

CHAPTER III

RESEARCH METHODOLOGY

3.0 INTRODUCTION

The researches that are relevant to the present study are included in the earlier chapters. This chapter outlined the study's methodology, with particular attention paid to the instruments employed, the sample, the study's design, the methodologies employed for data analysis, and statistical methods. Research is a deliberate and systematic endeavor that requires clear direction and well-defined parameters. It is not a random process but rather a purposeful and scientific pursuit. Effective research involves careful planning and adherence to established procedures to prevent it from descending into a disorganized collection of ideas. To conduct research successfully, it is crucial to follow a structured approach and methodical procedure.

This chapter includes the following-

- 3.1** Design of the study
- 3.2** Geographical context of the study
- 3.3** Population of the study
- 3.4** Sample of the study
- 3.5** Sampling technique
- 3.6** Variables used in the study
- 3.7** Tool used
- 3.8** Procedure
- 3.9** Statistical techniques used

3.1 DESIGN OF THE STUDY

A research design outlines the strategy for gathering and employing data in a manner that ensures the acquisition of desired information with precision or enables the effective testing of hypotheses (Peirce, 1989). The present study has been conducted using Quasi-experimental research design which comes under the Experimental

research. The term experimental design refers to the statistical principles guiding the planning and analysis of experiments, allowing investigators to arrange treatments and measurements for maximum statistical effectiveness. It encompasses tasks such as selecting factors and their manipulation levels, identifying and controlling extraneous variables, managing experimental units, choosing criterion measures, selecting specific designs, and analyzing data (Brooker, 1999).

For the current study, Pre-test Post-test Non-equivalent control group design research design was employed. The design conceptualized by Donald T. Campbell and Julian C. Stanley, is given below-

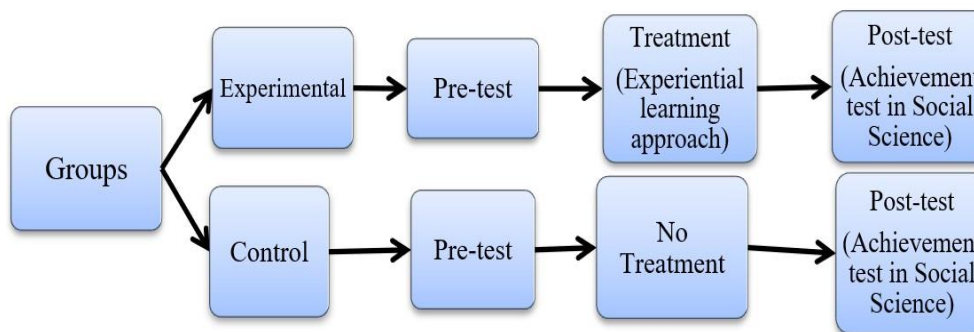
Table No. 3.1
Research design

Non-equivalent control group design			
	Pre-test	Treatment	Post-test
Experimental group	O ₁	X	O ₂
Control group	O ₂	—	<u>O₂</u>

Cambell & Stanely, 1963

The design of the present study is given below-

Figure- 3.1
Experimental design used in the study

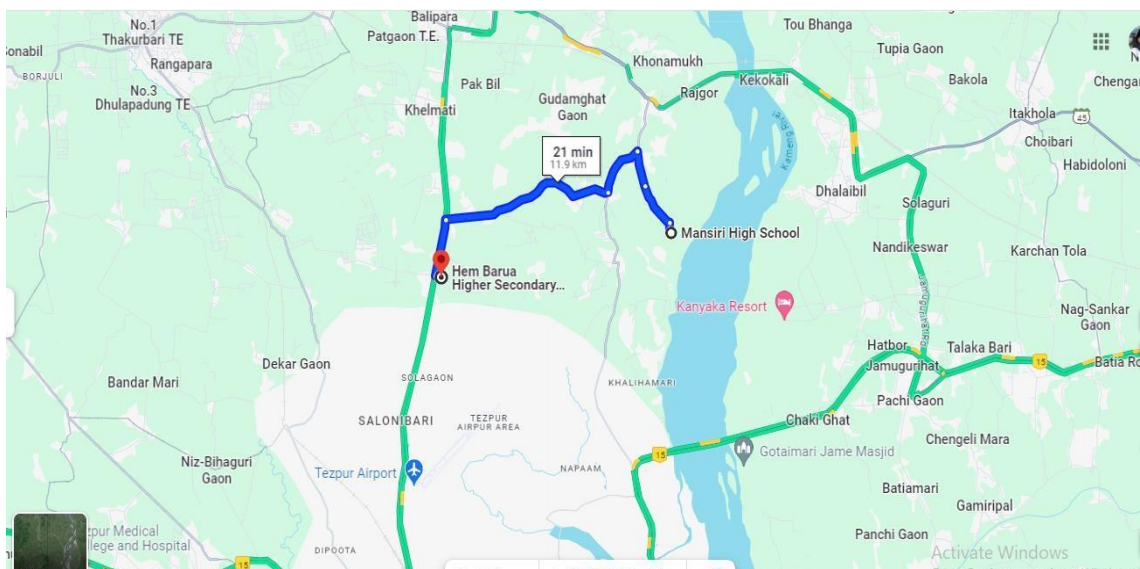


3.2 GEOGRAPHICAL CONTEXT OF THE STUDY

The study was carried out in two schools situated in the Sonitpur area of Assam. The schools were meticulously chosen to serve as the experimental and control groups for this quasi-experimental study. Both schools are located in close proximity, ensuring that external environmental characteristics such as socio-economic situations and access to educational resources were similar, thus reducing the influence of potential confounding variables. The experimental group is the class VIII students of Hem Baruah Higher Secondary School and control group is also VIII students of Mansiri Higher Secondary School. Both the schools are government and Assamese medium schools and are situated in rural area. The location of the two schools is shown below-

Figure- 3.2

Location of the selected school for the study in Sonitpur district



Source: <https://maps.app.goo.gl/GdDvLvBVWmVvgrVw5>

3.3 POPULATION OF THE STUDY

A population is fundamental in research methods, representing a group of persons with common traits within a specified geographic or institutional context (Martínez- Mesa et al., 2016). Population refers to a group or collection of units that can be used

to make generalizations. The population in research refers to the extensive group of individuals or entities that the researcher intends to study and from which conclusions will be derived. The population of the present study includes all the students studying in class VIII in government schools of Assam.

3.4 SAMPLE OF THE STUDY

A sample refers to a subset of individuals, items, or instances that is chosen from a broader population in order to carry out a study. The objective of selecting a sample is to make the study more controllable and feasible. The sample serves as a representative subset of the population, enabling researchers to derive conclusions or make assumptions about the full population based on the data gathered from the sample.

The sample of the present study comprises of 140 students of class VIII in total from both Experimental and Control group. There are 71 girls and 70 boys in the sample. The Experimental group comprises of 70 students including 34 boys and 36 girls and the Control group also comprises of 70 students including 35 boys and 35 girls. The selected classes naturally reflected the existing gender distribution within the school, with 34 boys and 36 girls in the experimental group and 35 boys and 35 girls in the control group. This composition is typical of the school's enrolment patterns and highlights the importance of studying educational interventions in their natural context, where gender imbalances may exist. The intervention, which was part of the regular social science curriculum, made it necessary to include the entire class. Moreover, Quasi-experimental studies often face limitations regarding randomization. Unlike true experiments, random assignment of participants to experimental and control groups is not always feasible, particularly in educational settings. In this study, the use of intact groups allowed for the examination of the intervention within a real-world context, reflecting authentic classroom dynamics that might not be replicated through random sampling. There are 286 government schools in 7 blocks of Sonitpur district of Assam. Out of 286 schools, the following two schools have been selected randomly for control and experimental group.

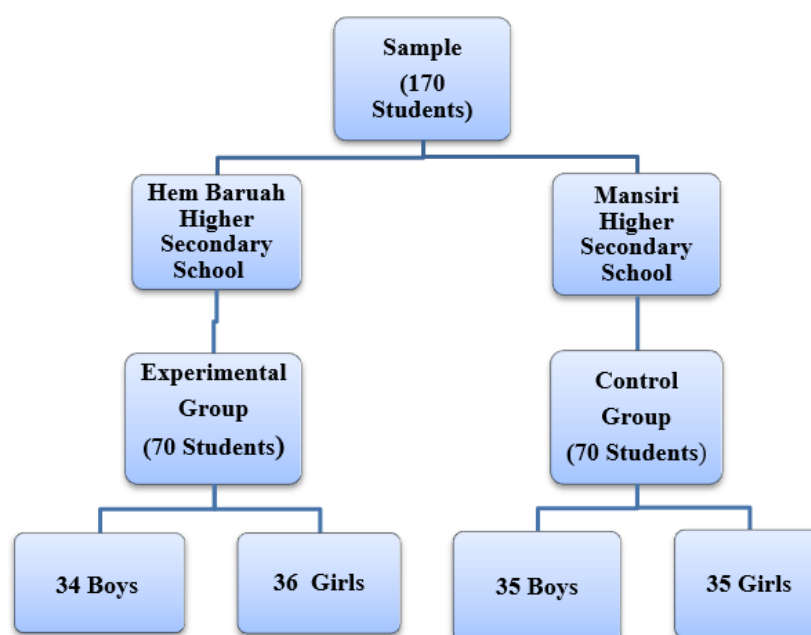
1. Hem Baruah Higher Secondary School
2. Mansiri Higher Secondary School

These two schools are situated in Sonitpur district of Assam. The rationale for considering the two groups as equivalent arises from multiple factors. Both schools are government-operated and situated in rural regions, guaranteeing comparable institutional resources and community environments. Secondly, both student groups originate from identical socio-economic backgrounds, hence reducing variability in external factors such as access to educational resources and economic pressures. The shared medium of instruction (Assamese) and identical grade level (class VIII) of both schools further diminishes any academic or linguistic disparities. The proximity of the schools, at about 12 kilometers apart, renders their geographical and environmental influences comparable. The commonalities establish a robust basis for deeming the groups equal, facilitating a legitimate comparison following treatment.

Description of sample is given below-

Figure- 3.3

Description of sample



3.5 SAMPLING TECHNIQUE

For selection of the two schools, the researcher used lottery method under simple random sampling. After selection of the two schools, the researcher used intact group

sampling technique to select the students of class VIII. Intact group sampling involves utilizing pre-existing groups or classes, such as complete classrooms, departments, or organizations, as the sample in a research study. This approach is frequently employed in educational research, particularly when dealing with entire groups of students who are already grouped into classes. Using intact groups reduces the disturbance to usual classroom activities. It enables the study to be carried out in an authentic, real-life environment without requiring the reorganization or reassignment of students to various groups.

3.6 VARIABLES USED IN THE STUDY

A variable is an element, attribute, or situation that can exist in different amounts or types and can change or vary. Variables play a vital role in experimental research since they are utilized to create links, uncover causes and effects, and test hypotheses.

The variables involved in the study are discussed below-

- a. **Independent variable:** An independent variable is a condition or trait that the experimenter deliberately manipulates in order to examine its effect on dependent variables (Field, 2019). In this study the independent variable is the Experiential Learning Approach that was used as the treatment for the experimental group.
- b. **Dependent variables:** According to Donald Campbell and Julian Stanley 'the dependent variable is the variable that is measured and is expected to be influenced or changed by the independent variable'. It represents the outcome or effect in the study and is dependent on the variations in the independent variable. The dependent variable of the present study is the achievement of the students in the social science subject.
- c. **Intervening variables:** An intervening variable, often referred to as a mediator variable, it provides insight into the process through which an independent variable influences a dependent variable, enhancing our comprehension of the link between them. It serves as a middle stage in the causal relationship between the independent and dependent variables. When intervening variables are not controlled in a study, the impact of the independent variable on the dependent variable may be incompletely understood. Researchers may misinterpret the relationship between variables if they fail to account for these variables, which could result in inaccurately attributing effects or an inability to recognize the true mechanisms at play. Establishing distinct

cause-and-effect relationships can be challenging due to this oversight, which can compromise the internal validity of the study. It is crucial to include intervening variables in the study's analysis in order to handle them properly. In actual classroom settings, it is extremely unlikely that such factors will be completely absent. These factors cannot be completely controlled; however, they can be managed with the help of a well-designed experiment or statistical methods like ANCOVA and partial correlation etc. In the present study, student's previous knowledge of Social Science subject, their intelligence, their gender, study habits are some of the intervening variables that might have affected the result of the study. The researcher used ANCOVA to statistically control these variables.

3.7 TOOL USED

For the present study the following tools were used-

3.7.1 Tool No. I - Achievement Test in Social Science subject

The researcher developed an Achievement test in Social Science for estimating the achievement of students belonging to class VIII. The objective of the achievement test is to ascertain the level of students' knowledge in Social Science subject. The development of Achievement test includes

- i) Specification of content
- ii) Specification of instructional objectives
- iii) Development and Standardization of the Achievement test
- iv) Reliability
- v) Validity

i) Specification of content

For the development of the Achievement test, the researcher selected 7 lessons from the Social Science subject of class VIII of SEBA board. The same 7 lessons are included in the module. Details of contents is presented in the table no. 3.2

Table No. 3.2**Details of selected contents**

S. L No.	Name of the lessons	Content
1	Natural resource	Types of natural resources Soil, water, forest and power resources Wild animals Need and importance of these natural resources in economic and social development Management and preservation of the resources
2	Settlement	Human settlement and its different types. Rural settlement and Urban Settlement Highland settlement Lowland settlement
3	Contribution of medieval rulers to socio economic life of Assam	Medieval rulers of Assam Innovative practices invented by the Ahoms for state organization Social outlook of medieval rulers Architecture, sculpture and paintings patterns of the medieval period
4	Revolt of 1857	Revolt of 1857 Leaders of the revolt. Role of Assam in the revolt Farmers' revolt of Assam
5	Problems of human resource development and role of the government	Human resource development. Challenges of Human resource development Governmental measures implemented in the realm of education, Health and employment.

6	Consumer rights and protection	Concept of Consumer Importance of consumer in the economic system Consumer rights Promotion of consumer awareness to prevent fraud Consumer protection organizations, laws and consumer forum
7	Fundamental rights	Fundamental rights Fundamental rights as provided by the constitution Necessity and importance of fundamental rights Limitation of fundamental rights

ii) Specification of instructional objectives

After selection of the content for the achievement test, the researcher specified the instructional objectives for each lesson.

Table No. 3.3
Details of instructional objectives

Lessons	S. No	Objectives
Natural resource	1	Students will be able define different types of natural resources which are Soil, Water, Forest, Wild animals and Power.
	2	Identify the reasons for ecological imbalance
	3	Describe the need and importance of these natural resources in economic and social development.
	4	Describe the need of management and preservation of these resources
	5	Analyse the role of human activities in the depletion and conservation of natural resources.
	6	To identify the reasons of land degradation and its solution
	7	To find out ways of recycling household items

	8	To differentiate between conventional and non-conventional energy sources.
Settlement	9	Describe human settlement and its different types.
	10	Explain why people settle in certain areas.
	11	Explain how ecosystems influence community development
	12	Describe the difference and relation between Rural settlement and Urban Settlement
	13	Discuss the difference between highland settlement and lowland settlement
	14	Make the students understand the advantages of living in lowland settlement
	15	Make the students understand disadvantages of living in highland settlement
	16	Identify the reasons for high population in urban area and low population in rural area.
	17	Write the problems which arise due to high population in an area.
	18	Describe different types of occupation
Contribution of medieval rulers to socio economic life of Assam	19	Recognize the medieval rulers of Assam
	20	Compare the economic status of medieval period with present economic status
	21	Describe the innovative practices invented by the <i>Ahoms</i> for state organization
	22	Analyze social outlook of medieval rulers
	23	Describe the architectural, sculptural, and painting styles of the Medieval period.
	24	Identify key architectural features of Medieval temples, bridges and <i>maidams</i>
25	Identify key Medieval rulers who made significant contributions to literature, such as patronage of poets, writers, and scholars	

	26	Examine the social, economic, and political status of women during the Medieval period
Revolt of 1857	27	Analyze the political, economic, and social factors that contributed to the outbreak of the Revolt of 1857
	28	Identify key events and individuals involved in the Revolt of 1857, including leaders, soldiers and civilians
	29	Describe the role of Assam in the revolt of 1857
	30	Analyze the farmers' revolt of Assam
	31	Examine the causes and consequences of British colonial policies that sparked resentment and resistance among Indian soldiers and civilians.
Problems of human resource development and role of the government	32	Describe the importance of human resource development.
	33	Identify key challenges and obstacles in human resource development, including issues related to education, training, employment, and skill gaps
	34	Examine the government's policies regarding employment, health, and education.
	35	To identify different educational, technical and medical institutions in Assam
	36	To identify solutions to the problems of human resource development
Consumer awareness, rights, protection	37	Define the meaning of Consumer
	38	Explain the importance of consumer in the economic system
	39	Describe how the consumers are cheated
	40	Identify the fundamental rights consumers, including the rights to safety, the right to information, right to choose and the right to redressal
	41	Analyze the responsibilities of consumers in

		exercising their rights, such as conducting research, reading product labels, and reporting unethical business practices
	42	Evaluate strategies for promoting consumer education and empowerment, including consumer advocacy, public awareness campaigns, and educational programs
	43	Discuss the legal mechanisms available to consumers for seeking redressal and compensation in cases of fraud, negligence, or product defects
Fundamental Rights	44	Define the concept of rights
	45	Define the concept of fundamental rights and its significance
	46	Explain fundamental rights as provided by the constitution
	47	Explain the necessity and importance of fundamental rights Evaluate the limitation of fundamental rights
	48	Reflect on the responsibilities of citizens and government in upholding and defending fundamental rights

iii) Development and Standardization of Achievement test

In this phase, the researcher followed the following steps-

- a. Planning of the test
- b. Writing the items of the test
- c. Try-out of the test
- d. Difficulty value
- e. Index of discrimination
- f. Distractor analysis

The development of the test is discussed below-

a. Planning of the test

After thorough study of the social science syllabus of class VIII, the researcher did the selection of the content for the test; then the researcher specified the instructional objectives for each lesson. Total 7 lessons have been selected for the test. The researcher developed 'short answer' 'type questions', 'fill in the blanks', 'identify the picture', 'multiple choice question' and 'true/false questions'.

b. Writing the items of the test

After proper planning, the researcher wrote the items of the test in simple language. The achievement test was developed by analyzing the course content and objectives of social science at the elementary school level. The primary focus was placed on the goals of social science instruction. The investigator thoroughly examined the prescribed syllabus of the Secondary Education Board of Assam (SEBA) for class VIII in the subject of social science, with a focus on the objectives. Total 70 questions were prepared from selected 7 chapters, on the basis of knowledge, understanding, reasoning, comprehension and application. The draft of 70 questions was sent to experts for their opinion and suggestions.

After getting feedback from the experts, some of the items were modified and excluded from the first draft. Out of 70 questions, 10 questions were excluded and finally 60 questions were kept for tryout phase. The 60 questions cover all the 6 categories of Bloom's taxonomy which are- 'Remember' 'Understand', 'Apply', 'Analyze', 'Evaluate' and 'Create'.

The draft consists of the following-

Table No. 3.4
Details of questions

Type of questions	Total Number of questions
Multiple choice questions	29
True/False questions	12
Identification of pictures	5
Fill in the blanks	10
Arrange in order	4

c. Try-out of the test

The tryout or the pilot testing of the achievement test is done in two phases as described below

- i) **Preliminary try out:** The preliminary version was conducted on a group of 15 students from the ninth grade in order to assess their comprehension of statements. The students were instructed to openly express their challenges encountered when tackling the test items. Following this brief group trial, minor modifications were implemented to the wording and structure of the questions.
- ii) **Final try-out:** After the initial try-out and necessary modification, the researcher administered the draft of achievement test on 80 students of class IX of Haleswar Higher Secondary School for pilot testing. After administration and evaluation of the achievement test, the researcher proceeded for item analysis of the test to know the level of difficulty and discriminating power of items.

- d. **Difficulty index:** An item's difficulty value is expressed as the percentage of examinees who properly answer the question. The primary goal of determining difficulty value (DV) is to select objects with an appropriate degree of difficulty. Item analysis involved sorting the scores from highest to lowest in descending order. Afterwards, two distinct groups formed; one had high scores and the other had low scores. From the two groups, 27% from the high scorer and 27% from low scorer were selected for analysis of items (Kelly, 1939).

The following formula was used to calculate the Difficulty Value (DV)

$$DV = \frac{CR_U + CR_L}{N}$$

CR_U = Correct responses in the upper group

CR_L = Correct responses in the lower group

N = Total number of students who took the test

The Criteria for difficulty level given by Instructional Assessment Resources (IAR, 2011) has been followed to reject or accept an item. Items below 0.20 (Very easy items) and items above 0.90 (very difficult items) have been rejected. Items between 0.20 to 0.90 have been accepted.

The results of the item analysis are given below

Table No. 3.5
Item wise Difficulty Value of the Achievement test in Social Science

Item No.	Item difficulty	Results	Item No.	Item difficulty	Results	Item No.	Item difficulty	Results
1	0.64	Accepted	21	0.48	Accepted	41	0.90	Rejected
2	0.69	Accepted	22	0.64	Accepted	42	0.40	Accepted
3	0.76	Accepted	23	0.59	Accepted	43	0.59	Accepted
4	0.66	Rejected	24	0.71	Accepted	44	0.76	Accepted
5	0.71	Accepted	25	0.66	Accepted	45	0.69	Accepted
6	0.59	Accepted	26	0.11	Rejected	46	0.57	Rejected
7	0.59	Accepted	27	0.64	Accepted	47	0.42	Accepted
8	0.42	Accepted	28	0.59	Accepted	48	0.69	Accepted
9	0.28	Rejected	29	0.59	Accepted	49	0.69	Rejected
10	0.42	Accepted	30	0.64	Accepted	50	0.59	Accepted
11	0.40	Accepted	31	0.76	Accepted	51	0.33	Rejected
12	0.38	Accepted	32	0.40	Accepted	52	0.42	Accepted
13	0.57	Accepted	33	0.14	Rejected	53	0.69	Rejected
14	0.64	Accepted	34	0.69	Accepted	54	0.59	Accepted
15	0.66	Accepted	35	0.59	Accepted	55	0.42	Accepted
16	0.64	Accepted	36	0.5	Rejected	56	0.59	Accepted
17	0.71	Accepted	37	0.76	Accepted	57	0.28	Rejected
18	0.69	Accepted	38	0.40	Accepted	58	0.59	Accepted
19	0.16	Rejected	39	0.59	Accepted	59	0.69	Rejected
20	0.24	Rejected	40	0.66	Rejected	60	0.42	Accepted

e. Index of Discrimination: Item discrimination is a measure that separates students in the top group based on their correct responses from those in the lower group. So, 27% from the high scorer and 27% from low scorer were selected for item discrimination of items (Kelly, 1939). To calculate Item discrimination index (DI), the following formula was used-

$$DI = \frac{CR_U - CR_L}{N/2}$$

CR_U = Correct responses in the upper group

CR_L = Correct responses in the lower group

N = Total number of students who took the test

The criteria for discrimination index level given by Ebel (1972); Ovwigho, 2013 has been followed-

Table No. 3.6
Discrimination Index for item analysis

Index of discrimination	Item evaluation
0.40 and above	Very good items ; accept
0.30 – 0.39	Reasonably good but subject to improvement
0.20 – 0.29	Marginal items , usually need and subject to improvement
Below 0.19	Poor items , to be rejected or improved by revision

Source: Ebel (1972); Ovwigho, 2013

Table No. 3.7

Item wise Discriminative Power Index of the Achievement test in Social Science

Item No	Discriminative Power	Result	Item No	Discriminative Power	Result	Item No	Discriminative Power	Result
1	0.43	Accepted	21	0.76	Accepted	41	0.09	Rejected
2	0.43	Accepted	22	0.43	Accepted	42	0.61	Accepted
3	0.48	Accepted	23	0.52	Accepted	43	0.52	Accepted
4	-0.09	Rejected	24	0.48	Accepted	44	0.48	Accepted
5	0.48	Accepted	25	0.48	Accepted	45	0.43	Accepted
6	0.43	Accepted	26	0.14	Rejected	46	0.04	Rejected
7	0.52	Accepted	27	0.43	Accepted	47	0.66	Accepted
8	0.66	Accepted	28	0.43	Accepted	48	0.43	Accepted
9	0.38	Rejected	29	0.52	Accepted	49	0.14	Rejected
10	0.57	Accepted	30	0.61	Accepted	50	0.43	Accepted
11	0.61	Accepted	31	0.48	Accepted	51	0.52	Rejected
12	0.57	Accepted	32	0.61	Accepted	52	0.66	Accepted
13	0.57	Accepted	33	0.19	Rejected	53	0.33	Rejected
14	0.61	Accepted	34	0.43	Accepted	54	0.43	Accepted
15	0.48	Accepted	35	0.52	Accepted	55	0.66	Accepted
16	0.71	Accepted	36	-0.04	Rejected	56	0.43	Accepted
17	0.57	Accepted	37	0.48	Accepted	57	0.38	Rejected
18	0.69	Accepted	38	0.61	Accepted	58	0.52	Accepted
19	0.33	Rejected	39	0.43	Accepted	59	0.14	Rejected
20	0.38	Rejected	40	-0.09	Rejected	60	0.66	Accepted

After finding the difficulty value and discrimination index for all the items, 15 items (item no. 4,9,19,20,26,33,36,40,41,46,49,51,53,57 and 59) have been rejected. Out of total 60 items, 15 items have been rejected after item analysis and 45 items were finalized for final social science achievement test.

f) Distractor Analysis - The method of examining how students respond to each option in a multiple-choice question is known as distractor analysis. The objective is to evaluate each option's ability to distinguish between students who perform well and those who don't, as well as how well it matches the intended learning objectives. A good distractor should only draw in underachievers and be convincing yet inaccurate. A poor distractor should draw in both high- and low-achieving pupils, or it

should be either unbelievable or correct. Distractor analysis aims to identify distractors that are chosen by less than 5% of test-taker, as they may not effectively differentiate between students who understand the material and those who do not (Haladyna & Rodriguez, 2013). For distractor analysis of all the 15 MCQ items, the researcher has calculated the percentage of all the options selected by students in both the upper group and lower group in each statement.

Table No 3.8
Item wise Distractor analysis of Achievement test in Social Science

Item No.	Distractors	No. of upper group answers (Total students-22)	No. of lower group answers (Total students- 22)	Total (44)	Interpretation
1	A*	11	10	47.72%	>5% students
	B	3	4	15.90%	
	C	4	5	20.45%	
	D	4	3	15.90%	
2	A	5	8	29.54%	>5% students
	B*	9	5	31.81%	
	C	5	5	22.72%	
	D	3	4	15.90%	
3	A	6	5	25%	>5% students
	B*	10	9	43.18%	
	C	3	4	15.90%	
	D	3	4	15.90%	
4	A*	11	11	50%	>5% students
	B	4	3	15.90%	
	C	3	3	13.64%	
	D	4	5	20.45%	
5	A*	9	9	40.90%	>5% students
	B	4	6	22.72%	
	C	5	3	18.18%	
	D	4	4	18.18%	
6	A	5	6	25%	>5% students
	B	4	3	15.90%	
	C	3	4	15.90%	
	D*	10	9	43.18%	
7	A	4	4	18.18%	>5% students
	B	3	4	15.90%	
	C	5	6	25%	
	D*	10	8	40.90%	
8	A	3	4	15.90%	>5% students
	B*	13	10	52.27%	
	C	3	4	15.90%	
	D	3	4	15.90%	
	A	2	4	13.64%	
	B	3	5	18.18%	

Item No.	Distractors	No. of upper group answers (Total students-22)	No. of lower group answers (Total students- 22)	Total (44)	Interpretation
10	A	3	5	18%	>5% students
	B	3	4	15%	
	C*	15	10	56%	
	D	2	3	11%	
11	A*	13	11	54.55%	>5% students
	B	3	4	15.90%	
	C	3	4	15.90%	
	D	3	3	13.64%	
12	A	3	4	15.90%	>5% students
	B	2	4	13.64%	
	C	3	5	18.18%	
	D*	14	9	52.27%	
13	A	3	4	15.90%	>5% students
	B	3	4	15.90%	
	C*	12	10	50%	
	D	4	4	18.18%	
14	A	4	5	20.45%	>5% students
	B*	10	9	43.18%	
	C	5	5	22.72%	
	D	3	3	13.64%	
15	A	3	5	18.18%	>5% students
	B	4	5	20.45%	
	C*	10	8	40.90%	
	D	5	4	20.45%	

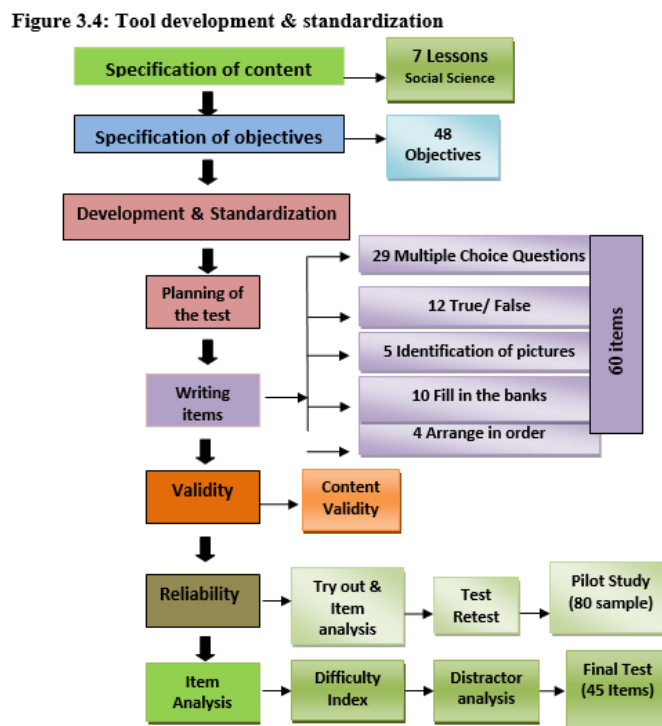
*Correct option/answer

From table no. 3.8 it can be interpreted that, all the 45 distractors of 15 items, have been chosen by more than 5% of total students. Hence, it is clear that all the distractors are functional distractors and effective enough to distinguish between upper group and lower group students.

- iv. **Reliability:** The researcher has used the test-retest and Cronbach's alpha method to ensure the reliability of the achievement test. The internal consistency was estimated using the Cronbach's alpha method, while the test-retest method was used to determine the measures' consistency across time. For the test-retest, the time interval between the first and the second test was three weeks. The coefficient of stability is found to be 0.88; hence the prepared Achievement test has good test-retest reliability. The items in the final achievement test were found to have acceptable reliability with a Cronbach's alpha score of 0.79, which is greater than 0.7.
- v. **Validity:** In the current study, the content validity of the test was established by aligning the test tasks with the instructional objectives. The draft of the test was sent to subject experts from social science education, psychology and experiential education for their judgment and suggestion. On the basis of their inputs, the researcher made necessary modifications and finalized the tool.

The process of development & standardization of Achievement test is shown in figure 3.4

The process of development & standardization of Achievement test is shown in figure 3.4



3.7.2. Tool No. II

The second tool is the self-developed Reaction Scale for assessing the reaction/feedback of students towards the experiential learning approach as used by the researcher. Students' involvement, satisfaction, perceived effectiveness, and the method's applicability are some of the aspects that the scale attempted to capture. This is a Five Point Likert Scale with responses such as Strongly Agree (SD), Agree (A), Undecided, Disagree (DA) and Strongly Disagree (SDA). At the beginning the researcher developed 25 statements covering various aspects of the module used by the researcher as the treatment. The draft of 25 statements was sent to experts for their opinion and suggestions. These experts evaluated the relevance, clarity, and comprehensiveness of the items. Based on their feedback, the researcher revised items for clarity, and some were removed or refined to better align with the constructs being measured. Total 5 statements were removed from the scale; hence the final scale comes with a total of 20 statements. There are 9 negative and 11 positive statements.

The scoring pattern of the scale is as follows-

Table No. 3.9
Scoring pattern of the reaction scale

Type of items	Responses				
	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Positive	5	4	3	2	1
Negative	1	2	3	4	5

Thus, the total score of the scale ranges from 20 to 100.

Beside these three self-constructed tools, the researcher used two more tools to test the intelligence and study habits of the students. The researcher has selected the following tools for serving the purpose.

3.7.3. Tool No. III

The third tool is the Group test of intelligence by Dr. Pramila Ahuja. This test was used to assess the intelligence level of the students. The test-retest reliability of the test is .852 and the Split-half reliability is .943.

3.7.4. Tool No. IV

The fourth tool is the Study habits inventory by Prof. M.N Palsane and Anuradha Sharma. This test was used to assess the study habits of the students. The test-retest reliability of the test is .88 and split-half reliability is .56.

3.7.5 INSTRUCTIONAL MODULE BASED ON EXPERIENTIAL LEARNING APPROACH (INTERVENTION)

The researcher developed experiential learning lesson plans in Social Science subject of Assamese medium Class VIII. The module was used to provide treatment to the experimental group. While developing the lesson plans, the researcher followed the steps given in the handbook of experiential learning prepared and published by Central Board of Education (CBSE) in 2019.

While developing the module, the researcher has taken suggestions and opinions from experts. Necessary modifications had also been done on the basis of expert's opinion and suggestions.

Total 7 lessons from the Class VIII Social science book have been selected for preparing the module. The lessons are as following-

Table No. 3.10
Details of lessons

S.L. No	Name of the Lesson	Area
1	Natural resource	Geography
2	Settlement	
3	Contribution of medieval rulers to socio economic life of Assam	History
4	Revolt of 1857	

5	Problems of human resource development and role of the government	Economics
6	Consumer awareness, rights and protection	
7	Fundamental rights	Political Science

For developing the instructional module, the researcher followed the following steps for each lesson.

Table No. 3.11

Development Process Steps

Steps	Details
Checking prior knowledge	Checking what learners already know through various ways like tests, quizzes, drawings etc.
Sparking curiosity	Introducing the lesson to create interest and curiosity among students
Providing the experience	Use of experiential learning strategies to achieve lesson objectives
Drawing inferences	Recording or documenting the observations and learning from experiential learning task
Conceptualization	Integration of fundamental elements of learning based on the conclusions reached by students
Connecting to real life	Linking the lesson/learning to real life situation to make learning meaningful
Extended Learning	Providing opportunities for reflection on the experience
Assessment	Checking for construction of knowledge and achievement of learning objectives

The researcher went through each step to ensure the proper use of experiential learning approach. The module included various activities in every lesson to make sure that the students actively engage in teaching-learning, they have interest and curiosity to learn, they can relate their learning to real life situation, and they can

reflect on their learning and apply their learning as much as possible in their everyday situations. The module equally focused on theory and practice.

3.8 PROCEDURE OF DATA COLLECTION/ EXPERIMENTATION

After selection of the two schools, the researcher administered pre-test using the achievement test on social science on students of both the schools to ascertain their prior knowledge on the selected lessons of Social Science subject. Then the researcher used independent samples t-test to find out the difference between the pre-test score of the two schools. The researcher also administered the Intelligence test and Study habits test on both the groups of students. After testing all the variables involved in the study, the researcher randomly selected one school as Experimental and another school as Control group. After selection of the Experimental group, the researcher provided the treatment using the experiential learning module. The control group did not get any treatment but was taught through the conventional learning approach.

The various experiential learning strategies used to teach different lessons in the experimental group, as well as the conventional strategies used to teach the control group, are shown in Table 3.12

Table No. 3.12
Details of strategies used

Teaching strategies			
S.L. No	Name of the Lesson	Experimental Group	Control Group
		Experiential learning	Conventional learning
1	Natural resource	Self-survey, Observation, Discussion, showing video/film, Plantation drive, slogan writing and model making	Lecture, Chalk & Talk
2	Settlement	Discussion, Observation, games,	Lecture, Chalk & Talk

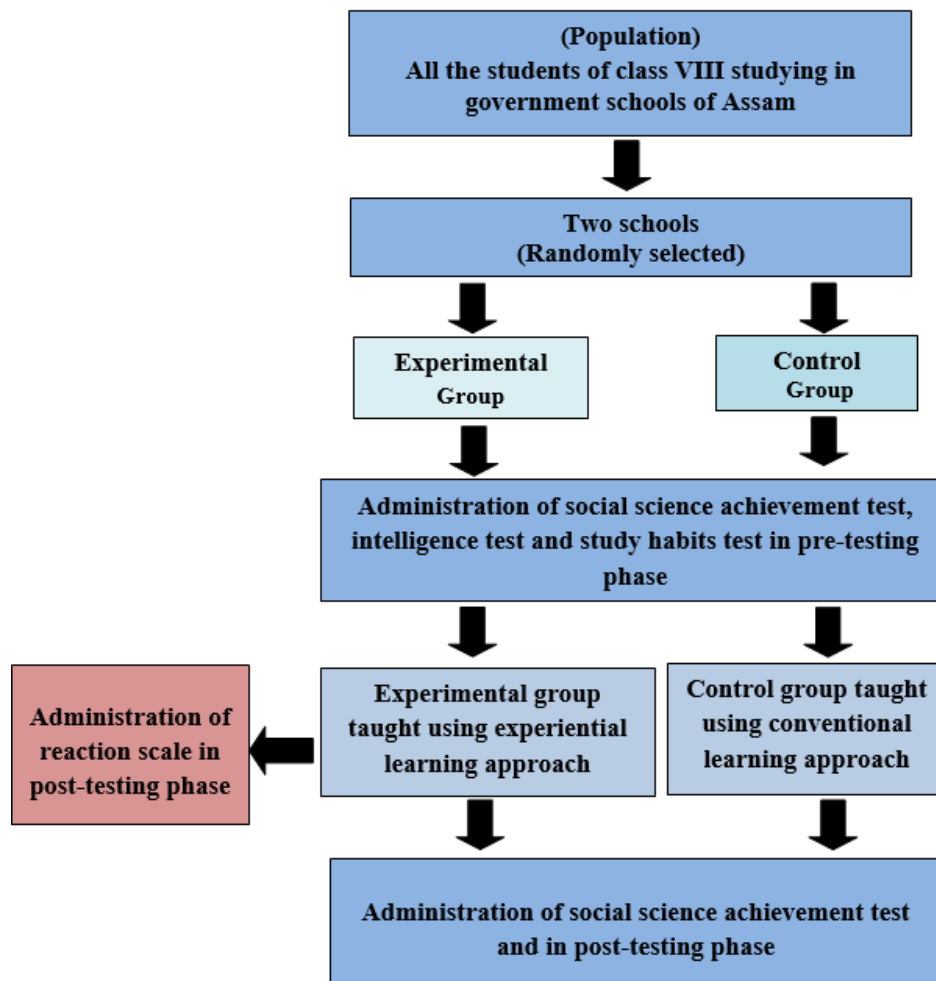
		storytelling, survey, concept map making	
3	Contribution of medieval rulers to socio economic life of Assam	Storytelling, group discussion, brainstorming, group project, heritage board making, field visit	Lecture, Chalk & Talk Textbook reading and Question-answer method
4	Revolt of 1857	Role play, movie screening, survey, discussion, album and map making	Lecture, Chalk & Talk Textbook reading and Question-answer method
5	Problems of human resource development and role of the government	Think-pair-share, Showing video clips, field visit, concept map, storytelling, discussion, inside out strategy	Lecture, Chalk & Talk Textbook reading and Question-answer method
6	Consumer awareness, rights and Protection	Discussion, interview, case presentation, slogan writing, Role-play	Lecture, Chalk & Talk Textbook reading and Question-answer method
7	Fundamental rights	Role play, poster making discussion, survey, interview	Lecture, Chalk & Talk

The treatment took 2 months to complete; after teaching the experimental group for 2 months, the researcher conducted the post-test using same achievement test on both

the experimental and control group. After completion of post-test, the researcher assessed the reaction or feedback of the students belonging to experimental group using reaction scale.

The procedure adopted for experimentation is shown in the following figure 3.5

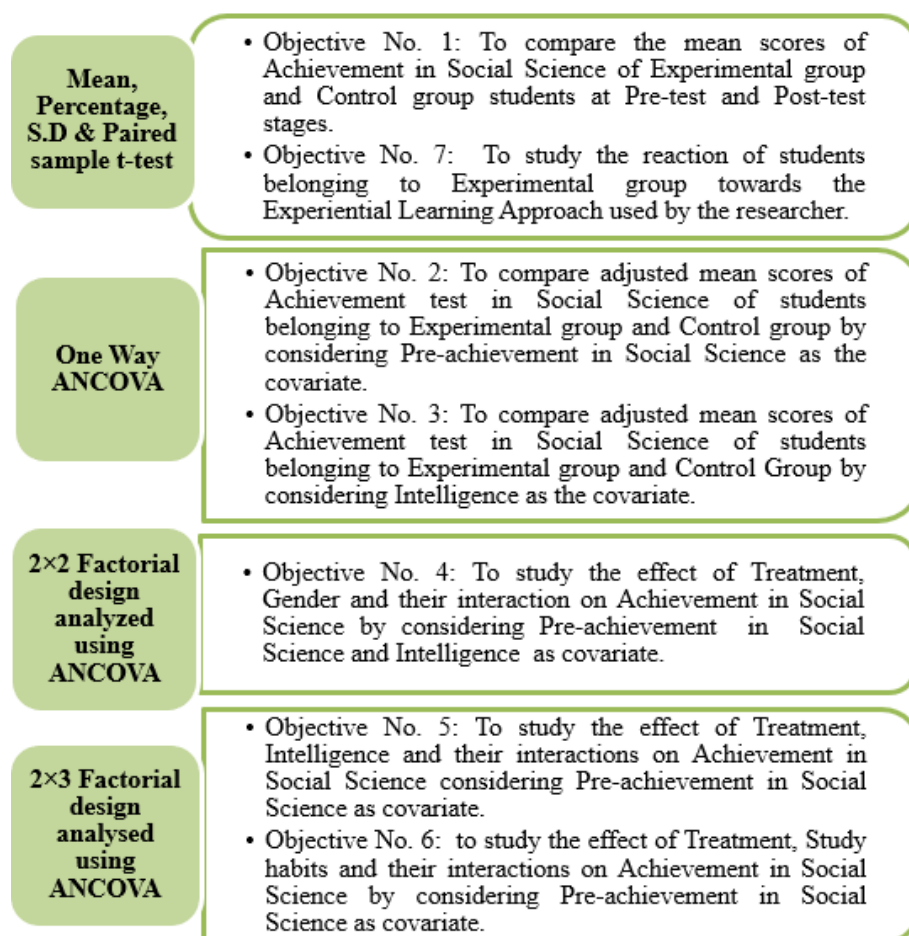
Figure 3.5: Procedure adopted for experimentation



3.9 STATISTICAL TECHNIQUES USED

The following figure no. 3.6 shows the statistical techniques employed for the analysis based on the different objectives-

Figure 3.6: Statistical techniques used



3.10 ETHICAL CONSIDERATION

In conducting the present quasi-experimental study ethical considerations were paramount to ensure the integrity and welfare of all participants. Prior to commencing the study, explicit permission was obtained from the principals and class teachers of the participating schools to ensure transparency and respect for institutional protocols, also clear explanations provided about the study's objectives, procedures, and potential impacts. To protect participants' privacy, data was collected and stored confidentially, ensuring anonymity in reporting and analysis. Additionally, the study adhered to ethical guidelines by minimizing any potential risks or disruptions to the students' regular learning activities and by ensuring that the control group received no disadvantageous impact. These measures collectively upheld the ethical standards necessary for conducting research involving minors in an educational setting.