

**CHAPTER 3**  
**RESEARCH METHODOLOGY**

## CHAPTER 3

### RESEARCH METHODOLOGY

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## **Chapter 3: Research Methodology**

### **3.1. Introduction**

Research is a systematic and scientific study of a phenomenon. The accuracy of the result of any research depends on the suitability of the research method, research tools, and statistical techniques used for data analysis. This chapter deals with the research method, population, sample and sampling technique, research tools, data collection, statistical techniques for data analysis, and conclusion. It describes the actual steps which are followed in the study. This chapter establishes a strong foundation for the entire structure of the research work.

### **3.2. Research Method**

Research is something that unfolds what already exists in the field. Before starting any work, planning is a must which enables the researcher to proceed systematically. The research method gives direction to the research and confidence to the researcher for conducting the research. Since the objective of the study is to study the status of implementation of the activity based teaching learning approach in social science at the secondary level school in Assam, the descriptive survey research method is found to be the best method to conduct the research. Descriptive survey research is a kind of quantitative research that makes careful descriptions or studies of the status of an educational phenomenon.

### **3.3. Population**

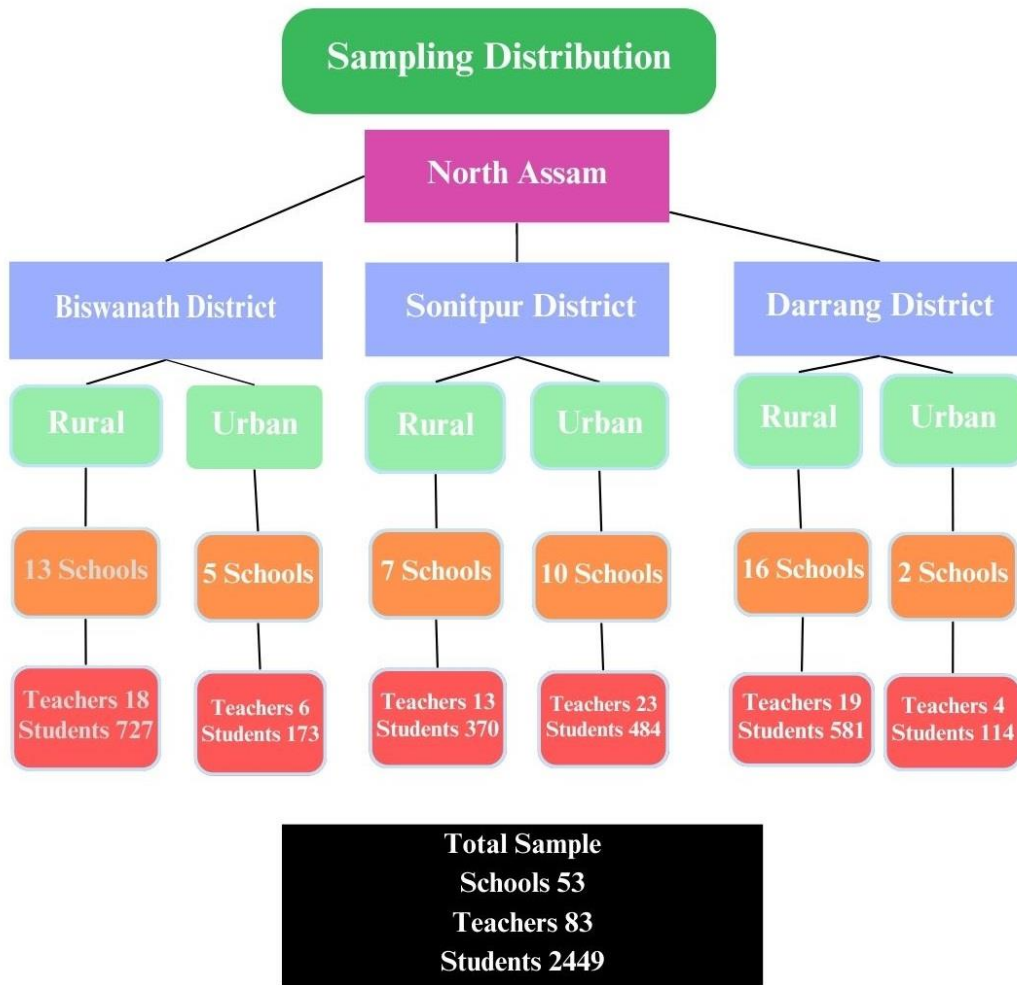
The term population refers to the entire mass of observations, which is the parent group from which the sample is derived (Bhalla and Puri, 2013). In this research, the term ‘population’ denotes all the secondary schools of Assam.

### **3.4. Sample and Sampling Technique**

Administratively, the state Assam is divided into five parts namely Lower Assam, Upper Assam, Central Assam, North Assam, Barak Valley. The researcher carried out the present study in North Assam only. North Assam comprises 4 districts, namely Darrang, Sonitpur, Udalguri, and Biswanath (Government of Assam General Administration, 2018). Out of which the researcher has selected 3 districts (Darrang, Sonitpur, Biswanath) randomly to carry out the present study. Again the investigator has further classified the selected districts into rural and urban category to choose the sample schools. Hence, the researcher has used stratified random sampling technique to classify the districts and rural-urban category. There are 53 schools have been selected randomly from all the three

districts keeping in mind rural and urban category. Out of 53 schools, there are 36 schools from rural and 17 schools from urban area are selected. The total respondents are as follows- teachers 83 and students 2449. The details of the sampling and sample are shown through the following diagram-

**Figure 3.1: Diagrammatic Presentation of Sampling Distribution of the Study**



### **3.5. Data Collection Tools**

The present study is a kind of descriptive survey research where the researcher attempts to find out the status of the implementation of activity based teaching learning approach at the secondary levels of Assam. Keeping this in view, the researcher did an intensive survey in order to find out the tools which could be used in this research. The researcher did not find any suitable tool which could be used for the study, so the researcher developed all the tools. For the construction of the tools related to activity based teaching-learning approach, a detailed literature review is done by the researcher. The researcher went through different books, journals, reports, encyclopedias, abstracts on the internet and Ph.D. works etc. in order to develop the tools. After the review, the researcher met with different staff and officials of different government institutions such as the Directorate of Secondary Education, State Council of Educational Research And Training, Rashtriya Madhyamik Shiksha Abhiyan, Sarba Siksha Abhiyan Assam to understand the steps which are taken by them to promote the activity based teaching learning approach. After developing some ideas related to the tools, the researcher went for a pilot study in 15 schools in 5 districts of Assam, namely Nagaon, Hojai, Sonitpur, Biswanath, and Morigaon. These schools provide an opportunity for the researcher to observe some of the classes and help to get insight into the real practice of activity based teaching learning approach in the different classrooms of Assam. In these schools, the researcher got the chance to discuss with the teachers and students the activity based teaching learning approach and selected some items for the study. In order to develop the tools, the researcher went on a library visit to the different reputed institutions of India, such as the Maharaja Sayajirao University of Baroda, Vadodara, the National Council of Educational Research and Training, New Delhi, National University of Educational Planning and Administration, New Delhi. In those institutions, the researcher got the chance to discuss with different experts in the relevant field and did a qualitative analysis of all the tools. A detailed description of all the tools is given below:

#### **3.5.1. Activity Based Teaching Learning Inventory for Teachers**

##### **A. Description**

The researcher reviewed a lot of literature to develop this tool. The researcher discussed with different faculties and staff from different institutions to find out the activities which are used by the teachers in the classroom. The final draft of this part of the tool consists of 21 items that need to be answered by the teachers. The scoring procedure of the items

is scored in such a manner that if the respondent tick in the option mostly, a score of 3 is given, for sometimes 2, for rarely 1, for never 0 will be assigned. The degree of score secured by the respondent will be implies the degree of uses of activities in the teaching learning process.

### **B. Item Analysis**

Item analysis is one of the important component of the development of a standard questionnaire. For item analysis, the researcher conducted a pilot study on a group of 30 social science teachers who were selected from 16 schools in Nagaon and Hojai Districts. From the total sample, 27% of the respondents with the lowest total scores and 27% of the respondents with the highest total scores were identified to create two groups i.e. high achiever group and low achiever group. The t-values and sig. scores were calculated to evaluate the responses of the low achiever and high achiever groups on each item. The t-values and sig. for the 21 items are given in the following Table 3.1:

**Table 3.1: Independent Sample t-test and sig-values of Low Achiever and High Achiever Group for Activity Based Teaching Learning Inventory for Teachers**

Item No	t-value	Sig.	Acceptance/Rejection
1	-3.45	.008	Accepted
2	-3.03	.013	Accepted
3	-4.66	.001	Accepted
4	-2.69	.025	Accepted
5	-5.15	.000	Accepted
6	-3.16	.012	Accepted
7	-6.76	.000	Accepted
8	-5.61	.001	Accepted
9	-3.92	.003	Accepted
10	-5.15	.000	Accepted
<b>11</b>	<b>.306</b>	<b>.764</b>	<b>Rejected</b>
12	-3.60	.003	Accepted
<b>13</b>	<b>-1.13</b>	<b>.281</b>	<b>Rejected</b>
14	-3.42	.004	Accepted
15	-5.00	.000	Accepted
16	-3.90	.002	Accepted
17	-7.51	.000	Accepted
18	-6.48	.000	Accepted
19	-7.89	.000	Accepted
20	-6.77	.000	Accepted
21	-6.77	.000	Accepted

\*Values marked in bold are non-significant

After using an independent sample t-test, the researcher compares the sig. value with .05 and found that 2 items scored above the .05 value, which means that the items do not show any significant difference between the low achiever group and the high achiever group. Item analysis helps to select those items which could effectively make a difference between low achiever group and high achiever group. As it is not fulfilled in this analysis process, so the researcher rejected items no 11 and 13, which are given in the bold letter. After item analysis, the final draft of this tool consists of 19 items.



### **C. Reliability**

After item analysis, the researcher needed to establish the reliability of the tool. Reliability refers to the degree of consistency of scores which ultimately helps in making a tool a standard one. For establishing reliability, the researcher used the test-retest method. The researcher administered the tool to a group of 21 secondary school science teachers who were selected from 11 schools in the Nagaon District and after a gap of 1 week again the same tool is administered to the same group of teachers. The coefficient of correlation which is calculated in Statistical Package for Social Science (SPSS) with the help of the Pearson formula is found for this tool to be 0.88 which is significant at 0.01 level of significance. This coefficient of correlation denotes that it has high relation between these two sets of scores which means the tool has strong reliability (Brace, Kemp and Snelgar, 2012).

### **D. Validity**

For this research, the researcher establish the content validity of the tool. Content validity refers to all the items of a tool being representative of the entire domain of the test which seeks to measure (Salkind, 2010). For content validity, the researcher sent this tool to different experts from different reputed institutions. The experts recommended that this tool can be used in this research because all the items of the tool fairly represented the objective of the study. However, the experts suggested that the researcher should create a separate column namely by Remarks (Reasons for Adoption) option, which makes this tool a more comprehensive one. As per suggestion, the researcher modified the tool and used it for final data collection.

### **E. Norms**

To establish z-score norms, the researcher administered the tool to a group of 21 social science teachers in 12 schools in the Biswanath district. To interpret the raw scores received from this tool, statistical calculations were done to find out the mean and standard deviation so that norms could be prepared. The mean and standard deviation are:

**Mean:** 33.33 **SD:** 4.86 **N:** 21

Based on the above statistics, z-score norms prepared, which are given in Table 3.2 and norms for interpreting the levels of uses of activities in the classroom are given in Table 3.3.

**Table 3.2: Z-score Norms for Activity Based Teaching Learning Inventory for Teachers**

Raw Score	Z Score	Raw Score	Z Score	Raw Score	Z Score	Raw Score	Z Score
20	-2.74	27	-1.30	34	0.14	41	1.58
21	-2.54	28	-1.10	35	0.34	42	1.78
22	-2.33	29	-0.89	36	0.55	43	1.99
23	-2.12	30	-0.68	37	0.75	44	2.19
24	-1.92	31	-0.48	38	0.96	45	2.40
25	-1.71	32	-0.27	39	1.17	46	2.61
26	-1.51	33	-0.07	40	1.37	47	2.81

**Table 3.3: Norms for Interpretation of z-score for Activity Based Teaching Learning Inventory for Teachers**

Sl. No.	Range of Raw Scores	Range of Z-Scores	Level
1	44 and above	+2.01 and above	Very High Use of Activities
2	40-43	+1.26 to +2.00	High Use of Activities
3	36-39	+0.51 to +1.25	Above Average Use of Activities
4	31-35	-0.50 to +0.50	Average Use of Activities
5	28-30	-0.51 to -1.25	Below Average Use of Activities
6	24-27	-1.26 to -2.00	Low Use of Activities
7	23 and below	-2.01 and below	Very Low Use of Activities

### 3.5.2. Activity Based Teaching Learning Questionnaire for Teachers

The questionnaire which is used to assess the status of the implementation of activity based teaching learning approach is divided into 2 sections. The first section of the tool deals with the types of problems faced by the teacher in the activity based teaching learning approach classroom. The second section of the tool deals with the teaching-learning materials used in the activity based teaching learning approach classroom. The

development procedures of all the sections of the tools are given below in a detailed manner:

#### **A. Description**

After going through the various literature reviews and discussing with different teachers from different institutions to select the kind of problems that are faced by the teacher in the activity based teaching learning classroom and teaching learning materials used in the classroom, the researcher constructed the tool. The final draft of this first section of the tool consists of 11 items and the second section of the tool consists of 10 items that need to be answered by the teachers. Here the researcher skipped the item analysis part because the items which are mentioned here contain their own importance in the research and there is a chance that item analysis is not able to differentiate between the low achiever group and the high achiever group in terms of some items. There is a huge probability that all the teachers use books as teaching-learning material or may engage in non-academic work irrespective of the low achiever group and the high achiever group.

#### **B. Validity**

The researcher used content validity as a method for establishing validity for both sections of the questionnaire. The researcher sent this tool to different specialists from different reputed institutions. They recommended that all the items which are mentioned are quite comprehensive in nature and matched the objective of this research.

### **3.5.3. Student Engagement Scale for Activity Based Teaching Learning Approach**

#### **A. Description**

The researcher went through different literature and talked with numerous teachers from different institutions with the purpose of developing a student engagement scale. The final draft of this part of the tool consists of 16 items that need to be answered by the teachers. The scoring procedure of items is scored in such a manner that if the respondent tick in the option strongly agree, a score of 5 is given, for agree 4, for neutral 3, for disagree 2, for strongly disagree, 1 will be assigned. The degree of score secured by the respondent will be implies the degree of student engagement in the teaching learning process.

#### **B. Item Analysis**

Item analysis is one of the important component of any standard tool. The researcher conducted a pilot study with a group of 30 social science teachers from 16 schools in the Nagaon and Hojai Districts for item analysis. The researcher prepared two groups amongst the respondent by taking 27% respondent from the high achiever group and 27% from the low achiever group. To evaluate the responses of the low achiever and high

achiever groups on each item, t-values and sig. scores were generated. The t-values and sig. scores for each of the 16 items are listed in Table 3.4:

**Table 3.4: Independent sample t-test and sig-values of Low Achiever and High Achiever Group for Student Engagement for Activity Based Teaching Learning Approach**

Item No	t-value	Sig.	Acceptance/Rejection
1	-4.24	.004	Accepted
2	-4.02	.001	Accepted
3	-5.15	.000	Accepted
4	-4.02	.001	Accepted
5	-12.73	.000	Accepted
6	-6.11	.000	Accepted
7	-4.02	.001	Accepted
8	-7.60	.000	Accepted
9	-2.39	.031	Accepted
<b>10</b>	<b>-.552</b>	<b>.590</b>	<b>Rejected</b>
<b>11</b>	<b>-.447</b>	<b>.662</b>	<b>Rejected</b>
12	-9.90	.000	Accepted
<b>13</b>	<b>.298</b>	<b>.770</b>	<b>Rejected</b>
14	-4.92	.000	Accepted
15	-4.25	.001	Accepted
16	-3.92	.003	Accepted

\*Values marked in bold are non-significant

After conducting an independent sample t-test, the researcher compares the sig. value with .05 and found that 3 items scored above the .05 value, which means that the items do not show any significant difference between the low achiever group and high achiever group. As with the item analysis, the goal is to create items that could effectively differentiate between low achiever and high achiever group. The researcher eliminated the bold-lettered items 10, 11, and 13 since they did not meet the criteria which are needed in this analysis process. After item analysis, the final draft of this tool consists of 13 items.

### **C. Reliability**

Reliability is considered one of the important components of any standardized tool. There are various methods available for effectively determining the dependability of any instrument. The researcher selected the test-retest method for establishing the reliability of the tool. For establishing the tool's dependability, the researcher chose the test-retest method. The researcher gave the tool to a group of 21 secondary school social science instructors who were chosen from 11 schools in the Nagaon District, and then gave it to the same group of teachers again after a week. For this tool, the coefficient of correlation calculated in Statistical Package for Social Science (SPSS) using the Pearson formula is 0.67, which is significant at the 0.01 level of significance. This coefficient of correlation denotes that it has a marked relation between these two sets of scores which means that this tool possesses reliability (Garrett, 2006).

### **D. Validity**

Validity is considered one of the vital parts of any standardised tool. The researcher can effectively establish the validity of any tool through the help of different methods. The researcher establishes content validity in this tool. For that, the researcher sent this tool to different experts. They recommended that the items which are there on the tool fulfill the purpose of the research which is set by the researcher in the research.

### **E. Norms**

To establish z-score norms, the researcher administered the tool to a group of 21 social science teachers in 12 schools in the Biswanath district. To interpret the raw scores received from the scale, statistical calculations were done to find out the mean and standard deviation so that norms could be prepared. The mean and standard deviation are:

**Mean:** 53.38 **SD:** 4.59 **N:** 21

Based on the above statistics, z-score norms prepared which are given in Table 3.5 and norms for interpreting the levels of student engagement in the activity based teaching learning approach classroom are given in Table 3.6

**Table 3.5: Z-score Norms for Student Engagement in Activity Based Teaching Learning Approach**

Raw Score	Z Score	Raw Score	Z Score	Raw Score	Z Score	Raw Score	Z Score
41	-2.70	48	-1.17	55	0.35	62	1.88
42	-2.48	49	-0.95	56	0.57	63	2.09
43	-2.26	50	-0.74	57	0.79	64	2.31
44	-2.04	51	-0.52	58	1.00	65	2.53
45	-1.82	52	-0.30	59	1.22		
46	-1.61	53	-0.08	60	1.44		
47	-1.39	54	0.13	61	1.66		

**Table 3.6: Norms for Interpretation of Z-score for Student Engagement in Activity Based Teaching Learning Approach**

Sl. No.	Range of Raw Scores	Range of Z-Scores	Level
1	63 and above	+2.01 and above	Very High Student Engagement Rate
2	60-62	+1.26 to +2.00	High Student Engagement Rate
3	56-59	+0.51 to +1.25	Above Average Student Engagement Rate
4	52-55	-0.50 to +0.50	Average Student Engagement Rate
5	48-51	-0.51 to -1.25	Below Average Student Engagement Rate
6	45-47	-1.26 to -2.00	Low Student Engagement Rate
7	44 and below	-2.01 and below	Very Low Student Engagement Rate

**3.5.4. Attitude Scale Towards Activity Based Teaching Learning Approach (For Teachers)**

**A. Description**

The researcher examined different literature and discussed with different professionals in order to develop the attitude scale for this research work. As a result, the number of items is reduced from 109 items to 43 items which are considered as a final draft for item analysis. The scale consists of both positive and negative items where the respondent will

be the teacher. The scoring procedure for the positive items is scored in such a manner that if the respondent tick in the option strongly agree, a score of 5 is given, for agree 4, for neutral 3, for disagree 2, for strongly disagree, 1 will be assigned. For the negative items, the above scoring procedure is completely reversed. The degree of score secured by the respondent will be implies the level of teachers' attitude in the teaching learning process.

### **B. Item Analysis**

The researcher conducted a pilot study on a group of 30 social science teachers who were selected from 16 schools in Nagaon and Hojai Districts. From the total sample, 27% of the subjects with the lowest total scores and 27% of the subjects with the highest total scores were selected from the data for the preparation of two groups high achiever group and low achiever group. The t-values and sig. scores were calculated to evaluate the responses of the low achiever and high achiever groups on each item. The t-values and sig. scores for the 43 items are given in the following Table 3.7:

**Table 3.7: Independent Sample t-test and sig-values of Low Achiever and High Achiever Group for Attitude of Teachers Towards Activity Based Teaching Learning Approach**

Item No	t-value	Sig.	Acceptance/ Rejection	Item No	t-value	Sig.	Acceptance/ Rejection
1	-4.58	.000	Accepted	23	-15.00	.000	Accepted
2	-2.50	.026	Accepted	24	-3.02	.009	Accepted
3	-4.24	.004	Accepted	25	-7.17	.000	Accepted
4	-2.50	.026	Accepted	<b>26</b>	<b>-.475</b>	<b>.646</b>	<b>Rejected</b>
5	-9.00	.000	Accepted	27	-2.83	.013	Accepted
6	-6.18	.000	Accepted	<b>28</b>	<b>-2.05</b>	<b>.073</b>	<b>Rejected</b>
7	-2.37	.033	Accepted	29	-2.50	.041	Accepted
8	-7.00	.000	Accepted	30	-4.58	.003	Accepted
9	-2.37	.033	Accepted	31	-3.21	.015	Accepted
10	-7.48	.000	Accepted	32	-3.99	.005	Accepted
11	-6.11	.000	Accepted	33	-2.55	.033	Accepted
12	-2.55	.023	Accepted	34	-2.81	.033	Accepted
13	-10.69	.000	Accepted	35	-3.15	.011	Accepted
14	-5.46	.000	Accepted	36	-2.55	.023	Accepted
15	-5.46	.000	Accepted	37	-2.38	.043	Accepted
16	-2.44	.028	Accepted	38	-3.00	.020	Accepted
17	-2.68	.018	Accepted	39	-6.18	.000	Accepted
18	-2.68	.018	Accepted	40	-2.75	.016	Accepted
<b>19</b>	<b>-1.00</b>	<b>.351</b>	<b>Rejected</b>	41	-5.00	.002	Accepted
20	-2.50	.032	Accepted	42	-3.99	.005	Accepted
21	-9.35	.000	Accepted	43	-6.18	.000	Accepted
22	-2.83	.026	Accepted				

\*Values marked in bold are non-significant

After conducting an independent sample t-test, the researcher compared the sig value with .05 and found that 3 items scored above the .05 value, which means that the items do not show any significant difference between the low achiever group and the high achiever group. Item analysis helps in creating those items which could effectively differentiate



between low achiever group and high achiever group. As it is not fulfilled in this analysis process so the researcher rejected items no 19, 26 and 28 which were given in the bold letter. After item analysis, the final draft of this scale consists of 40 items.

### **C. Reliability**

Without reliability, it is not possible to develop a standardised tool. Reliability refers to the degree of consistency of scores. For establishing reliability, the researcher used the test-retest method. The researcher administered the tool to a group of 21 secondary school science teachers who were selected from 11 schools in Nagaon District and after a gap of 1 week again the same tool is administered to the same group of teachers. The coefficient of correlation which is calculated in Statistical Package for Social Science (SPSS) with the help of the pearson formula is found for this tool to be 0.94 which is significant at 0.01 level of significance. This coefficient of correlation denotes that it has high relation between these two sets of the score which means that this scale possesses high reliability (Garrett, 2006).

### **D. Validity**

To develop the tool, the researcher establishes the content validity of the scale. To do that, the researcher sent this scale to different experts from different reputed institutions. The experts recommended that the items which are there on the scale suitably fulfil the objectives of the research.

### **E. Norms**

To establish z-score norms, the researcher administered the tool to a group of 21 social science teachers in 12 schools in the Biswanath district. To interpret the raw scores received from the scale, statistical calculations were done to find out the mean and standard deviation so that norms could be prepared. The mean and standard deviation are:

**Mean:** 158.14 **SD:** 15.48 **N:** 21

Based on the above statistics, z-score norms prepared which are given in Table 3.8 and norms for interpreting the levels of positive or negative attitude towards activity based teaching learning approach are given in Table 3.9

**Table 3.8: Z-score Norms for Attitude of Teachers Towards Activity Based  
Teaching Learning Approach**

<b>Raw Score</b>	<b>Z Score</b>	<b>Raw Score</b>	<b>Z Score</b>	<b>Raw Score</b>	<b>Z Score</b>	<b>Raw Score</b>	<b>Z Score</b>
116	-2.72	138	-1.30	160	0.12	182	1.54
117	-2.66	139	-1.24	161	0.18	183	1.60
118	-2.59	140	-1.17	162	0.25	184	1.67
119	-2.53	141	-1.11	163	0.31	185	1.73
120	-2.46	142	-1.04	164	0.38	186	1.80
121	-2.40	143	-0.98	165	0.44	187	1.86
122	-2.33	144	-0.91	166	0.51	188	1.93
123	-2.27	145	-0.85	167	0.57	189	1.99
124	-2.20	146	-0.78	168	0.64	190	2.06
125	-2.14	147	-0.72	169	0.70	191	2.12
126	-2.08	148	-0.65	170	0.77	192	2.19
127	-2.01	149	-0.59	171	0.83	193	2.25
128	-1.95	150	-0.52	172	0.89	194	2.32
129	-1.88	151	-0.46	173	0.96	195	2.38
130	-1.82	152	-0.40	174	1.02	196	2.44
131	-1.75	153	-0.33	175	1.09	197	2.51
132	-1.69	154	-0.27	176	1.15	198	2.57
133	-1.62	155	-0.20	177	1.22	199	2.64
134	-1.56	156	-0.14	178	1.28	200	2.70
135	-1.49	157	-0.07	179	1.35		
136	-1.43	158	-0.01	180	1.41		
137	-1.36	159	0.05	181	1.48		

**Table 3.9: Norms for Interpretation of z-score for Attitude of Teachers Towards Activity Based Teaching Learning Approach**

Sl. No.	Range of Raw Scores	Range of Z-Scores	Level
1	190 and above	+2.01 and above	Extremely Favourable Attitude
2	178-189	+1.26 to +2.00	Highly Favourable Attitude
3	166-177	+0.51 to +1.25	Above Moderate Attitude
4	151-165	-0.50 to +0.50	Moderate Attitude
5	139-150	-0.51 to -1.25	Below Moderate Attitude
6	128-138	-1.26 to -2.00	Highly Unfavourable Attitude
7	127 and below	-2.01 and below	Extremely Unfavourable Attitude

### **3.5.5. Attitude Scale Towards Activity Based Teaching Learning Approach (For Students)**

#### **A. Description**

The researcher has done an intensive review and interacted with different teachers to develop the attitude scale of students for this research. As a result, the number of items of the tool is reduced from 105 items to 41 items which are considered as a final draft for item analysis. The scale consists of both positive and negative items where the respondent will be the students. The scoring procedure for the positive items is scored in such a manner that if the respondent tick in the option strongly agree, a score of 5 is given, for agree 4, for neutral 3, for disagree 2, for strongly disagree, 1 will be assigned. For the negative items, the above scoring procedure is completely reversed. The degree of score secured by the respondent will be implies the level of students' attitude in the teaching learning process.

#### **B. Item Analysis**

In the development process of any tool, item analysis plays an important role. Item analysis helps us to distinguish between individuals in terms of their performance. The researcher conducted a pilot study on a group of 200 secondary school students who were selected from different schools in the Nagaon and Hojai Districts. From the total sample, 27% of the subjects with the lowest total scores and 27% of the subjects with the highest

total scores were selected from the data for the preparation of two groups high achiever group and low achiever group. The t-values and sig. scores were calculated to evaluate the responses of the low achiever and high achiever group on each item. The t-values and sig. scores for the 41 items are given in the following Table 3.10:

**Table 3.10: Independent Sample t-test and sig-values of Low Achiever and High Achiever Group for Attitude of Students Towards Activity Based Teaching Learning Approach**

Item No	t-value	Sig.	Acceptance/ Rejection	Item No	t-value	Sig.	Acceptance/ Rejection
1	-10.86	.000	Accepted	22	-7.84	.000	Accepted
2	-6.20	.000	Accepted	23	-10.10	.000	Accepted
3	-10.34	.000	Accepted	24	-5.82	.000	Accepted
4	-6.73	.000	Accepted	25	-5.88	.000	Accepted
5	-6.15	.000	Accepted	<b>26</b>	<b>-.35</b>	<b>.729</b>	<b>Rejected</b>
6	-10.43	.000	Accepted	27	-3.42	.001	Accepted
7	-19.45	.000	Accepted	<b>28</b>	<b>-.231</b>	<b>.818</b>	<b>Rejected</b>
8	-18.37	.000	Accepted	29	-6.77	.000	Accepted
9	-20.19	.000	Accepted	30	-3.70	.000	Accepted
10	-18.88	.000	Accepted	31	-5.95	.000	Accepted
11	-6.450	.000	Accepted	<b>32</b>	<b>-.527</b>	<b>.599</b>	<b>Rejected</b>
12	-12.27	.000	Accepted	33	-5.69	.000	Accepted
13	-6.08	.000	Accepted	34	-5.68	.000	Accepted
14	-8.71	.000	Accepted	35	-5.02	.000	Accepted
15	-9.26	.000	Accepted	36	-5.67	.000	Accepted
16	-12.20	.000	Accepted	37	-4.15	.000	Accepted
17	-8.02	.000	Accepted	38	-9.22	.000	Accepted
18	-7.47	.000	Accepted	39	-4.86	.000	Accepted
19	-9.62	.000	Accepted	40	-8.63	.000	Accepted
20	-9.29	.000	Accepted	41	-6.88	.000	Accepted
21	-6.33	.000	Accepted				

\*Values marked in bold are non-significant

After conducting an independent sample t-test, the researcher compared the sig value with .05 and found that 3 items scored above the .05 value, which means that the items do not show any significant difference between the low achiever group and the high achiever group. Item analysis helps in creating those items which could effectively differentiate between the low achiever group and the high achiever group. As it is not fulfilled in this analysis process so the researcher rejected items no 26, 28 and 32 which were given in the bold letter. After item analysis, the final draft of this scale consists of 38 items.

### **C. Reliability**

The degree of consistency of scores gained by administering the test is referred to as reliability. Any developed tool must have a high level of reliability. The test-retest method is chosen by the researcher to establish reliability. The tool is given to a group of 110 students by the researcher, who then gave it to the same set of students after a one-week break. The coefficient of correlation calculated in Statistical Package for Social Science (SPSS) using the pearson formula for this tool is 0.86, which is significant at the 0.01 level of significance. This coefficient of correlation indicates that there is a high relation between these two sets of scores, implying that this scale is highly reliable (Garrett, 2006).

### **D. Validity**

The validity of a tool refers to whether the content of the tool matches the objective of the research. The researcher chooses content validity as a means of establishing validity. To accomplish so, the researcher sent the scale to a variety of experts from reputable organizations. The attitude scale for students is proven to be legitimate because all of the tool's items address practically the objective of the research, which is the study's ultimate goal.

### **E. Norms**

The researcher gave the instrument to a group of 112 students with the goal of developing z-score norms. To interpret the raw scores from the scale, statistical computations were performed to determine the mean and standard deviation, allowing norms to be created. The following are the mean and standard deviation:

**Mean:** 143.17 **SD:** 15.21 **N:** 112

On the basis of the above statistics, z-score norms prepared which are given in Table 3.11 and norms for interpreting the levels of attitude towards activity based teaching learning approach are given in Table 3.12

**Table 3.11: Z-score Norms for Attitude of Students Towards Activity Based  
Teaching Learning Approach**

<b>Raw Score</b>	<b>Z Score</b>	<b>Raw Score</b>	<b>Z Score</b>	<b>Raw Score</b>	<b>Z Score</b>	<b>Raw Score</b>	<b>Z Score</b>
103	-2.64	123	-1.33	143	-0.01	163	1.30
104	-2.57	124	-1.26	144	0.05	164	1.37
105	-2.51	125	-1.19	145	0.12	165	1.43
106	-2.44	126	-1.13	146	0.19	166	1.50
107	-2.38	127	-1.06	147	0.25	167	1.57
108	-2.31	128	-1.00	148	0.32	168	1.63
109	-2.25	129	-0.93	149	0.38	169	1.70
110	-2.18	130	-0.86	150	0.45	170	1.76
111	-2.11	131	-0.80	151	0.51	171	1.83
112	-2.05	132	-0.73	152	0.58	172	1.89
113	-1.98	133	-0.67	153	0.65	173	1.96
114	-1.92	134	-0.60	154	0.71	174	2.03
115	-1.85	135	-0.54	155	0.78	175	2.09
116	-1.79	136	-0.47	156	0.84	176	2.16
117	-1.72	137	-0.40	157	0.91	177	2.22
118	-1.65	138	-0.34	158	0.97	178	2.29
119	-1.59	139	-0.27	159	1.04	179	2.35
120	-1.52	140	-0.21	160	1.11	180	2.42
121	-1.46	141	-0.14	161	1.17	181	2.49
122	-1.39	142	-0.08	162	1.24	182	2.55

**Table 3.12: Norms for Interpretation of Z-score for Attitude of Students Towards Activity Based Teaching Learning Approach**

Sl. No.	Range of Raw Scores	Range of Z-Scores	Level
1	174 and above	+2.01 and above	Extremely Favourable Attitude
2	163-173	+1.26 to +2.00	Highly Favourable Attitude
3	151-162	+0.51 to +1.25	Above Moderate Attitude
4	136-150	-0.50 to +0.50	Moderate Attitude
5	125-135	-0.51 to -1.25	Below Moderate Attitude
6	113-124	-1.26 to -2.00	Highly Unfavourable Attitude
7	112 and below	-2.01 and below	Extremely Unfavourable Attitude

### 3.6. Statistical Techniques for Data Analysis

The researcher used the following statistical techniques for this study:

**Percentage:** It is used in the analysis of the responses given by the teachers and students in different tools namely activity based teaching learning inventory for teachers, activity based teaching learning questionnaire for teachers, student engagement scale for activity based teaching learning approach, attitude scale towards activity based teaching learning approach (for teachers), attitude scale towards activity based teaching learning approach (for students).

**Mean:** It is used to determine the significant difference between the mean of the samples.

**Independent Sample t test:** It is used to find out the significant differences between teachers and students in terms of different variables. This technique is basically used for the data which are collected from different tools namely student engagement scale for activity based teaching learning approach, attitude scale towards activity based teaching learning approach (for teachers), attitude scale towards activity based teaching learning approach (for students).

**One Way ANOVA:** It is used to find out the significant differences between teachers in terms of experience variable. This technique is basically used for the data collected from different tools namely the attitude scale towards activity based teaching learning approach (for teachers).

**Column Graph:** It is used to present the data in a graphical form and compare the result between teachers in terms of different issues.

**Pie Diagram:** It is used to present the data of teachers in a graphical form in terms of different topics.

This chapter deals with the whole research methodology which is adopted in this study. It specifies the population, sample and sampling technique of the study. It also explains the procedure of tool construction which is applied in this study. It also gives a brief description of the statistical techniques which are used in this study. The next chapter of this paper deals with the data analysis and interpretation of the data.