CHAPTER - III
METHODOLOGY OF THE STUDY

3.1 OVERVIEW

The Present study is a Survey research aimed to measure the Achievement of the students of Standard VIII in Mathematics in Middle, High and Higher Secondary Schools in Dindigul district with reference to Teachers Morale and with respect to the other variables such as Sex, Locality, Type of Management, Community of the students, Parent’s Education and Parent’s Income. The Methodology followed in the present study is described in this chapter. The Objectives and Hypotheses of the Study, the Design of the Study, Size of the Sample, Development of the Tool and Administering the Tools and Limitations of the study have been reported in the present chapter.

3.2 OBJECTIVES OF THE STUDY

The major objective of the Study is to measure the achievement of the students of Standard VIII in Mathematics among Middle, High and Higher secondary schools in Dindigul district.

The specific objectives of the study were,

i. To measure the level of Achievement of the students in Mathematics with respect to Sex. i.e. Male and Female.

ii. To measure the level of Achievement of the students in Mathematics with respect to Locality. i.e., Rural and Urban.
iii. To measure the level of Achievement of the students in Mathematics with respect to Community. i.e. BC, MBC and SC.

iv. To compare Achievement of the students in Mathematics studying in Middle, High and Higher Secondary Schools with respect to the above mentioned variables.

v. To measure the level of Achievement of the students in Mathematics with respect to their Parents’ Education. i.e. School Level and College Level.

vi. To measure the level of Achievement of the students in Mathematics with respect to their Parents’ Occupation i.e., Agriculture and Daily wages.

vii. To measure the level of Achievement of the students in Mathematics, depending on the Teachers Morale with respect to School Managements. i.e. Aided and Government among the students studying in Middle, High and Higher Secondary Schools.

3.3 HYPOTHESES OF THE STUDY

The Hypotheses of the study are given below:

i. There is Significant Difference in the Mean Achievement in Mathematics of the students from different types of schools such as Middle, High and Higher Secondary Schools

ii. There is no Significant Difference in the Mean Achievement in Mathematics of the students with respect to gender.
iii. There is no Significant Difference in the Mean Achievement in Mathematics of the students with respect to the Locality i.e. Rural and Urban.

iv. There is no Significant Difference in the Mean Achievement in Mathematics of the students with respect to Community. i.e. B.C, M.B.C and SC.

v. There is no Significant Difference in the Mean Achievement in Mathematics of the students with respect to the above variables.

vi. There is no Significant Difference in the Mean Achievement in Mathematics of the students with respect to their Parents’ Education i.e. School level and College level.

vii. There is no Significant Difference in the Mean Achievement in Mathematics of the students with respect to their Parents’ Occupation i.e., Agriculture and Daily Wages.

viii. There is no Significant Difference in the Mean Achievement in Mathematics of the students depending on the Teachers Morale with respect to School Managements, Aided, and Government among the students studying in Middle, High and Higher Secondary Schools.

3.4 DESIGN OF THE STUDY

The Present study belongs to Normative Survey research. The design of the study is presented in the following schematic representation table 3.1
### TABLE 3.1
SCHEMATIC REPRESENTATION OF THE SURVEY DESIGN

<table>
<thead>
<tr>
<th>S. No</th>
<th>Type</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Nature of the Research</td>
<td>Normative Survey</td>
</tr>
<tr>
<td>2.</td>
<td>Variables</td>
<td>Sex, Locality of the students, Community, Parents’ Education, Parents’ Occupation and School Managements.</td>
</tr>
</tbody>
</table>
| 3.    | Tools                         | a. Teacher Constructed Tool to measure the Achievement in Mathematics of Standard VIII Students  
b. Tool to measure the Teachers’ Morale – Anjani Metha (1977) |
| 4.    | Sampling Technique            | Stratified Random Sampling Technique.                                  |
| 5.    | Size of the Sample            | **Total Students** - 3072  
Middle School - 1024  
High School - 977  
Higher Secondary - 1071  

**Total teachers** - 167  
Middle School - 42  
High School - 51  
Higher Secondary - 74  

Schools of Government and Aided Schools of Dindigul District in Tamilnadu State. |
| 6.    | Statistical Technique         | Mean, Standard Deviation and ‘t’ test                                  |
Fig – 1

Pie Chart Showing Size of Sample of Teachers
Fig – 2

Pie Chart Showing Size of Sample of Students
The Table 3.1 shows that the nature of the study was Normative study and the variables used in the study were students’ Sex, Locality, Community, Parents’ Education, Parents’ Occupation and School Managements. The tool was used in the study for measuring the achievement of the students in Mathematics was a teacher constructed tool i.e. Achievement Test in Mathematics (ATM) and tool to measure the Teacher’s Morale. The Stratified Random Sampling Technique was followed in the study. The size of the sample was 1024 students and 42 teachers from Middle Schools, 977 students and 51 teachers from High Schools and 1071 students and 74 teachers from Higher Secondary Schools of Government and Aided schools of Dindigul district in Tamilnadu state. The statistical techniques used in the study were Mean, Standard deviation, ‘t’ test.

3.5 DELIMITATIONS

1) The Investigator confined his study by administering the ATM among 3072 students of which 1024 were studying in Middle Schools, 977 in High Schools and 1071 in Higher Secondary Schools for want of time.

2) The Investigator administered the tools to measure the Teachers Morale among 167 teachers who were working in Middle (42), High (51) and Higher Secondary Schools (74) for the shortage of time.

3) In the Achievement Test in Mathematics the Investigator has included only the seven selected topics of mathematics from the whole syllabus.
3.6 DEFINITIONS OF KEY TERMS AND THEIR OPERATIONAL DEFINITION

The Important terms in the study are i. Achievement ii. Mathematics iii. Middle School iv. High School v. Higher Secondary School and vi. Dindigul District.

(i) **Achievement**: Achievement refers to performance or Attainment in a particular subject. In this study, Achievement refers to the Scholastic Attainment in the subject ‘Mathematics’.

(ii) **Mathematics**: Mathematics is a branch of measurement which is otherwise known as Queen of Sciences which deals with the quantities. In the present study, Mathematics of standard VIII is taken for measuring the achievement in Mathematics.

(iii) **Middle School**: Educational Institutions run by Government or Aided Trust where standard I to standard VIII students are learning. Here, similarly standard I to VIII is termed as Middle school.

(iv) **High School**: Educational Institution run by Government or Aided Trust where standard VI to standard X students are learning. It is considered similarly in the present study.

(v) **Higher Secondary School**: Educational Institution run by Government or Aided Trust where standard VI to standard XII students are learning. Here too it is considered similarly.
(vi) **Dindigul District:** In Tamilnadu state at present there are 32 districts among which Dindigul is one of the districts.

### 3.7 SAMPLE SELECTION

The Stratified Random Sampling Technique was followed in the study. On the whole, 1241 Government Schools and 320 Aided Schools, 27 unaided schools are functioning in Dindigul District. There are totally 1588 schools, of which 1501 are in rural areas and only 87 schools are in urban areas. Government Schools consist of Panchayat union, Municipal, Adi-Dravidar and Kallar schools. Aided schools consist of minority and non-minority schools. Unaided schools function as self-financing Institutions without any monetary support from the Government. There are 30,351 students studying in these schools in standard VIII. By using the Stratified Random Sampling Technique, 3072 students and 167 teachers handling Mathematics for Standard VIII in 59 schools were selected as the sample for the study. The 59 schools consisted of 19 Middle schools, 17 High schools and 23 Higher Secondary Government, Aided schools of Dindigul district.

### 3.8 TOOLS USED

Two types of tools were used in the study. One is Achievement Test in Mathematics (ATM) developed by the Investigator. The other standardized tool on Teacher’s Morale developed by **Anjani Metha (1977)**. The development of Achievement Test in Mathematics is described below.
3.8.1 Achievement Test in Mathematics (ATM)

As the standardized tool for measuring the achievement in Mathematics was not available among the standard VIII, the Investigator decided to develop an Achievement Test in Mathematics (ATM) by himself. The units chosen for developing achievement test were familiar to the Investigator, as he formerly worked as a Post Graduate Teacher in Mathematics. After selecting the units, the Investigator went on developing suitable items on each of the selected units for the study. The Investigator prepared the items in Objective type with 4 alternatives. The Multiple choice items were selected by the Investigator for ATM, as the objective type items were considered the best one than any other objective type items. While preparing the multiple choice items, the Investigator referred to a number of books, such as the book published by the Tamilnadu Text Book Society and written by many other authors in the subject Mathematics in different titles. The best answer type and correct answer type items were developed in the ATM. Utmost care was taken to prepare relevant multiple-choice items that dealt with significant ideas. The Investigator gave attention to the items uniformly selected from the seven different topics in Mathematics. The Investigator himself was satisfied after the deletion, addition and modification of the items prepared. To verify the suitability of the items it was shown to two Mathematics Graduate Teachers handling Mathematics for the standard VIII. Again the same was given to two teacher educators to verify the structure of the items.
The Preliminary draft of the ATM is as shown in the following Table 3.2

**Table 3.2**

**PRELIMINARY DRAFT OF THE ATM**

<table>
<thead>
<tr>
<th>S.No</th>
<th>Unit</th>
<th>No. of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Number System</td>
<td>18</td>
</tr>
<tr>
<td>2.</td>
<td>Daily Mathematics</td>
<td>15</td>
</tr>
<tr>
<td>3.</td>
<td>Menstruation</td>
<td>15</td>
</tr>
<tr>
<td>4.</td>
<td>Algebra</td>
<td>18</td>
</tr>
<tr>
<td>5.</td>
<td>Geometry</td>
<td>14</td>
</tr>
<tr>
<td>6.</td>
<td>Practical Geometry</td>
<td>13</td>
</tr>
<tr>
<td>7.</td>
<td>Handling the Data</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

There were 100 items in all seven units in Mathematics. The number of items selected from seven units is given in the preliminary draft of the ATM. After preparing the preliminary draft of the questionnaires in 3 sets, the Investigator gave them to the two Graduate Assistants handling Mathematics and two teacher educators for verifying the suitability and structure of the test. They critically analyzed the items and gave their suggestions. Afterwards, the Investigator modified the questionnaires, changing some of the items.

The preliminary draft was neatly typed and administered to the selected students of standard VIII. Thirty students studying in Panchyat Union Primary School at Gandhigramam were selected as sample for the pilot study and the test was conducted. The students took around 90 minutes to complete the test items.
Then the answer scripts were scored and arranged in the order from the highest to the lowest. 28 per cent (8) of the answer scripts was selected from the highest score and 28 per cent (8) was selected from the lowest score. The middle score 44 per cent (14) was kept aside. The numbers of correct responses in each item for both high scoring and low scoring groups were computed. The level of Difficulty Value was determined by applying appropriate formula, \( \frac{R}{N} \times 100 \) where \( R \) refers to total number of items answered correctly and \( N \) refers to the total number of students attempted to answer the test items. To determine the Discriminative Index, the formula \( \frac{R_{Hi} - R_{Lo}}{N} \) was applied where \( R_{Hi} \) refers to the number of students in the higher group who answered the test item correctly and \( R_{Lo} \) refers to the number of students in the lower group who answered the test item correctly and \( N \) refers to the number of students.

After calculating the Difficulty value and Discriminatory index for each item, it was found that 6 and 4 items were not having adequate scores of difficulty value and discriminatory index. Ultimately the total number of 100 items was reduced to 90 items for the final study. The final draft of the ATM consists of 90 items in four learning objectives, such as Knowledge-31, Understanding-29, Application-21 and Skill-9.

The 90 items selected for the present study were presented in the Table 3.3.
### Table 3.3

**FINAL DRAFT OF THE ACHIEVEMENT TEST IN MATHEMATICS (ATM) OF STANDARD VIII**

<table>
<thead>
<tr>
<th>S.No</th>
<th>Topics</th>
<th>Learning Objectives</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>K</td>
<td>U</td>
</tr>
<tr>
<td>1.</td>
<td>Number System</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>2.</td>
<td>Daily Mathematics</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3.</td>
<td>Menstruation</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>4.</td>
<td>Algebra</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>5.</td>
<td>Geometry</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>6.</td>
<td>Practical Geometry</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>7.</td>
<td>Handling the Data</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>31</td>
<td>29</td>
</tr>
</tbody>
</table>

#### 3.8.2. Validity and Reliability

Besides the Item Analysis, the ATM was given to Two Mathematics Teaching who is handling to subject to verify the suitability of the content. After the suggestions, the tool was made ready for administration. To check the reliability of the developed tool, ATM, Test and Re-test method was adopted. The tool ATM was administered among forty students of standard VIII of
Government Middle School at Periyakulam of Theni District. The reliability of the tool determined by the Split-Half Method using Spearman-Brown formula was 0.81 which revealed that the developed tool is highly reliable.

3.8.3 Tool of Teacher Morale

Other than the ATM, an other tool was Teachers Morale Tool. Teachers Morale Tool consists of 77 statements with Four Point Scale and the Options given in the Tool are Strongly Agree, Agree, Disagree and Strongly Disagree. The sub-tests or dimensions used in the above Teacher Morality Tool are as follows:

1) Teacher Welfare

This term refers to concern shown by the Government or Management to provide housing quarters, facilities for rest and recreation and provide sick leave and other kinds of other leave in hours of need. The item numbers 12, 14, 17, 27, 55, 59, 60, 73 and 74 represents the Teacher Welfare.

2) Security

The term security of job comprises various acts such as security of job, regular payment of monthly salaries, the honesty of payment to the staff etc., The item numbers 3, 16, 18, 31, 46, 58 and 62 in the Tool refers to the Security.

3) Conditions of Work

Much of the job satisfaction that teacher derive emanate from the conditions under which they are required to work and the subjects of their
likings they are assigned to teach. The item numbers 4, 6, 8, 11, 13, 22, 23, 36, 39, 40, 41, 45, 47, 48, 69, 76 and 77 refers to the Conditions of Work in the Tool.

4) **Interpersonal Relations**

   The School is a second home. A school, like all educational organizations, it is a social system. Teachers and Head Master are colleagues engaged in a common task achieving a common goal. The item numbers 2, 5, 7, 20, 33, 37 and 44 represents Interpersonal Relations of Teachers and the Head Master.

5) **Job Satisfaction**

   It is stipulated that job satisfaction stems not from doing a job in any way but doing it in the best possible manner. The item numbers 24, 25, 53, 56, 61, 63, 64 and 75 represent the Job Satisfaction in the study.

6) **Administration**

   The teacher morale goes up or rails down depending upon how it is administrated. Centralization of authority and strict supervision, control lower down teacher morale. The item numbers 9, 10, 15, 32, 35, 42, 49, 50, 65, 67, 68, 71 and 72 represent the Administration.

7) **Need Satisfaction**

   It includes the satisfaction of both social need and psychological needs. Staff-members need recreation, moments of relaxation, occasions of informality
and opportunities for free mixing and having fun. The item numbers 28, 29, 30, 38, 43, 51, 52, 54, 57, 66 and 70 represent the Need Satisfaction.

8) Cohesion

Cohesion refers to purposeful unity or agreement among the Head Master and the staff members. The school becomes a team. The members of the school organization operate as members of the same family. The item numbers in the Tool 1, 19, 21, 26 and 34 represent the Cohesion.

The respondents are asked to indicate the extent to which, each statement characterizes his school over a Four Point Scale. For the positive statements the scores are assigned as 4, 3, 2 and 1 respectively to the responses and for the negative statements the scores are reversed. Only eight items i.e., item numbers 12, 22, 34, 55, 71, 72, 76 and 77 are scored negatively.

The dimension wise distribution of TMQ items are given in the following Table 3.4.
TABLE 3.4
DIMENSIONWISE DISTRIBUTION OF THE ITEMS

<table>
<thead>
<tr>
<th>Sino</th>
<th>Dimensions</th>
<th>Item Numbers</th>
<th>Total No of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Teacher Welfare</td>
<td>12, 14, 17, 27, 55, 59, 60, 73, 74</td>
<td>9</td>
</tr>
<tr>
<td>2.</td>
<td>Security</td>
<td>3, 16, 18, 31, 46, 58, 62</td>
<td>7</td>
</tr>
<tr>
<td>3.</td>
<td>Conditions of Work</td>
<td>4, 6, 8, 11, 13, 22, 23, 36, 39, 40, 41, 45, 47, 48, 69, 76, 77</td>
<td>17</td>
</tr>
<tr>
<td>4.</td>
<td>Interpersonal Relations</td>
<td>2, 5, 7, 20, 33, 37, 44</td>
<td>7</td>
</tr>
<tr>
<td>5.</td>
<td>Job Satisfaction</td>
<td>24, 25, 53, 56, 61, 63, 64, 75</td>
<td>8</td>
</tr>
<tr>
<td>6.</td>
<td>Administration</td>
<td>9, 10, 15, 32, 35, 42, 49, 50, 65, 67, 68, 71, 72</td>
<td>13</td>
</tr>
<tr>
<td>7.</td>
<td>Need Satisfaction</td>
<td>28, 29, 30, 38, 43, 51, 52, 54, 57, 66, 70</td>
<td>11</td>
</tr>
<tr>
<td>8.</td>
<td>Cohesion</td>
<td>1, 19, 21, 26, 34</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td><strong>77</strong></td>
</tr>
</tbody>
</table>

3. 9 ADMINISTERING THE TOOL

The tool, ATM was administered to 3072 students. Of them, 1024 were studying in Middle Schools, 977 in High Schools and 1071 in Higher Secondary Schools. The Standardized tool Teacher Morale was administered among 167 teachers who were working in Middle (42), High (51) and Higher Secondary Schools (74). All the students and Teachers were from 19 Middle, 17 High and 23 Higher Secondary Schools. The Investigator instructed to read all the items
carefully and put the tick mark near the appropriate alternative in the answer. Afterwards the Investigator collected the filled in questionnaires.

3.10 STATISTICAL MEASURES USED IN THE STUDY

After collecting the filled in questionnaires from the students and the teachers, the Investigator scored all the questionnaires. Master table was prepared by plotting the Achievement Scores in Mathematics of the standard VIII students, Teacher’s Morale Scores of the teachers. Different statistical techniques were used in the study for finding out solutions to the problem. Mean and Standard Deviation were calculated to find out the significant difference between the two variables. The Investigator rejected or accepted the hypotheses based on the ‘t’ values.

3.11 SCHEME OF DATA ANALYSIS

The collected data as discussed under above headings were subjected to different types of analysis. Different statistical techniques were applied and the results were presented along with the interpretation. The results were presented in six classifications such as Type of the School, Sex, Locality, Community, Parents’ Educational status and Parents’ Occupation. The results were also analyzed with further consideration of the Teachers Morale.

3.12. ETHICS OF THE RESEARCH

By conducting this study, the students are benefited academically on knowing the nature of objective type examination and their level of achievement
in mathematics. They are not at all negatively bothered in any way. AS this experience is quite new, they enjoy with their friends. As the investigator is intended to conduct the test for the purpose of research, the students are not at all taking it source areas and they feel happy. They enjoy it in another way that they could help for getting the highest degree of Ph.D.

Next chapter deals with the Data Analysis.