CHAPTER - III
METHODOLOGY
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3.1 INTRODUCTION:

Learning mathematics involves learning ways of thinking. It involves, learning powerful mathematical ideas rather than a collection of disconnected procedures for carrying out calculations. Primary school children are capable of learning mathematics with understanding and create new ideas but opportunities to do so is not available. Teachers need training to update their knowledge in content and methodology. The present study aims to do so.

This chapter deals with objectives, hypotheses, delimitations, assumptions, statement of the problem, definition of key terms, operational definitions, experimental method, training design, experimental phase, sample, research tool, data collection and scheme of data analysis of the present study.

3.2 OBJECTIVES:

➢ To know teachers prior knowledge on content and methodology in class IV mathematics.
➢ To develop module for teachers to teach class IV mathematics.
➢ To organize training programme in the module prepared for teachers handling class IV mathematics.
➢ To find out teachers attitude towards in-service training programmes.

➢ To find out the prior knowledge of the students in mathematics of class III.

➢ To find out effect of training programme in teaching mathematics for class IV.

3.3 HYPOTHESES:

Hypotheses are framed based on the objectives of the study. It was framed to find out the significant difference among pre-test, post-test-1 and post-test-2 of students and attitude of primary teachers towards the training programme. Hypotheses were formulated based on the variable gender.

- There is no significant difference between the experimental group and control group teachers on content & methodology of IV mathematics.

- There will be a significant difference between pre test and post test scores of experimental group teachers towards impact of in-service training.

- There is no significant difference between pre test scores on achievement in mathematics for experimental group & control group students for total sample.
• There will be a significant difference between post test-1 scores on achievement in mathematics for experimental group & control group students for total sample.

• There will be a significant difference between post test-2 scores on achievement in mathematics for experimental group & control group students for total sample.

• There will be a significant difference between pre-test & post test-1 on achievement in mathematics for experimental group for total sample.

• There will be a significant difference between pre-test & post test-2 on achievement in mathematics for experimental group for total sample.

• There is no significant difference between post-test-1 & post test-2 on achievement in mathematics for experimental group for total sample.

• There is no significant difference between pre-test & post test-1 on achievement in mathematics for control group for total sample.

• There is no significant difference between pre-test & post test-2 on achievement in mathematics for control group for total sample.
• There is no significant difference between post-test-1 & post-test-2 on achievement in mathematics for control group for total sample.

• There is no significant difference between pre test scores on achievement in mathematics for experimental group boys and girls.

• There is no significant difference between post test-1 scores on achievement in mathematics for experimental group boys and girls.

• There is no significant difference between post test-2 scores on achievement in mathematics for experimental group boys and girls.

• There will be a significant mean difference between pre test and post test-1 scores on achievement in mathematics for experimental group students.

• There will be a significant mean difference between pre test and post test-2 scores on achievement in mathematics for experimental group students.

• There is no significant mean difference between post test-1 and post test-2 scores on achievement in mathematics for experimental group students.
• There is no significant mean difference between pre test and post test -1 scores on achievement in mathematics for control group school students.

• There is no significant mean difference between pre test and post test -2 scores on achievement in mathematics for control group school students.

• There is no significant mean difference between post test-1 and post test -2 scores on achievement in mathematics for control group school students.

• There will be a significant difference between high achievers and low achievers on pre test & post test -1 scores of experimental group.

• There will be a significant difference between high achievers and low achievers on pre test & post test -2 scores of experimental group.

3.4 DELIMITATIONS:

1. The training was given to six primary school teachers of kaveripattinam block in krishnagiri district.

2. The study was conducted for class IV students studying in kaveripattinam block in krishnagiri district.

3. The study was restricted to class IV mathematics.
4. The study was confined to statement problems in class mathematics.

3.5 ASSUMPTIONS:

In-service training helps teachers to improve their teaching skill. For all the teachers teaching classes from 1 to 8 must attend 20 days in-service training per year. These trainings are organized by DTERT under SSA scheme. Apart from these trainings, the investigator being a mathematics lecturer working in DIET prepared a module and gave training to the teachers for this study. This training will clear the doubts in solving statement problems in class IV mathematics. The training approach will improve the achievement of the students. This training will bring positive attitude towards the training programme. The teaching-learning materials will change the class room teaching method. Also it will change the classroom environment.

3.6 STATEMENT OF THE PROBLEM:

Primary school teachers are loaded with lot of works apart from teaching. They are filling nearly sixty forms for SSA regarding school particulars. They are engaged to take school census every year, election duty whenever election comes, attending 20 days in-service training programmes, distributing the government sanctioning benefits to the students. Even if they have interest to teach for each child individually they don’t have enough time. Present system of
education focuses on syllabus completion and examination. In primary schools all students are promoted to other classes compulsorily. There is no failure even though they do not achieve the competencies. They need attendance. Irregularity in attendance of students affects the quality of education. So to overcome these problems present study focuses on the activity based teaching methodology. Hence the investigator has chosen the topic “Impact of in-service training in the classroom teaching of primary mathematics.”

3.7 PRIMARY EDUCATION CURRICULUM:

Primary Education consists of two stages. First stage comprises of classes I to III. Second stage consists of classes IV and V. The scheme of studies for these two stages are given below.

Stage: 1

- Mother tongue
- English
- Mathematics
- Environmental studies
- Art of healthy living and productive living

Stage: 2

- Mother tongue
- English
- Mathematics
- Science
3.8 DEFINITION OF KEY TERMS:

The key terms in the study are

- In-service training
- Primary mathematics
- Statement problems
- Primary school
- Impact

In-service training:

According to Green's (1964) Topology of teaching, training is a kind of teaching. In training the expression of learners' intelligence is restricted. He is to obey certain orders. The trainer does not give reasons and the trainee also does not ask for it. The trainer is used to develop skills. According to government order, every primary teacher must attend 20 days in-service training per year apart from their pre-service training.

PRIMARY MATHEMATICS:

Based on New Education Policy (1986) Mathematics is a compulsory subject in the school curriculum. Mathematics syllabus is framed in spiral development. Learning mathematical concepts from class I to class V is basic for secondary school mathematics.
A child entering a primary school must master the 207 competencies in mathematics before leaving the school.

**IMPACT:**

Impact means the effectiveness of the training. It is measured by observing the classroom, student’s achievement, attitude of teachers etc.

**3.9 OPERATIONAL DEFINITIONS:**

**IN-SERVICE TRAINING:**

The investigator gave training to the teacher in the module prepared to teach mathematics for class IV. The module contains the method of teaching statement problems involving four fundamental operations such as addition, subtraction, multiplication, and division.

Primary mathematics consists of five competency areas. They are

1. Whole numbers
2. Operations on whole numbers
3. Measurements
4. Fractions
5. Geometry

For class IV, 60 competencies are to be learned by the students. The investigator covered the competencies which comes under the
topic statement problems. Following competencies are covered in
the module on the above mentioned areas.

**TABLE 3.1 LIST OF COMPETENCIES**

<table>
<thead>
<tr>
<th>Competency area</th>
<th>Competency number</th>
<th>Competency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundamental Operations on Whole numbers</td>
<td>2.4.3</td>
<td>Statement problems in 3,4 digit number addition and subtraction</td>
</tr>
<tr>
<td>Fundamental Operations on Whole numbers</td>
<td>2.4.9</td>
<td>Statement problems in 2,3 digit number multiplication and division</td>
</tr>
<tr>
<td>Fundamental Operations on Whole numbers</td>
<td>2.4.10</td>
<td>Statement problems in two fundamental operations</td>
</tr>
<tr>
<td>Fundamental Operations on Whole numbers</td>
<td>2.4.13</td>
<td>Unitary method to solve statement problems</td>
</tr>
<tr>
<td>Measurements</td>
<td>3.4.3</td>
<td>statement problems in money</td>
</tr>
<tr>
<td>Measurements</td>
<td>3.4.10</td>
<td>statement problems in length</td>
</tr>
<tr>
<td>Measurements</td>
<td>3.4.12</td>
<td>statement problems in mass</td>
</tr>
<tr>
<td>Measurements</td>
<td>3.4.15</td>
<td>statement problems in capacity</td>
</tr>
<tr>
<td>Fractions</td>
<td>4.4.7</td>
<td>statement problems in addition and subtraction of fraction</td>
</tr>
</tbody>
</table>
PRIMARY MATHEMATICS:

The investigator has taken IV mathematics for the study.

Primary mathematics includes mathematics for class I to V.

STATEMENT PROBLEMS:

Using these four fundamental operations word problems related to daily life situations are given in the book. These are statement problems in the fundamental operations.

PRIMARY SCHOOL:

The researcher has undertaken research in Panchayat union primary schools and in Panchayat union middle schools. This study focus the class IV students studying in primary and middle schools.

IMPACT:

Effective use of training module will be reflected in the class room process. If a teacher applies the training method in her teaching, the learners’ achievement level will be increased. To study the effectiveness of the training post test 1 and 2 were conducted for the students. To study the impact of training pre test and post test were conducted for the teachers.
3.10 RESEARCH DESIGN:

Experimental design is the blue print of the procedures that enables the researcher to test hypotheses by reaching valid conclusions about relationships between independent and dependent variables.

Three categories of experimental design are as follows:

[1] pre-experimental design
[2] True experimental design
[3] Quasi-experimental design

3.11 EXPERIMENTAL DESIGN:

Ten Schools were taken for the study. 5 schools were treated as control group and 5 schools were treated as experimental group. Pre-test was conducted for experimental group and control group. Training was given to the teachers working in experimental group schools. Treatment was given in the beginning of academic year. Teaching-learning material and module were supplied to experimental group schools. Traditional method of teaching was adopted in control group. At the end of the year post-test-1 was conducted for both experimental and control group. To know the consistency of treatment post-test-2 was administered for all the 10 schools after a month gap.

3.12 SCHEMATIC REPRESENTATION OF EXPERIMENTAL DESIGN
Table 3.2 Schematic representation of experimental design

<table>
<thead>
<tr>
<th>S.NO</th>
<th>TYPE</th>
<th>SOURCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Category of experimental design</td>
<td>Quasi-experimental design</td>
</tr>
</tbody>
</table>
| 2    | Variables                         | 1. Inservice training  
2. Attitude  
3. Achievement |
| 3    | Tool used                         | 1. Teacher tool-Impact of in-service training  
2. Teacher tool Content & methodology  
3. Student tool-achievement test      |
| 4    | Population                        | 1. Teachers handling class IV mathematics  
2. Students studying class IV in Krishnagiri district.                   |
| 5    | Sampling technique                | Stratified random sampling                                              |
| 6    | Sample                            | Teachers  
Students                                                          |
| 7    | Sample details: Students          | Control group  
Boys: 52  
Girls: 32  
Total: 84  
Experimental group  
Boys: 63  
Girls: 53  
Total: 116  
Teachers  
Control group: 5  
Experimental group: 6 |
| 8    | Statistical techniques used       | ‘t’ test & correlation                                                  |

3.13 Training design:

The investigator conducted a diagnostic test for class IV students in the beginning of the academic year. It is found that students comprehension of statement problems is low. Hence special focus is given for activity based approach in teaching statement
problems in the module. Teaching learning material is also prepared for giving training to the teachers. Module was prepared and it was given to the experts like teacher educators, primary school practicing teachers and lecturers working in DIET for establishing validity.

TABLE 3.3 CHART FOR TRAINING DESIGN

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test for control group</td>
<td>Pre-test for experimental group</td>
</tr>
<tr>
<td>Traditional method of teaching</td>
<td>Activity based teaching for</td>
</tr>
<tr>
<td>for control group</td>
<td>experimental group</td>
</tr>
<tr>
<td>Module not supplied</td>
<td>Module &amp; TLM were supplied</td>
</tr>
<tr>
<td>Class room supervision was not</td>
<td>Frequent supervision &amp; monitoring of</td>
</tr>
<tr>
<td>done</td>
<td>training by the investigator</td>
</tr>
<tr>
<td>Post-test-1 was conducted</td>
<td>Post-test-1 was conducted</td>
</tr>
<tr>
<td>Traditional method of teaching</td>
<td>Activity based teaching continued</td>
</tr>
<tr>
<td>continued</td>
<td></td>
</tr>
<tr>
<td>Post-test-2 was conducted</td>
<td>Post-test-2 was conducted</td>
</tr>
</tbody>
</table>

3.14 EXPERIMENTAL PHASE:

Experimental phase involves following steps:

Pre-test → Training → Supply of material → Classroom implication → Monitoring → post-test-1 → Classroom process continued → Post-test-2

Pre-test was conducted for all the 10 schools. Training was given for experimental group teachers. Training module consist of following topics.

- Addition in statement problems
- Subtraction in statement problems
- Multiplication in statement problems
- Division in statement problems
- Addition and subtraction in statement problems
Multiplication and division in statement problems

Following list of materials were prepared and used in the training program.

- Picture cards
- Statement cards
- Flash cards
- Bebbles
- Clock
- Paper cuttings
- Real objects
- Wooden pieces
- Flowers
- Water & water bottles
- Toys
- Bags
- Coins & Rupee note

Same materials were used by the teachers in their classroom teaching.

3.15 Sample:

Krishnagiri district has 10 blocks. Sample was selected from 1 block namely Kaveripattinam block. This block is convenient to visit the schools often and the block is an adopted block for the investigator. This block has 107 panchayat union primary schools and
24 panchayat union middle schools. Total schools for primary education in the block is 131. Under SSA scheme, every year census is taken in the schools. According to the census taken in 2005-2006 repetition rate of the schools is considered for selection of sample. Reputation rate varies from 0 to 58.33%. If the repetition rate is low, achievement is high. So high repeaters rate is considered for selection of sample. 10 schools were selected for the study. Randomly 5 schools were taken for control group and 5 schools were taken for experimental group. Educational census is taken by SSA in the year 2003-2004 is considered for selection of sample. The report is given below for the ten schools.
<table>
<thead>
<tr>
<th>S.NO</th>
<th>Name of the school</th>
<th>Completion rate(%)</th>
<th>Drop out rate(%)</th>
<th>Repetition Rate(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Agaram</td>
<td>45.45</td>
<td>0.00</td>
<td>54.55</td>
</tr>
<tr>
<td>2</td>
<td>Avathuvadi</td>
<td>52.50</td>
<td>0.00</td>
<td>47.50</td>
</tr>
<tr>
<td>3</td>
<td>Errahalli</td>
<td>41.67</td>
<td>0.00</td>
<td>58.33</td>
</tr>
<tr>
<td>4</td>
<td>Kallipatti</td>
<td>56.52</td>
<td>0.00</td>
<td>43.48</td>
</tr>
<tr>
<td>5</td>
<td>Keelpaiyur</td>
<td>56.52</td>
<td>0.00</td>
<td>43.48</td>
</tr>
<tr>
<td>6</td>
<td>Pannandur</td>
<td>56.67</td>
<td>0.00</td>
<td>43.33</td>
</tr>
<tr>
<td>7</td>
<td>Nattanmaikottai</td>
<td>51.43</td>
<td>0.00</td>
<td>48.57</td>
</tr>
<tr>
<td>8</td>
<td>Sobanoor</td>
<td>18.75</td>
<td>18.75</td>
<td>62.50</td>
</tr>
<tr>
<td>9</td>
<td>Kaveripattinam</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IV ward</td>
<td>60.27</td>
<td>0.00</td>
<td>39.73</td>
</tr>
<tr>
<td>10</td>
<td>Pothapuram</td>
<td>64.29</td>
<td>0.00</td>
<td>35.71</td>
</tr>
</tbody>
</table>
TABLE 3.5 DETAILS OF SAMPLE-1

<table>
<thead>
<tr>
<th>S.No</th>
<th>School</th>
<th>Locality</th>
<th>School</th>
<th>Class</th>
<th>Sections</th>
<th>Boys</th>
<th>Girls</th>
<th>Total</th>
<th>RR rate</th>
<th>Pre Test B+G</th>
<th>Post Test1 B+G</th>
<th>Post Test2 B+G</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Control Group</td>
<td>R</td>
<td>G</td>
<td>MGT</td>
<td>1</td>
<td>18</td>
<td>16</td>
<td>34</td>
<td>35.71</td>
<td>10+11</td>
<td>15+13</td>
<td>15+13</td>
</tr>
<tr>
<td></td>
<td>Pups Pothapuram</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>Pups Errahalli</td>
<td>R</td>
<td>G</td>
<td>MGT</td>
<td>1</td>
<td>5</td>
<td>9</td>
<td>14</td>
<td>58.33</td>
<td>6+3</td>
<td>5+9</td>
<td>5+9</td>
</tr>
<tr>
<td>03</td>
<td>Pups Kallipatti</td>
<td>R</td>
<td>G</td>
<td>MGT</td>
<td>1</td>
<td>13</td>
<td>8</td>
<td>21</td>
<td>43.48</td>
<td>12+7</td>
<td>12+8</td>
<td>13+6</td>
</tr>
<tr>
<td>04</td>
<td>Pups Nattanmaikot tai</td>
<td>R</td>
<td>G</td>
<td>MGT</td>
<td>1</td>
<td>25</td>
<td>14</td>
<td>39</td>
<td>48.57</td>
<td>19+14</td>
<td>24+14</td>
<td>21+12</td>
</tr>
<tr>
<td>05</td>
<td>Pups keezpaiyur</td>
<td>R</td>
<td>G</td>
<td>MGT</td>
<td>1</td>
<td>11</td>
<td>7</td>
<td>18</td>
<td>43.48</td>
<td>8+5</td>
<td>10+6</td>
<td>11+7</td>
</tr>
<tr>
<td>06</td>
<td>Experimental group</td>
<td>R</td>
<td>G</td>
<td>MGT</td>
<td>1</td>
<td>10</td>
<td>3</td>
<td>13</td>
<td>62.50</td>
<td>9+3</td>
<td>10+2</td>
<td>8+2</td>
</tr>
<tr>
<td></td>
<td>Pups sobanoor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>Pups Agaram</td>
<td>R</td>
<td>G</td>
<td>MGT</td>
<td>1</td>
<td>10</td>
<td>11</td>
<td>21</td>
<td>54.55</td>
<td>3+9</td>
<td>9+11</td>
<td>7+11</td>
</tr>
<tr>
<td>08</td>
<td>Pups IV Ward</td>
<td>U</td>
<td>G</td>
<td>MONO</td>
<td>1</td>
<td>14</td>
<td>18</td>
<td>32</td>
<td>39.73</td>
<td>10+16</td>
<td>14+16</td>
<td>12+15</td>
</tr>
<tr>
<td>09</td>
<td>PUPS Avathuvadi</td>
<td>R</td>
<td>G</td>
<td>MGT</td>
<td>1</td>
<td>15</td>
<td>12</td>
<td>27</td>
<td>47.50</td>
<td>13+11</td>
<td>14+11</td>
<td>14+12</td>
</tr>
<tr>
<td>10</td>
<td>Pums Pannandur IVA</td>
<td>R</td>
<td>G</td>
<td>MONO</td>
<td>2</td>
<td>21</td>
<td>13</td>
<td>34</td>
<td>43.33</td>
<td>18+12</td>
<td>16+13</td>
<td>17+12</td>
</tr>
<tr>
<td>11</td>
<td>IVB</td>
<td>R</td>
<td>G</td>
<td>MONO</td>
<td></td>
<td>22</td>
<td>11</td>
<td>33</td>
<td></td>
<td>20+10</td>
<td>20+11</td>
<td>19+10</td>
</tr>
</tbody>
</table>

Students who attended pre-test was not present for the post-test-1 & post-test-2. To find out the effectiveness of the training, students who were present for all the three test were taken as final sample.
TABLE 3.6 DETAILS OF FINAL SAMPLE-1

CONTROL GROUP

<table>
<thead>
<tr>
<th>S.No</th>
<th>Name Of School</th>
<th>Total Boys</th>
<th>Total Girls</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>PUMS Pothapuram</td>
<td>09</td>
<td>08</td>
<td>17</td>
</tr>
<tr>
<td>02</td>
<td>PUPS Errahalli</td>
<td>06</td>
<td>03</td>
<td>09</td>
</tr>
<tr>
<td>03</td>
<td>PUPS Kallipatti</td>
<td>11</td>
<td>06</td>
<td>17</td>
</tr>
<tr>
<td>04</td>
<td>PUMS Nattanmaikottai</td>
<td>18</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>05</td>
<td>PUPS Keezpaiyur</td>
<td>08</td>
<td>03</td>
<td>11</td>
</tr>
</tbody>
</table>

Total sample for control group = 84

TABLE 3.7 DETAILS OF FINAL SAMPLE-1

EXPERIMENTAL GROUP

<table>
<thead>
<tr>
<th>S.No</th>
<th>Name Of School</th>
<th>Total Boys</th>
<th>Total Girls</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>PUPS Sobanoor</td>
<td>08</td>
<td>02</td>
<td>10</td>
</tr>
<tr>
<td>02</td>
<td>PUPS Agaram</td>
<td>03</td>
<td>09</td>
<td>12</td>
</tr>
<tr>
<td>03</td>
<td>PUPS IV WARD</td>
<td>09</td>
<td>11</td>
<td>20</td>
</tr>
<tr>
<td>04</td>
<td>PUPS Avathuvadi</td>
<td>12</td>
<td>11</td>
<td>23</td>
</tr>
<tr>
<td>05</td>
<td>PUMS Pannandur iva</td>
<td>15</td>
<td>11</td>
<td>26</td>
</tr>
<tr>
<td>06</td>
<td>IVB</td>
<td>16</td>
<td>09</td>
<td>25</td>
</tr>
</tbody>
</table>

Total sample for experimental group = 116

Total sample for the study = 200 students
SAMPLE : 2

Teachers handling mathematics for class IV in control and experimental group schools were taken as sample. Total sample is 11 Teachers. 10 female & 1 Male teacher.

3.16 RESEARCH TOOLS:

Three tools were prepared. Two tools were constructed for teachers and one tool was constructed for students.

3.16.1 TEACHER TOOL ON CONTENT & METHODOLOGY

A tool was developed to know about teachers mathematics knowledge on content and methodology. This tool was constructed and administered for the 11 teachers taking mathematics for class IV. This tool was administered to the teachers before preparing the module. Questionnaire consist of 10 questions each carries 5 mark. Total score is 50 marks. All the questions were taken from the statement problems.

TABLE 3.8 BLUE PRINT: TEACHER TOOL ON CONTENT & METHODOLOGY

<table>
<thead>
<tr>
<th>S.NO</th>
<th>TOPICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Addition of numbers in statement problems</td>
</tr>
<tr>
<td>02</td>
<td>Multiplication and division of numbers</td>
</tr>
<tr>
<td>03</td>
<td>Define: Unitary method Solving related problems</td>
</tr>
<tr>
<td>04</td>
<td>Difference between SLM &amp; TLM</td>
</tr>
<tr>
<td>05</td>
<td>Addition of fraction</td>
</tr>
<tr>
<td>06</td>
<td>Subtraction (measures of capacity)</td>
</tr>
<tr>
<td>07</td>
<td>Teaching method for statement problems TLM</td>
</tr>
<tr>
<td>08</td>
<td>Measures of mass (multiplication)</td>
</tr>
<tr>
<td>09</td>
<td>Measures of time (subtraction)</td>
</tr>
<tr>
<td>10</td>
<td>Explain ABL using example</td>
</tr>
</tbody>
</table>
CONTENT VALIDITY:

After construction of the questionnaire some questions were revised with the guidance of experts.

RELIABILITY:

The reliability of the tool was developed by Kuder-Richardson and it was found to be 0.83 which is highly significant.

SCORING:

Each question carries 5 marks for question number 1, 5, 6, 8

Statement----2marks
Calculation----3marks

For question number 3, 4, 7, 9 & 10
Definition----2marks
Example------3marks

3.16.2 TEACHER TOOL: IMPACT OF IN-SERVICE TRAINING

Tool was prepared to assess the impact of in-service training in the classroom teaching of primary mathematics. This tool was developed to study the attitude of teachers towards training.

Questionnaire consists of 50 items with four alternatives such as strongly agree, agree, disagree and strongly disagree.

SCORING:

For positive items

Strongly agree --- 4marks
Agree ---3marks
Disagree ---2marks
Strongly disagree ----1mark

For negative items:
Strongly agree ----1marks
Agree ----2marks
Disagree --- 3marks
Strongly disagree ----4mark

VALIDITY:

The question was checked by the experts in relation to its objectivity and suitability. On the basis of the experts opinion some of the items were modified in the questionnaire and the tool was finalised.

RELIABILITY:

Reliability of the tool was found using Kuder-Richardson formula and it was found to be 0.8286 which is highly significant.

3.16.3 ACHIEVEMENT TEST:

The investigator developed a tool to conduct pre-test for the students to know their prior knowledge in mathematics. This tool was developed for class IV. Topic selected for the tool was statement problems involving four fundamental operations. Tool consists of 12 items. Total mark is 50. Question 1,2,6,8 &9 carries each 3marks. Question number 3,4,5,7,10,11,12 carries each 5 marks. 3mark question
need only calculations. 5mark questions need statement and calculation.

**VALIDITY:**

After framing the questionnaire, the investigator consulted with experienced primary school teachers, teacher educators and the subject lecturers. The tool was modified with the suggestions given by the experts.

**RELIABILITY:**

The reliability of the tool was developed by Kuder-Richardson and it was found to be 0.87 which is highly significant.

**SCORING:**

For post-test-1 &post-test-2 slight modifications were made in the pre-test questionnaire.

**3.17 DATA COLLECTION:**

The investigator conducted pre-test for all the 10 schools using the constructed tool. Traditional method of teaching was done in control group schools. Training was conducted for the teachers working in experimental schools. Preparation and use of self learning materials were demonstrated in the training program. After the training, module and self learning materials were supplied to the teachers.

Frequent visit was done by the investigator. During school visit doubts raised by the teachers were cleared. Teachers' comment on the
module was satisfactory. Students feel happy to work with the self-learning materials. To study the effectiveness of the training post-test-1 was administered to the students. To study the existence of achievement of students, post-test-2 was conducted after a month gap. Post-test 1 & 2 was administered simultaneously for control group also. To study the impact of the training to the teachers constructed tool was administered to the teachers.

3.18 SCHEME OF DATA ANALYSIS:

In this study the investigator computed ‘t’ values, Correlation and gain score for the test scores.