include various types of analysis techniques such as univariate, bivariate and multivariate analysis. Multivariate analysis may be defined as the compilation of all statistical method that concomitantly examine numerous dimensions of each individual or object under investigation using other approaches.

An indispensable constituent of making certain data reliability is the precise and suitable investigation of research findings. The inappropriate statistical analyses disfigure systematic findings, mislead casual readers, and may pessimistically maneuver the public discernment of research. The truthfulness issues are immediately as pertinent to psychoanalysis of non-statistical data as well.

3.7.1 Analysis of numerical variables

Two statistics – the centre and the spread – commonly describe numerical data. The centre describes a typical value and the spread describes distance of data from the centre.
The most common statistics used to describe the centre are the mean (commonly known as the average) and the median. The median is the middle value in a data set, half the data are greater than the median and half are less. The mean is calculated by adding up all the values and then dividing by the total number of values.

Using our case study example – if you were to interview 23 street children and record their age you might get a set of data as below. Each number is the age of an individual child and the ages have been arranged in order.

3 3 4 4 5 7 7 8 9 10 10 11 12 12 12 13 13 14 14 15 15 15 16

The mean and the median would be different for this dataset. To calculate the median you need to arrange the children in order of age and then find the mid-way point. In this example, 11 children are below the age of 11 and 11 children are above the age of 11.

To calculate the mean you need to add up all the ages and then divide by the number of children (23 in this example).

So

\[ 3+3+4+4+5+7+7+8+9+10+10+11+12+12+12+13+13+14+14+15+15+16 \]

\[ = 232 \]

\[ 232/23 \]

\[ = 10.08 \]

\[ = \text{mean age of the children interviewed.} \]
“Central Tendency”

<table>
<thead>
<tr>
<th>Measure</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (Sum of all values / no. of values)</td>
<td>Best known average, Exactly calculable, Make use of all data, Useful for statistical analysis</td>
<td>Affected by extreme values, Can be absurd for discrete data (e.g. Family size = 4.5 person), Cannot be obtained graphically</td>
</tr>
<tr>
<td>Median (middle value)</td>
<td>Not influenced by extreme values, Obtainable even if data distribution unknown (e.g. group/aggregate data), Unaffected by irregular class width, Unaffected by open-ended class</td>
<td>Needs interpolation for group/aggregate data (cumulative frequency curve), May not be characteristic of group when: (1) Items are only few; (2) distribution irregular, Very limited statistical use</td>
</tr>
<tr>
<td>Mode (most frequent value)</td>
<td>Unaffected by extreme values, Easy to obtain from histogram, Determinable from only values near the modal class</td>
<td>Cannot be determined exactly in group data, Very limited statistical use</td>
</tr>
</tbody>
</table>

Figure 3.11 Comparisons of central Tendencies

3.7.2 Issues in data analysis

There are numerals of problems that researchers should be cognizant of with respect to data analysis. These include:

- Having the essential skills to investigate
- Concomitantly selecting data collection methods and suitable investigation
- Drawing impartial presumption
- Unsuitable subgroup investigation
- Following satisfactory norms for disciplines
- Determining arithmetic consequence
- Be deficient in of obviously defined and purpose conclusion measurements
- Providing truthful and precise analysis
- Comportment of presenting data
- Ecological/appropriate issues
- Data recording means
• Partitioning 'text' when scrutinizing qualitative data
• Training of staff conducting analyses
• Consistency and legality
• Scope of analysis

The Primary and Secondary data collected by using various techniques like questionnaires and further analyzed to find the correct solution.