CHAPTER III
DESIGN OF THE STUDY

3.0 Introduction
3.1 Population
3.2 Sample
3.3 Tools Used
3.4 Method of Study
3.5 Data Collection Procedure
3.6 Statistical Techniques Used
3.0 Introduction

Research Design is a procedural plan that is adopted by the researcher to carry on the research work in a systematic way. It includes the measurement procedures, the sampling strategy, the frame of analysis etc. Hence the present chapter deals with the design of the study that is categorised into the following headings:

i. Population
ii. Sample
iii. Tools Used
iv. Method of Study
v. Data Collection Procedure
vi. Statistical Techniques Used

3.1 Population

The population for the present study consist of all the students studying in Class IX in the Government and Private secondary schools of Kamrup Metropolitan District, Lower Assam. The Kamrup Metropolitan District has a total of 197 secondary schools out of which 87 are government and 110 are private schools. The total enrolment of students in Class IX in these schools was approximately 19,892 for the year 2014. The Population in details is shown in the table below:

Table 3.1
Table Showing the Population of Students Enrolment (as on 2014)

<table>
<thead>
<tr>
<th>Types of Schools</th>
<th>No. of Schools</th>
<th>Total No. of Students Enrolment in Class IX</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rural</td>
<td>Urban</td>
</tr>
<tr>
<td>Government/Provincialized</td>
<td>20</td>
<td>67</td>
</tr>
<tr>
<td>Private</td>
<td>20</td>
<td>90</td>
</tr>
<tr>
<td>Grand Total</td>
<td>40</td>
<td>157</td>
</tr>
</tbody>
</table>

Source: Office of the Inspector of Schools, Kamrup Metropolitan District, Lower Assam
3.2 Sample

The sample for the present study consist of 995 students of Class IX which is selected randomly by giving a fair representation to all private and government secondary schools situated in different blocks under rural areas and different wards under urban areas. The details of the sample are shown in the table below:

Table 3.2
Table Showing the Sample Size of the Students

<table>
<thead>
<tr>
<th>Types of Schools</th>
<th>No. of Schools</th>
<th>No. of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rural</td>
<td>Urban</td>
</tr>
<tr>
<td>Government/ Provincialized</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Private</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Grand Total</td>
<td>4</td>
<td>16</td>
</tr>
</tbody>
</table>

3.3 Tools Used

The following tools were used for the present study

A) Academic Anxiety Scale for children by A.K. Singh and A. Sengupta (2009)\(^{97}\) (Appendix A)

B) Academic Achievement Motivation Test by T.R. Sharma (2006)\(^{98}\) (Appendix B)

A) Academic Anxiety Scale for children (AASC): The Academic Anxiety Scale for children has been used for testing the academic anxiety level of Class IX students for the present study. The description of the tool is given below:

i) Description of the Test

The Academic Anxiety Scale has been developed for use with school students of Class VIII, IX and X (age range; 13-16 years). The preliminary form of the Academic Anxiety Scale for children had 30 items. After carrying out item

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analysis based upon Kelly technique (1939), only 20 items were retained and the remaining 10 were dropped.

ii) Reliability

The reliability of the AASC test was computed through the two methods, that is, test-retest method and the split-half method. In order to compute the test-retest reliability, the test was administered twice on a sample of 100 pupils with 14 days gap. Subsequently, Pearson r was computed between the two sets of scores. The obtained Pearson r was .60 which was significant beyond .01 level. For the split half reliability of the test, it was administered on a fresh sample of one hundred. Subsequently, the test was split by the odd-even method. The resulting odd-even correlation coefficient was .433 (p < .01, Cf. Table 3.3 (A) (ii) which, after being corrected to full length, became .65.

Table 3.3 (A) (ii)
Reliability Coefficient for AASC

<table>
<thead>
<tr>
<th>Method</th>
<th>N</th>
<th>Coefficient of Correlation</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test-Retest</td>
<td>100</td>
<td>.60*</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Split-half</td>
<td>100</td>
<td>.65*</td>
<td>&lt; .01</td>
</tr>
</tbody>
</table>

*Significant

iii) Validity

The present test (AASC) has been validated against the Sinha-anxiety test, Neuroticism scale of MPI and CAAT. Former two tests are the measures of general anxiety and the latter intends to measure academic anxiety among school children. Table 3.3 (a)(iii) presents the validity coefficients of AASC against these different measures. On the basis of the obtained correlation coefficients it can be said that Academic Anxiety Scale for children (AASC) is a valid test.
### Table 3.3 (A) (iii)

Validity Coefficient for AASC

<table>
<thead>
<tr>
<th>Test</th>
<th>Criterion</th>
<th>Correlation Coefficient</th>
<th>N</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Anxiety Scale</td>
<td>Neurotic Scale</td>
<td>.31*</td>
<td>100</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>(AASC)</td>
<td>Sinha-anxiety Scale</td>
<td>.41*</td>
<td>100</td>
<td>&lt; .01</td>
</tr>
<tr>
<td></td>
<td>CAAT</td>
<td>.57*</td>
<td>100</td>
<td>&lt; .01</td>
</tr>
</tbody>
</table>

*Significant

### iv) Norms

Percentile norms have been constructed for the present test. In order to serve the purpose, the test was administered on a fresh heterogeneous sample of 600 students studying in Class VIII, IX and X. Their age ranged between 13 to 16 years.

The percentile norm is qualitatively described as follows in the Table 3.3 (A) (iv).

### Table 3.3 (A) (iv)

Qualitative Description of the obtained percentile rank

<table>
<thead>
<tr>
<th>Percentile Rank</th>
<th>Description</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>P^{80} and above</td>
<td>Very Anxious</td>
<td>High Academic Anxiety</td>
</tr>
<tr>
<td>P^{60} to P^{79}</td>
<td>Anxious</td>
<td></td>
</tr>
<tr>
<td>P^{55} to P^{59}</td>
<td>Average</td>
<td>Average Academic Anxiety</td>
</tr>
<tr>
<td>P^{25} to P^{44}</td>
<td>Less Anxious</td>
<td>Low Academic Anxiety</td>
</tr>
<tr>
<td>P^{24} and below</td>
<td>Very Less Anxious</td>
<td></td>
</tr>
</tbody>
</table>

### v) Scoring

The maximum possible score of this test is 20. Each item of the test is scored as either +1 or 0. There are two types of items- positive and negative. All positive items which are endorsed by the subjects as ‘yes’ and all negative items which are endorsed by the subject as ‘No’ are given a score of +1. A score of zero is awarded to all other answers. Thus, high score on the test indicates high academic anxiety and low score on the test indicates low academic anxiety.
B) Academic Achievement Motivation Test (AAMT): The present study also used the Academic Achievement Motivation Test for testing the motivation level of Class IX students towards their academics. The description of the tool is given below:

i) Reliability

Three methods were tried to determine the reliability of the test. The results have been calculated below:

a) Split-half Reliability of the whole test = 0.697

b) Test-Retest Reliability = Boys – 0.795, Girls – 0.807

ii) Validity

Three types of validities- content, criterion and construct, were established. The items of the test were selected on the basis of pooled judgement of nearly 40 judges (experts) in the field of testing. This sufficed for content validity. For criterion validity, on the basis of considered judgements of class teachers twenty students, ten low on achievement motivation and ten high on achievement motivation were administered this test under standardization. Significant differences were found in the mean test-scores of the two groups. Data are given below:

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean Score</th>
<th>S.D.</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Motivated</td>
<td>10</td>
<td>33.1</td>
<td>2.60</td>
<td>6.30</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Low Motivated</td>
<td>10</td>
<td>20.7</td>
<td>4.18</td>
<td>6.30</td>
<td>&lt; 0.01</td>
</tr>
</tbody>
</table>

iii) Norms

The test manual provides a direct numerical score indicating how much an individual boy or girl is motivated in the field of academic achievement. The scores range from 0-38. Ready-reckoner given below serves as a quick guide.
### Table 3.3 (B) (iii)

**Qualitative Description of Academic Motivation Scores**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Level</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High Academic Motivated</td>
<td>Boys 33 or above</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Girls 34 or above</td>
</tr>
<tr>
<td>2</td>
<td>Average Academic Motivated</td>
<td>Boys between 26 and 32</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Girls between 27 and 33</td>
</tr>
<tr>
<td>3</td>
<td>Low Academic Motivated</td>
<td>Boys 25 or below</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Girls 26 and below</td>
</tr>
</tbody>
</table>

### V) Scoring Key

Award one mark if box A ☐ has been ticked in case of items No. 1, 3, 4, 6, 8, 10, 12, 13, 15, 16, 17, 18, 21, 25, 27, 31, 35, 36 and 37 and if box B ☐ has been ticked in case of items at Sr. No. 2, 5, 7, 9, 11, 14, 19, 20, 22, 23, 24, 26, 28, 29, 30, 32, 33, 34, 38.

<table>
<thead>
<tr>
<th>Items No.</th>
<th>Box A</th>
<th>Box B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1, 3, 4, 6, 8, 10, 12, 13, 15, 16, 17, 18, 21, 25, 27, 31, 35, 36, 37</td>
<td>Award one mark if subject tick Box A</td>
<td>Award one mark if subject tick Box B</td>
</tr>
<tr>
<td>2, 5, 7, 9, 11, 14, 19, 20, 22, 23, 24, 26, 28, 29, 30, 32, 33, 34, 38</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 3.4 Method of Study

For the present study, descriptive method was followed. The descriptive research method has undoubtedly been the most popular and the most widely used research method in education. Descriptive research studies are designed to obtain pertinent and precise information concerning the current status of phenomenon and, whenever possible to draw valid general conclusions from the facts discovered. (Koul, 2008⁹⁹).

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3.5 Data Collection Procedure

At first the investigator took a written permission from the inspector of schools of the Kamrup Metropolitan District to collect data from the sample schools. Permission was also taken from the principals of the sample schools before collecting the data. The investigator visited all the schools personally and had an informal interaction with the students and the questionnaires were distributed. The two tools i.e. Academic Anxiety Scale for children and Academic Achievement Motivation Test were administered to the Class IX students of the sample schools. The students were explained about the purpose of the study and if the students had any difficulty in understanding the items of the tools, the investigator explained it to them properly. The tool was administered to the students a few months before their annual examination to test their level of academic anxiety and academic motivation before their examinations.

For the academic achievement, the marks obtained by the students in their Class IX district board examination (2014-15) was collected from the respective schools after a few months when the annual examination results of the students were declared.

After completing the data collection procedure, the data entry was done in Microsoft Excel. The data was analysed using descriptive statistics which involved the use of frequencies, Mean, Standard Deviations and inferential statistics involving t-test and techniques of correlation.

3.7 Statistical Techniques Used

The following statistical techniques were used for analysing the data

i). Pearson’s Coefficient of Correlation

\[
\rho = \frac{N \sum x' y' - \sum f x' \sum f y'}{\sqrt{[N \sum f x'^2 - (\sum f x')^2][N \sum f y'^2 - (\sum f y')^2]}}
\]

Where,

\( x' = \) The deviation of variable \( x \) from the assumed mean

\( y' = \) The deviation of variable \( y \) from the assumed mean
Design of the Study

\[ f = \text{Frequency of the score} \]

\[ fx^2 = \text{The sums of the square x value} \]

\[ fy^2 = \text{The sums of the square of y value} \]

\[ N = \text{Size of the sample} \]

\[ \Sigma = \text{Summation} \]

For testing the significance of simple correlation, Table Value of \( r \) has been used.

ii). Partial Correlation (first order correlation)

\[
\Gamma_{1.2} = \frac{r_{12} - r_{13} \cdot r_{23}}{\sqrt{1-r_{13}^2} \cdot \sqrt{1-r_{23}^2}}
\]

\[
\Gamma_{2.1} = \frac{r_{21} - r_{23} \cdot r_{13}}{\sqrt{1-r_{23}^2} \cdot \sqrt{1-r_{13}^2}}
\]

Where,

\( r_{13.2} \) means the correlation between 1 and 3 (Academic Anxiety and Academic Achievement), while making the third variable “Academic Motivation” as constant or partialled out

\( r_{23.1} \) means the correlation between 2 and 3 (Academic Motivation and Achievement Achievement), while making the third variable “Academic Anxiety” as constant or partialled out

For testing the significance of partial correlation, the following formula was used and Table Value of \( t \) has been used.

\[
t = r \sqrt{\frac{N-2-K}{1-r^2}}
\]

Where,

\( K = \text{Order of Partial } r \)

\( r = \text{Value of Partial correlation} \)

\( N = \text{Size of the Sample} \)
iii). Multiple Correlation

\[
\gamma_{3,1} = \sqrt{\frac{r_{1}^2 + r_{2}^2 - 2r_{1}r_{2}r_{1}}{1 - r_{1}^2}}
\]

Where,

\( r_{13} \) = Correlation between Academic Anxiety Scores and Academic Achievement

\( r_{23} \) = Correlation between Academic Motivation Scores and Academic Achievement

\( r_{12} \) = Correlation between Academic Anxiety scores and Academic Motivation Scores

(Academic Anxiety is independent variable - 1, Academic Motivation is Independent Variable - 2, and Academic Achievement is dependent variable - 3)

To test the significance of multiple correlation, F test has been employed and has been calculated with the following formula and also Table Value of F has been used.

\[
F = \frac{R^2}{1-R^2} \times \frac{N-K-1}{K}
\]

Where,

\( R^2 \) = Multiple Determination

\( N \) = Size of the sample

\( K \) = Number of variables

iv). Significance of the difference between two means (t-test)

To test the significance of the difference between two Means, the following formulas were used and also Table value of t was used.
\[ \sigma_D = \sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}} \]

\[ t = \frac{U}{\sigma_D} \]

Where,

- \( \sigma_D \) = Standard Error of the difference between two sample means
- \( \sigma_1 \) and \( \sigma_2 \) = Standard Deviation of the two scores
- \( N_1 \) and \( N_2 \) = Sizes of the two samples

v). Percentage