CHAPTER 4

DESIGN OF THE STUDY

In the study, “Academic Achievement Test” prepared by the researcher has been used to standardize the intensification in the academic achievements of the students. According to the findings of the study; the academic achievements of the students towards Social science, who have been in the experimentation group studying in inquiry based teaching environment has exhibited a distinction in a noteworthy way compared to those in control group studying in the environment to which 2013 Social curriculum of CBSE board has been applied. Precisely measuring academic achievement is an imperative part of planning for a child's education. However, no one source of information should be used to evaluate academic achievement. A student may exhibit knowledge on one appliance and not on another. Using good strategies to evaluate academic achievement from multiple sources will guarantee good information and the best potential educational planning. Let’s talk about the definition of the academic achievement before discussing the design of the study in this research work.

4.1 ACADEMIC ACHIEVEMENT

Academic achievement is the outcome of teaching which defines the degree of the academic improvement achieved by the student, teacher or institution. These factors also bring about their learning objectives of the individual institutions. It is universally distinguished by examinations or unremitting assessment, but there is no comprehensive concord on how it is best established or which aspects are the majority imperative including bureaucratic knowledge such as skills. The academic achievement of individual student has been associated to difference in cleverness and behavior. Students with complicated emotional aptitude as established by IQ tests and those who are superior in meticulousness tend to accomplish extremely in academic settings.
The academic achievement can be expressed in many ways. The parents and institution take concern of the academic achievement of their students. This factor represents overall progress of the students in the particular subject. It is used to scale the progress of the students during the particular session. It may be following type as given below:

- Positive academic achievement
- Negative academic achievement

If there is the improvement in the academic level then it is called as positive academic achievement as shown in the figure 4.1. In the figure 4.1 there is positive mean change in the academic achievement scale score. The level is shown in the figure 4.1 also.

Normally the words "achievement" and "progress" are regularly used in this context of academic environment. On the other hand, their meanings are extremely dissimilar. Let’s discuss the meaning of these terms.

**Achievement** may be defined as the performance of the students’ at the specific time and how is different from the other students’ performance in the particular class. Generally it is calculated with the help of class tests and the exam results with respect of the academics grading. For example the teachers want to calculate the particular student's social science achievement level, which can be calculated yearly using exam score cards having the scores achievement in different exams conducted in the class room.
**Progress** may be defined as measurement of students’ performance over the specific time period for example particular 2013 to 2014 or 1st semester to 2nd semester. With the help of the child's growth chart, the academic progress may be measured very easily. The growth chart demonstrates the child's height at different age stages like 2nd year, 3rd year etc. These data points can be connived to demonstrate that child's physical enlargement over a precise phase of time. The basic differences between the achievement and the progress are being demonstrated with the help of figure 4.2.

![Achievement Vs Progress](image)

**Figure 4.2 Achievement Vs Progress**

The growth model measures the magnitude of students' educational improvement between two points in time. The terms "value added" and "growth models" are frequently the cited arithmetic methods for calculating the student growth for liability purposes. Growth models can be classy tools that help measurement how much student learning is taking place. But like all tools, they are the largest part efficient in the hands of those who recognize how to use them.

**4.2 WAYS TO IMPROVE ACADEMIC ACHIEVEMENT**

There is one self-confident characteristic to a school being located in School enhancement. It releases eyes that improvement has an occurrence to develop. One of the primary rebuffs is that variation which is occasionally comfortable. People elevate to the same position quo and do not necessitate the apple cart upturned. This is by no resources
all that schools should be doing. Note that these are extensive actions; there are many more comprehensive actions that require to be taken.

1. **The School Should Be a Variation Agent:** The Variation agents are obsessive and driven about their vision. They make the intimidating conclusions keeping what's best for the students in focal point. When grievances about change and enrichment come rolling in, and they will pay close consideration to the leadership and their decisions.

2. **Analyze Data:** Everyone convoluted must be data inspection; from the administration to the teachers. The surreptitious to data scrutiny is to do roughly with the data. Many schools explore the data and do not do whatever thing with it. It must celebrate the strengths, preserve the focus on enhancement and draw up plans on how going to recover on the failing and execute it.

3. **Introduce Students to Their Data:** As comprehensible as this may wide-ranging, many times teachers take on the impediment of the accountability and do not allow students to take possession of their education. It involves students by giving out their data with them from consistent test data to classroom data.

4. **Increase severity:** Schools are looking for atmosphere and the prescription is precise under their noses. Schools can do all else in this list, including plummeting class magnitude, but if a school does not upsurge the rigor in education and learning, they are spitting in the wind. The key is distinguishing the difference between stiff questions and multifaceted questions. Numerous teachers will articulate the students that they have backbreaking assignments, when in reality, they do not. This one thing will make the chief impact in not only learning, but in scores. If schools were to increase the severity and complexity, the scores would take care of themselves.

5. **Teach Students the Levels of severity:** It should teach students the difference between recollect, solicitation, and planned reasoning. When students learn the alteration between how much thinking is required to answer questions at each level, it supports them in not only responding questions, but also in their learning. I've taught the levels to my previous students and it was a crucial instant in their
careers as learners. This strategy paired with the above affirmed increasing strictness in instruction and assignments is an influential combination.

6. **Expectations:** The expectations go hand-in-hand with increasing rigor. Students will rise to expectations. It makes sure the prospect are not set too low and demonstrate an expectation that all students can achieve the objectives of courses.

7. **Teach Students How to Learn:** The students are taught what to learn. In order for them to be victorious as learners, they also have to determine how to learn and to expand an appetite for learning. I'm convinced that one of the reasons some students do not succeed in college is that they cruise through high school learning the prearranged curriculum, but never learn how to learn. Students, at an early age have to be taught how to:
   - self-regulate their learning
   - set their own educational objectives
   - develop strategies to meet their objectives
   - reproduce on their academic performance

8. **Teachers as Learners Environment:** Teachers are all about educating their students. Teachers should also empower in themselves. I'm referring to teachers aggressively following knowledge because they want to be acquainted with more.

9. **Teach Smarter and Not Harder:** It should amalgamate research-based teaching and learning strategies.

These are the places of interest of what the researchers deem as significant to creating an environment that encourages student accomplishment. The school still has changes that need to be made. Optimistically, the researcher will struggle to continue the good quality work. The researchers have begun and combine that with goals toward the expectations.

### 4.3 EXPERIMENTAL DESIGN

In the research, the experimental design may be defined as the blueprint of any assignment which has been designed for purpose of illustrating or clarifying the distinction of information under circumstances that are assumed to replicate the distinction. The experimental design is normally linked with precise trial in which the design establishes circumstances that unswervingly influence the deviation, but may also
refer to the design of quasi-experiments, in which normal conditions that manipulate the deviation are chosen for inspection.

In its simplest outline, an experiment aims at forecasting the conclusion by initiating a alteration of the prerequisites, which is replicated in a variable called the predictor. The alteration in the predictor is usually assumed to consequence in the alteration in the succeeding variable, hence called the outcome variable. Experimental design engages not only the assortment of appropriate predictors and conclusions, but planning the liberation of the experiment under statistically most favorable conditions which are agreed the constrictions of accessible resources.

The major worries in experimental design consist of the founding of validity, reliability, and explicability. For example, these concerns can be moderately addressed by cautiously preferring the predictor, reducing the hazard of measurement miscalculation, and ensuring that the credentials of the technique are adequately comprehensive. Connected concerns embrace achieving suitable levels of statistical supremacy and sympathy. The appropriately planned experiments precede knowledge in the ordinary and social sciences and engineering.

4.3.1 Types of designs

The experimental design can be categorized into an uncomplicated threefold categorization by inquiring a few key queries. First query is related to selection of random assignment to groups? As the shown in figure 4.3, there can be two situations as given below:

a) Case I: The random assignment is used in the experimental design

b) Case II: The non-random assignment is used in the experimental design

When case I occur then such design may be called as the randomized experiment or true experiment design. Otherwise the case II occurs then next concern about design whether using various groups or numerous influence of measurement. There are following answers as given below:

a) If there exist then it is called as quasi-experimental design.

b) If no, then it is called as non-experimental design.
This threefold classification is particularly helpful for recitation the design with respect to interior validity. A randomized experiment usually is the strongest of the three design categories.

4.4 RANDOMIZED EXPERIMENTAL DESIGN

In this study, the randomization engages indiscriminately distribution of the experimental units across the solution. The randomized experimentation is not unsystematic. The randomization moderates preconception by harmonizing other factors that have not been explicitly accounted for in the experimental design. The randomized experimental design can be performed in following types as given below:

- **The "One-Shot Case Study"**: In this study there exists no control group in this type of research study. This design has practically no interior or exterior legality.

- **2 Group, Post-test Comparison**: The major benefit of this plan is randomization. The post-test assessment with randomized subjects controls for the foremost consequences of the past, maturation, and pre-testing; since no pre-test is applied there can be no dealings outcome of pre-test and X. Another benefit of this design
is that it can be comprehensive to comprise more than two groups if indispensable.

- **One group Pre-test, Post-test**: There exists minimum control. There is rather supplementary configuration; there is a solitary preferred group under surveillance, with a vigilant extent being done earlier than concerning the investigational conduct and then computing after. This design has negligible interior authority, calculating only for assortment of subject and investigational humanity. It has no exterior legitimacy.

- **Two groups, Nonrandom Selection, Pre-test, Post-test**: The main weakness of this research design is the internal validity is questioned from the interaction between such variables as selection and maturation or selection and testing. In the absence of randomization, the prospect always exists that a quantity of decisive dissimilarity, not replicated in the pretest, is working to pollute the posttest data.

- **Two groups, Random Selection, Pre-test, Post-test**: The benefit here is the randomization, so that any differences that emerge in the posttest should be the consequence of the investigational variable rather than potential difference between the two groups to establish with. This is the conventional type of experimental design and has superior interior legitimacy. The exterior soundness of the study is incomplete by the feasible effect of pre-testing.

- **Solomon Four-Group Design**: This design overcome the exterior validity limitations in the exceeding blueprint caused when pre-testing influence the subjects in such a way that they become sensitized to the investigational erratic and they retort in your own way than the un pre-tested theme.

4.5 **EXPERIMENTAL DESIGN USED**

In this study the research scholar used 2 Group, Post-test Comparison Control Group Design as a kind of Experimental Design during this research work. Because the random assignment of already formed classes to experimental and control groups of 60 students each was employed to observe the solution consequence due to experience to the collective strategy of Inquiry-based teaching model. The whole classes were used
because it would have been too troublemaking to the curriculum and too time overwhelming to have students out of their classes for solution.

Table 4.1 Research design of the Study

<table>
<thead>
<tr>
<th>Groups</th>
<th>Treatment</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental Group</td>
<td>Inquiry-based Teaching Model (ITM)</td>
<td>Social Science Achievement Test (SSAT)</td>
</tr>
<tr>
<td>Control Group</td>
<td>Traditional Teaching Model (TTM)</td>
<td>Social Science Achievement Test (SSAT)</td>
</tr>
</tbody>
</table>

There are following observation about this table as given below:

- The size of the Experiment group (EG) is 60
- The size of the Control Group (CG) is 60.
- Maximum marks for Social Science Achievement Test (SSAT) is 30 for experimental group.
- Maximum marks for Social Science Achievement Test (SSAT) is 30 for control group.

4.6 VARIABLES

The next point here is to discover what a variable is. A variable is classified as something that has an extent or excellence that diverges. The purpose of all research is to describe and explain variance in the world. Variance is just the differentiation; that is discrepancy that occurs obviously in the world or revolutionize that the scholar generate as a result of exploitation. Variables are names that are given to the inconsistency the scholar desire to elucidate.

A variable is also a consequence of some strength or is itself the strength that grounds a modify in additional inconsistent. These variables can be divided into multiple categories called dependent and independent variables correspondingly.
4.6.1 Dependent and Independent Variables

The dependent variable is the variable an investigator is interested in the research study. The alterations to the dependent variable are what the researcher is trying to quantify with all their fancy techniques. In our illustration, your dependent variable is the person's aptitude to bowl a sphere. The scholar is trying to calculate the transform in sphere throwing as prejudiced by appetite.

An independent variable is a variable supposed to influence the dependent variable. This is the variable that the researcher will influence to see if it makes the dependent variable alteration. In our example of famished people throwing a sphere, our independent variable is how extensive it's been since they've eaten.

To retell, the independent variable is the thing over which the researcher has organized and is operating. In this experiment, the researcher is controlling the food drinking of the applicant. The dependent variable is believed to be dependent on the independent variable.

Extraneous variables are defined as any variable other than the independent and dependent variable. So, a confounding variable is a variable that could muscularly manipulate research study, while extraneous variables are weaker and characteristically influence the experiment in a slighter way. Independent variables are control variables, which are the researcher, choose to learn and often control in order to charge their possible effects on one or more other variables. And the variable that the independent variable is supposed to involve is called the dependent variable.

4.6.2 Variables of current study

Variables are significant to appreciate because they are the essential units of the information considered and understood in research studies. Researchers cautiously investigate and construe the value(s) of each variable to make intelligence of how things narrate to each other in an evocative study or what has occurred in the research study.

There are following variables in this research work as given below:

- Academic Achievement
- Inquiry-based teaching model
- Traditional teaching model
• Students of Social Science subject,
• Students of Secondary schools.

The variables used in this study are given in Table 4.2.

Table 4.2 Types of variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Achievement</td>
<td>Dependent</td>
</tr>
<tr>
<td>SSAT Scores</td>
<td>Dependent</td>
</tr>
<tr>
<td>Inquiry-based teaching model</td>
<td>Independent</td>
</tr>
<tr>
<td>Students of Social Science subject</td>
<td>Independent</td>
</tr>
<tr>
<td>Students of Secondary schools</td>
<td>Independent</td>
</tr>
</tbody>
</table>

Figure 4.4 Variables

4.7 TOPICS COVERED IN INQUIRY-BASED CLASSES

Intact classes were used because it would have been too disrupting to the curriculum and too time consuming to have students out of their classes for treatment. The research
scholar has selected the topics selected from social science syllabus of 9th class CBSE Curriculum during her study.

There are following units being selected for inquiry-based classes as given below:

Table 4.3 List of Chapters selected

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Chapter name</th>
<th>Sections</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Poverty as a challenge</td>
<td>Economics</td>
</tr>
<tr>
<td>2</td>
<td>Clothing: A Social History</td>
<td>History</td>
</tr>
<tr>
<td>3</td>
<td>Democratic Rights</td>
<td>Political science</td>
</tr>
<tr>
<td>4</td>
<td>Population</td>
<td>Geography</td>
</tr>
</tbody>
</table>

Let’s know the contents & objectives of these chapters taught in the Inquiry-based class

4.7.1 Poverty as a challenge

After reading this chapter, the students come to know following facts as given below:

- Who is considered as the poor in both rural & urban area;
- Indicators for defining the poverty;
- Describing the reasons of absolute poverty;
- Background of imbalanced allotment of resources;
- Evaluation between various nations
- Steps taken by government for purpose of poverty lessening.

4.7.2 Clothing: A Social History

After reading this chapter, the students come to know following facts as given below:

- A diminutive narration of changes in clothing.
- Discuss over clothing in India.
Swadeshi and the movement for Khadi.

### 4.7.3 Democratic Rights

After reading this chapter, the students come to know following facts as given below:

- Necessitate of the rights in Indian constitution
- Essential Rights benefited from by the citizen under the Indian constitution
- Defending the Fundamental Rights of the civilian
- self-government of the magistrates ensured

### 4.7.4 Population

After reading this chapter, the students come to know following facts as given below:

- Population magnitude,
- Population division,
- Age-sex composition,
- Population change-migration as a determinant of population change,
- Literacy,
- Fitness,
- Occupational structure and national population policy:
- Adolescents as under-served population group with particular needs.

Syllabuses of Social Science of Term-I (April to September 2014) has been shown in Appendix E.

### 4.8 CONDUCTING INQUIRY-BASED CLASSES

Next phase of this study is to conduct the Inquiry-based classes for teaching the above selected topics.
In this model, the teaching process is being divided into various stages as given below:

4.8.1 Preparation for the Inquiry-- Poverty as a challenge

This stage consist the preparation of the inquiry regarding the topic titled as “Poverty as a challenge” in the class rooms. First the researcher scholar showed the particular picture related Poverty as given below:
After showing these pictures, the research scholar started his class through asking following inquiries as given below:

### 4.8.2 Planning phase

**Activity 1.1**

Students! In Picture 1, five children are eating in single bowl. What can be the reason to do it?

**Activity 1.2**

Students! In Picture 1, they are not well dressed up and with tangled hair. What do you think about it?

**Activity 2.1**

Students! In picture 2, the people are living in slums. They are sitting on the ground outside the slums. Do you understand the reason of seating like this?

**Activity 2.2**

Students! In picture 2, the lady is feeding her baby outside the slum. Do you think the baby is not feeling good inside the slum?

### 4.8.3 Retrieving phase

**Responses to Activity 1.1**

There are following responses for the activity 1.1 as given below:
• Students answered that they are sharing their food with another. So they are eating in single bowl.
• They have not sufficient utensils.
• They like eating in single bowls.

Responses to Activity 1.2
There are following responses for the activity 1.2 as given below:
• Because they have no combs.
• They like the style of tangled hair.
• Their parents are not careful about them
• They are poor. So they have no good clothes to wear.

Responses to Activity 2.1
There are following responses for the activity 2.1 as given below:
• They like sitting in the groups outside their slums.
• They have no chairs and tables to sit.
• They have no cemented houses. So they live in slums.
• They have not big house to sit together.

Responses to Activity 2.2
There are following responses for the activity 2.2 as given below:
• They have not proper electricity system inside. So the baby is weeping inside.
• There is no fans & ACs inside the slum, they are feeling hot.
• The lady is not able to control the baby properly.
• She wants to sit outside to talk others.

These response are being collected from the students regarding various inquiries generated in various activities.

4.8.4 Processing phase

After receiving the various responses then following processing is being made as given below:

Activity 1.1:
There are following relevant responses for the activity 1.1 as given below:
• They have not sufficient utensils.
Activity 1.2
There are following relevant responses for the activity 1.2 as given below:

- They are poor. So they have no good clothes to wear.

Activity 2.1
There are following relevant responses for the activity 2.1 as given below:

- They have no chairs and tables to sit.
- They have no cemented houses. So they live in slums.

Activity 2.2
There are following relevant responses for the activity 2.2 as given below:

- They have not proper electricity system inside. So the baby is weeping inside.
- There is no fans & ACs inside the slum, they are feeling hot.

Making connections and inferences
Many people are living in slum areas. They have a great lack of cemented house, good clothes, nutritious food, utensils, chairs and tables, electricity, fans and ACs in their life. The main reason is that they are poor & have not permanent job to earn money so they are not capable of providing good education, medical facilities, proper food and other facilities. They are below the poverty line.

Figure 4.8 1st Poverty scene
For concentrating the topic the research scholar has shown the above picture to tell them that the type of the poverty in India is an absolute poverty. The poverty in India makes
the worst impacts in every aspect of life. Just because of hunger, the child is so helpless to eat the food that is thrown on the ground by someone as the waste.

![Figure 4.9 2nd Poverty scene](image)

Next she has shown the worst impact of poverty in form of lack of nutritious food and medical care. The figure 4.8 shows the children who are prey of hunger. They have not single cloth to wear and looking like as the skeleton.

### 4.8.5 Creating phase

Now at this phase, the scholar concentrated on the poverty. All the information about the poverty has been collected and organized for smooth discussion with the students. There are following issues related to the poverty has been decided to discuss to next phase as given below:

- Poverty Line
- Criteria for poverty line
- Landlessness
- Poor health
- Unemployment
- Illiteracy
- Malnutrition
- Child Labor
- Disability
- Helplessness
4.8.6 Sharing phase

All above contents & issues related to the poverty has been shared with the students. The research scholar motivates the students to ask about new facts and demonstrated appropriate students' behavior regarding the poverty in the country. The research scholar shared that without controlling poverty, the country cannot grow. The poverty can be controlled with better education and controlled birth rate. The government is trying to provide employment, education and medical services for improving the living standard of BPL families.

4.8.7 Evaluating phase

The research scholar evaluates the poverty topic with the help of following table as given below:

<table>
<thead>
<tr>
<th>Year</th>
<th>No of peoples (in millions)</th>
<th>Rural</th>
<th>Urban</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>1973-74</td>
<td>321</td>
<td>56.4</td>
<td>49.0</td>
<td>54.9</td>
</tr>
<tr>
<td>1993-94</td>
<td>320</td>
<td>37.3</td>
<td>32.4</td>
<td>36.0</td>
</tr>
<tr>
<td>1999-00</td>
<td>260</td>
<td>27.1</td>
<td>23.6</td>
<td>26.1</td>
</tr>
</tbody>
</table>

Figure 4.10 Poverty Ratio
With the help of these classes the students come to know that the education is best way to solve the poverty problem and improve their living standard. So they can transfer learning to their career building beyond school. They are motivated to help such children by clothes, food and education etc.

All these steps illustrate the implementation and execution of the inquiry-based teaching model in the classroom for teaching the topic “Poverty as a challenge”. This approach motivates the students to arise their inquiries about the topic and actively involved in the classroom. Finally, she is happy with the response of the students and felt that the whole class involved during her inquiry-based teaching process. In case of traditional teaching, the teacher feels that the students are passive in the class.

The phases of conduct the Inquiry-based classes for teaching the remaining three selected topics are shown in Appendix A, B & C.