CHAPTER 4
METHODOLOGY

4.1 RESEARCH METHOD ADOPTED
4.2 VARIABLES OF THE STUDY
4.3 SAMPLE SELECTED
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4.5 TOOLS USED FOR THE STUDY
4.6 PROCEDURE FOR COLLECTION OF DATA
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INTRODUCTION

Research is an endless quest for knowledge or unending search for truth. Research is considered to be the more formal, systematic, intensive process of carrying on the scientific method of analysis. It involves a more systematic structure of investigation usually resulting in some sort of formal record of procedures and report of results or conclusions (Best and Kahn, 2003). All significant research leads to progress in one field of life or the other. Research has three fold objectives- theoretical, factual, and application. In order to get factual knowledge, it is necessary to take into consideration the method that will provide the basis for the construction of knowledge about whatever is being researched. Thus methodology of the investigation is the core of every research work and the success of all research studies depends on the methodology adopted and the tools employed.

Methodology is a procedure or technique used by the investigator for conducting an investigation. It lays out the way that formal research is to be carried out, and outlines the details of description of the research variables and procedures. According to Lincoln and Guba (2000), “Method or methodology applies in correspondence with the assumption about the social interaction between and among investigator and respondents”. It refers to the study design through which the validity of elements is to be established. A suitable method helps the researcher to explore the various dimensions of the study. The reliability and validity of the findings also depends upon the method adopted and hence methodology occupies a very important role in the field of any research. A preplanned and well-described method will provide the researcher a scientific and feasible plan for attacking and solving the problem under investigation.
The present study intended to test the Effectiveness of Mental Modelling based on Multiple Strategy Instruction in enhancing Reading Competency in English among Upper Primary School Students. The methodology adopted for the study is presented under seven sub headings, viz.

4.1 Research Methods Adopted
4.2 Variables of the Study
4.3 Sample Selected
4.4 Research Design of the Experiment
4.5 Tools Used for the Study
4.6 Procedure for Data Collection
4.7 Statistical Techniques Employed

The details follow.

4.1 RESEARCH METHODS ADOPTED

According to Best and Kahn (2002), “Research method refers to the behavior and instruments used in selection and construction of research techniques.” Different methods and procedures were employed to aid in the acquisition of data.

The Experimental method, which was found to be the most suitable method, was used for collecting relevant data for the present study. Experimental method is a systematic and logical method of hypotheses testing under carefully controlled conditions. It is the most sophisticated, exact and powerful method for discovering and developing an organized body of knowledge. It is the only type of research that directly attempts to influence a particular variable and can really test hypotheses about cause and effect relationships. The results of experimental research permit prediction and it provides much control and therefore establishes a systematic and logical association between manipulated factors and observed effects. Hence, this was found to be most appropriate for the
study to compare the effectiveness of Mental Modelling based on Multiple Strategy Instruction with that of Activity Oriented Method of Instruction.

### 4.2 VARIABLES OF THE STUDY

Variables are the conditions or characteristics that the experimenter manipulates, controls or observes (Best and Kahn, 2000). Independent, dependent and extraneous variables play a vital role in the present study.

#### Independent Variables

The variables that are manipulated by the experimenter or are suspected of being the cause in the experiment are called independent variables. “It is under the direct control of the experimenter who may vary it in any direction” (Sax, 1979).

In this experimental study, the independent variables were

- Mental Modelling based on Multiple Strategy Instruction, and
- Activity Oriented Method of Instruction

#### Dependent Variables

Dependent variables are the conditions or characteristics that appear, disappear, or change as the experimenter introduces, removes or changes the independent variable (Best and Kahn, 2003).

The dependent variables used in this study were

- Reading Competency in English
- Reading Habit and
- Attitude towards English

#### Extraneous Variables

Extraneous variables are independent variables that are not related to the purpose of the study, but may affect the dependent variables. They control the relationship between the independent and dependent variables either in
the research design or through statistical procedures. Extraneous variables are the variables which operate in the experimental situation, in addition to the independent variables, such that it is difficult to determine the effects of each (Gay, 1996).

The extraneous variables considered for the experiment were

- Gender,
- Locale of School, and
- Management of School.

The variables used in the present study are diagrammatically presented in Figure 4.1.

**Figure 4.1**

Variables of the study
4.3 SAMPLE SELECTED

Sampling is the process by which a relatively small number of individual objects or events are selected and analysed in order to find out something about the entire population from which it is selected. Sampling procedures provide generalizations on the basis of a relatively small proportion of (Koul, 1997).

In this study, the selection of sample was done according to the purpose of experiment. The details of the sample selected follow.

A. Sample for the Experiment

The population of the experimental study consisted of Students studying in the Upper Primary Schools of Kerala following the State Syllabus. Purposive Sampling Technique was adopted keeping in view the experimental nature of the study and its demands and limitations. The selection of the Sample for the experiment involved Selection of Standard and Selection of Groups, the details of which follow.

B. Selection of Standard

The National Committee on Reading (1925), in its first report, described the importance of Reading Instruction. The Committee recommended that Sixth grade reading ability is sufficient for most of the general reading done by adults. A determined effort should therefore be made in the sixth grade so as to bring as many students as possible up to the seventh grade level in reading ability. Hence, Students of Standard VI were selected for the study.

C. Selection of Groups

The study was conducted on eight Standard VI divisions from five schools in Kottayam and Pathanamthitta Districts, giving due weightage to Gender, Locale of School and Management of School.
Methodology

a. Boys and Girls

The Student population consists of Boys and Girls. To avoid discrimination and to genuinely represent the population, the schools were selected in such a way that due representation is given to both genders of students.

b. Urban and Rural School Students

Research studies relating to Locale of School reveals that there is a strong relationship between locales of schools and performance of students. Hence, students studying in the Urban and Rural Upper Primary Schools, which represent the true population of Kerala, comprised the sample for the study.

c. Government and Aided School Students

Studies concerning Type of Management of Schools reveal that there is a strong relationship between locales of Type of Management of School and performance of students. Hence, students studying in the Government and Aided Upper Primary Schools, which represent the true population of Kerala, comprised the sample for the study.

On the basis of the above considerations, the Sample comprised of 284 Standard VI Students studying in Upper Primary School Students of both Urban and Rural Locales, as well as in Government and Aided Schools of Kottayam and Pathanamthitta Districts. Due representation was also given to Boys and Girls. The break-up of the final sample is presented in Table 4.1.
Table 4.1
Break-up of the Final Sample

<table>
<thead>
<tr>
<th>Sample</th>
<th>No. of Students</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>139</td>
<td>284</td>
</tr>
<tr>
<td>Girls</td>
<td>145</td>
<td></td>
</tr>
<tr>
<td>Locale of School</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>148</td>
<td>284</td>
</tr>
<tr>
<td>Rural</td>
<td>136</td>
<td></td>
</tr>
<tr>
<td>Management of School</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government</td>
<td>147</td>
<td>284</td>
</tr>
<tr>
<td>Aided</td>
<td>137</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>284</td>
</tr>
</tbody>
</table>

The Schools used for the study include:

- Government Upper Primary School, Thuruthikkad.
- Government Upper Primary School, Pariyaram.
- St. Mary’s Upper Primary School, Koothrappally.
- St. Philomena’s Upper Primary School, Nedungadappally.

4.4 RESEARCH DESIGN OF THE EXPERIMENT

Research design is the arrangement of conditions of data in a manner that aims to combine relevance to the research purpose with economy in procedure. In fact, a research design is the conceptual structure within which research is conducted; it constitutes the blue-print that enables the researcher to test hypotheses by researching and arriving at valid conclusions about relationship between the variable that are made by analysis of data. “Experimental design is the blueprint of the procedures that enables the researcher to test hypotheses by reaching valid conclusions
about the relationship between independent and dependent variables” (Best and Khan 2003).

Research design refers to the plan and structure of the investigation used to obtain evidence to answer research questions. The design describes the procedure for conducting the study including when, from where and under what conditions the data will be obtained. In other words, design indicates how the research is set up, what happens to the subjects, and what methods of data collection are used (Mac Millan and Schumacher, 1989). Among the various experimental designs, the pre-test post-test non-equivalent group design was adopted for the study. “This design is often used in classroom experiments when the experimental and control groups are such naturally assembled groups as intact classes, which may be similar” (Best and Khan 2003). The reason for this is that in a school situation, it is practically not possible to upset class schedules, to gather subjects for obtaining a sufficiently large sample or to reorganize classes in order to employ randomization of groups.

In the present study, the previous Achievement in English, and the General Mental Ability of the students served to ensure that intact classroom groups were identical with regard to these two aspects. The groups were then randomly assigned as the Experimental Group and the Control Group. Pre-Tests were initially administered on the Groups. The experimental treatments were then conducted and Post-Tests were administered. A comparison of the relative effectiveness of the experimental treatments in the two groups decides which of the two experimental treatments are better. The research design adopted for the experimental study is presented in Figure 4.2.
4.5 TOOLS USED FOR THE STUDY

A tool is one of the most important devices to acquire data. A measuring tool is an instrument that has general acceptance and is used for taking measurement in acceptable units. These tools employ distinctive ways of describing and quantifying the data. The selection of suitable and appropriate devices for the collection of new and unknown data for the
study of any problem is vital for successful research. For each and every type of research, certain instruments are needed to gather facts. The instruments thus employed are called tools. According to Best and Kahn (2003), “like tools in the carpenter’s box, each research tool is appropriate in a given situation to accomplish a particular purpose”. The researcher needs various instruments to gather new facts for the research work. The instruments thus employed are called tools. The nature of the tools plays an important role in the research study.

The following tools were employed for gathering relevant data for the study.

1. General Data Sheet
2. Raven’s Coloured Progressive Matrices (Raven, 1936)
3. Test on Reading Competency in English (Jaise and Thomas, 2011)
4. Inventory on Reading Habit (Jaise and Thomas, 2011)
5. Scale on Attitude towards English (Jaise and Thomas, 2011)
6. Instructional Plans using Mental Modelling based on Multiple Strategies
7. Instructional Plans using Activity Oriented Method.

Description of the Tools
Each of the tools employed for the study are described below.

1. General Data Sheet
The General Data Sheet was prepared to collect the personal details of the students, viz. Name of the Student, Age, Gender, Name of the School, Standard/Class, Locality of the School, Management of School, and District in which the School is located. The General Data Sheet used for the study is attached as Appendix A.
2. **Raven’s Coloured Progressive Matrices**

Raven’s Progressive Matrices (RPM) was first introduced in 1936 by J. C. Raven. The RPM is a non-verbal test of inductive reasoning based on figural stimuli. Raven’s test is actually a series of three different instruments. Even though the three forms of the RPM resemble one another, there may be subtle differences in the problem solving strategies required by each.

Raven’s Coloured Progressive Matrices (RCPM) is a 36 item test designed for children from 5 to 11 years of age. Raven incorporated colours into this version of the Test to help to hold the attention of the young children. The Test consists of 36 items in three Sets, viz. A, A_B, and B.

Set A of the Test consists largely of very difficult items of closure and abstract reasoning by analogy. Set A_B is labeled pattern completion through identity and closure. Set B consists of the easiest items and is defined as simple pattern completion. The very easy and the very hard items of the Coloured Progressive Matrices appear to tap different intellectual processes. The maximum score for each Set is 12 and the maximum score for the RCPM is 36.

**Validity**

The validity coefficient with achievement tests ranges from 0.30 to 0.60. Internal consistency coefficients with the other intelligence tests ranging from 0.71 to 0.90.

**Reliability**

Reliability refers to the degree to which observations of the study are repeatable. For the Coloured Progressive Matrices, reliability coefficients of 0.67 to 0.83 are reported with young children producing lower values.

The **Scoring Key of Raven’s Coloured Progressive Matrices** is provided as **Appendix B**.
Administration of the RCPM

Intelligence Test was administered to the final sample of 284 Upper Primary School Students. The results revealed that all the Upper Primary School Students belong to ‘normal’ or ‘above average’ intelligence group.

3. Test on Reading Competency in English

Competency means ‘understanding and interpreting written material, including technical material, rules, regulations, instructions, reports, charts, graphs, or tables and applying what is learned from written material to specific situations. Reading Competency is the act or skill of interpreting the written text with comprehension. It is the capacity of the mind to perceive and understand what is read. Reading competency is interrelated with and supportive of the other communication processes of listening, speaking, writing and thinking. According to Hittleman (1988), a reader’s reconstruction of the ideas and information intended by an author is somewhat like a listener’s reconstruction of ideas from a speaker’s combinations of sounds. The reader, like the listener, may create meanings that are different from those intended by the author. What a reader understands from the constructed and reconstructed meanings depends on the reader’s prior knowledge, and his/her maturity and proficiency in using language in various social contexts.

The Draft Test on Reading Competency in English

A Test on Reading Competency in English (Jaise and Thomas, 2011) was prepared and standardized for assessing the level of Reading Competency in English before and after the implementation of the Mental Modelling based on Multiple Strategy Instruction. The details of the procedure involved in the development of the Test are given below.

Before constructing the Test, the opinion of Experts in the field of Education and Upper Primary School Teachers were solicited. The English
Reader prescribed for Standard VI was relied upon for the construction of the Test. The Test on Reading Competency in English was prepared giving due weightage to the Components of Reading Competency in English, Form of Questions and Difficulty Level of Questions. The Components of Reading Competency in English included for study are the Print Skills, viz. Phonemic Awareness, Phonics, Spelling and Fluency, as well as the Meaning Skills, viz. Vocabulary, Background Knowledge, and Reading Comprehension.

Forty items were prepared and submitted to Experts and English Teachers of Upper Primary Schools. Based on their suggestions, some items were modified. Thus a Draft form of the Test with 40 items was developed. The Marking Scheme of the Draft Test was also prepared.

The Test on Reading Competency in English (Draft), its Response Sheet and Marking Scheme are provided as Appendix C.

Try out of the Draft Test

The items were tried out on five Upper Primary School students and the wordings used in the question paper were modified to make the test clearer and to avoid ambiguity from the students’ point of view. Then The Draft Test on Reading Competency in English was administered on a sample of 110 Standard VI Upper Primary School Students of different Schools in Kottayam and Pathanamthitta Districts. The Response Sheets of 100 subjects were scored and arranged in the descending order of scores for item analysis.

Item Analysis

Item Analysis is the process of examining the student’s response to each item to determine the quality and merit of the Test. The procedure suggested by Ebel and Frisbie (1991) was used for this purpose. Accordingly, the Response Sheets were arranged in the order of their total
scores from high to low. The Upper Group (the 27% from the higher level) and the Lower Group (27% from the lower level) were separated. These two Groups were used for item analysis. The two important characteristics, the Difficulty Index (DI) and Discriminating Power (DP) were found out and the suitability of the item for the final test was established. DI and DP were calculated using the formulae,

\[
\text{Index of Item Difficulty, } DI = \frac{U+L}{2N}, \quad \text{and}
\]

\[
\text{Index of Discriminating Power, } DP = \frac{U-L}{N},
\]

where

- \(U\) is the number of correct responses in the Upper Group,
- \(L\) is the number of correct responses in the Lower Group, and
- \(N\) is the number of students.

**The Final Test**

The items with DI values falling between 0.30 and 0.60 and DP values 0.3 and above were selected for the Final Test. Thus, 19 items were selected for the Final Test. The **Difficulty Index and Discriminating Power of Items in Test on Reading Competency in English (Draft)** are provided as Appendix D.

The maximum mark allotted for the Test is 25. The maximum time required for the Test is 40 minutes.

The details of weightages assigned to the Components of Reading Competency in English, Form of Questions and Difficulty Level of items follow.

**Weightage to Components of Reading Competency in English**

The Components of Reading Competency in English were Phonemic Awareness, Phonics, Spelling, Fluency, Vocabulary, Background Knowledge, and Reading Comprehension. The details of weightages
assigned to these Components of Reading Competency in English in the Test are given in Table 4.2.

**Table 4.2**

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Components</th>
<th>Marks</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Phonemic Awareness</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>2.</td>
<td>Phonics</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>3.</td>
<td>Spelling</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>4.</td>
<td>Fluency</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>5.</td>
<td>Vocabulary</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>6.</td>
<td>Background Knowledge</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>7.</td>
<td>Reading Comprehension</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>25</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

**Weightage to Form of Questions**

Due weightage was assigned to the form of questions. Very short answer, short answer, and long answer type of questions were used in the Test. The details of the weightages assigned to Form of Questions in the Test on Reading Competency in English are shown in Table 4.3.

**Table 4.3**

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Form of Questions</th>
<th>Marks</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Very Short Answer</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>2.</td>
<td>Short Answer</td>
<td>9</td>
<td>36</td>
</tr>
<tr>
<td>3.</td>
<td>Long Answer</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>25</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
Weightage to Difficulty Level of Items

The items in the Reading Competency Test were classified into easy, average and difficult on the basis of their level of difficulty. Majority of the items were placed in average level of difficulty, since majority of students in a common class are average in their cognitive behavior. The details of the weightages assigned to Difficulty Level of items in the Test on Reading Competency in English are shown in Table 4.4.

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Difficulty Level</th>
<th>Marks</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Easy</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>2.</td>
<td>Average</td>
<td>15</td>
<td>60</td>
</tr>
<tr>
<td>3.</td>
<td>Difficult</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>25</td>
<td>100</td>
</tr>
</tbody>
</table>

The Blue Print

Blue Print, the three dimensional chart conveying a fair idea about the different aspects on the Test on Reading Competency in English, shows the distribution of items with regard to three dimensions, viz. Components of Reading Competency in English, Form of Questions and Difficulty Level of Questions. The Blue Print is given as Table 4.5.
### Table 4.5

Blue Print of the Test on Reading Competency in English

<table>
<thead>
<tr>
<th>Components of Reading Competency</th>
<th>VSA</th>
<th>SA</th>
<th>LA</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Easy</td>
<td>Average</td>
<td>Difficult</td>
<td>Easy</td>
</tr>
<tr>
<td>1. Phonemic Awareness</td>
<td>(1)&lt;sup&gt;v&lt;/sup&gt;</td>
<td>(1)&lt;sup&gt;v&lt;/sup&gt;</td>
<td>(1)&lt;sup&gt;v&lt;/sup&gt;</td>
<td>(1)&lt;sup&gt;v&lt;/sup&gt;</td>
</tr>
<tr>
<td>2. Phonics</td>
<td>(1)&lt;sup&gt;v&lt;/sup&gt;</td>
<td>(1)&lt;sup&gt;v&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Spelling</td>
<td>(1)&lt;sup&gt;v&lt;/sup&gt;</td>
<td>(1)&lt;sup&gt;v&lt;/sup&gt;</td>
<td>(1)&lt;sup&gt;v&lt;/sup&gt;</td>
<td>(1)&lt;sup&gt;v&lt;/sup&gt;</td>
</tr>
<tr>
<td>4. Fluency</td>
<td>(1)&lt;sup&gt;v&lt;/sup&gt;</td>
<td>(1)&lt;sup&gt;v&lt;/sup&gt;</td>
<td></td>
<td>(2)&lt;sup&gt;v&lt;/sup&gt;</td>
</tr>
<tr>
<td>5. Vocabulary</td>
<td>(1)&lt;sup&gt;v&lt;/sup&gt;</td>
<td>(1)&lt;sup&gt;v&lt;/sup&gt;</td>
<td>(1)&lt;sup&gt;v&lt;/sup&gt;</td>
<td>(1)&lt;sup&gt;v&lt;/sup&gt;</td>
</tr>
<tr>
<td>6. Background Knowledge</td>
<td>(1)&lt;sup&gt;v&lt;/sup&gt;</td>
<td>(2)&lt;sup&gt;v&lt;/sup&gt;</td>
<td>(1)&lt;sup&gt;v&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>7. Reading Comprehension</td>
<td>(1)&lt;sup&gt;v&lt;/sup&gt;</td>
<td>(1)&lt;sup&gt;v&lt;/sup&gt;</td>
<td>(4)&lt;sup&gt;v&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>8. Total</td>
<td>8</td>
<td>9</td>
<td>8</td>
<td>25</td>
</tr>
</tbody>
</table>

**N. B.**

- VSA indicates Very Short Answer
- SA indicates Short Answer
- LA indicates Long Answer
- Numbers inside the brackets indicate number of questions.
- Numbers outside the bracket indicate marks.
Administration and Scoring of the Final Test

The Test on Reading Competency in English was administered on 284 students under ideal conditions. The time limit of 60 minutes was strictly followed. The answer scripts were valued strictly according to the Scoring Key prepared and total scores were arrived at.

Validity of the Test

Validity accurately reflects the concepts it is intended to measure. Validity of the Test was taken care of during preparation of items, opinion of experts were also given due importance. Thus content validity of the Test was ensured.

Reliability of the Test

Reliability refers to the degree of consistency in the performance of the examinees. The reliability of the Test was established using the Test-Retest Method. Three weeks after conduct of the Final Test, the same Test was re-administered on the same set of students. Correlation coefficient between these sets of scores was found to be 0.85, which shows that the Test is highly reliable.

Objectivity and Practicability

Objectivity demands definiteness in the answer expected. The Test was made cent percent objective by including various types of test items and by preparing scoring items carefully. Besides this, the Test was conducted under ideal conditions and the Response Sheets were valued strictly according to the Scoring Key. So objectivity was ensured to its fullest extent. Practicability is the feasibility of the Test. The time fixed for the Test was 60 minutes, which was sufficient. The Test Booklets were reusable, since the Response Sheets were provided separately. Thus practicability of the Test was ensured.
The Test on Reading Competency in English (Final), its Response Sheet and Marking Scheme are provided as Appendix E.

**Determination of Norms**

Norms provide average standards of specific groups, with a view to make comparisons and thereby take instructional as well as other decisions. The values of Arithmetic Mean and Standard Deviation of the Scale were 35.19 and 13.12 respectively, on the basis of which three groups were formed, viz. upper, average and lower groups. The norms of the Scale on Attitude towards English were calculated as follows:

- **Upper Group**: Students with scores 48 and above
- **Average Group**: Students with scores from 22 to 47
- **Lower Group**: Students with scores below 22.

4. **Inventory on Reading Habit**

Reading Habit refers to the behavior which expresses the liking towards reading, the individual types of reading and the tastes of reading (Sangkao, 1999). It is a pattern with which an individual organizes his/her reading. Reading habit has a powerful and lasting influence on the promotion of one’s personal development in particular and social progress in general. Regular and systematic reading sharpens the intellect, refines the emotions, elevates tastes and provides perspectives for one’s living, and thereby prepares one for an effective civilizing force tending to unite social groups through the dissemination of common experiences (Thanuskodi, 2011).

**The Draft Inventory on Reading Habit**

The Inventory on Reading Habit was developed by Jaise and Thomas (2011) after a thorough review of relevant literature and with the advice of experts in the field. After discussions with the experts in the field of
English and Education, 50 statements were prepared and it was again given to another group of experts for comments and suggestions. As per the comments and suggestions received, some of the statements were deleted and others were modified.

The Scoring Key of the Draft was prepared, in which correct response gets ‘one score’ and ‘zero’ for incorrect response.

The **Inventory on Reading Habit (Draft)** and **Response Sheet** are provided as **Appendix F**.

**Try out of the Draft Inventory**

The items were tried out on five Upper Primary School Students and the wordings used in the Inventory were modified to make the items clearer and to avoid ambiguity from the Student’s point of view. Then the Draft Inventory on Reading Habit, comprising 50 items, was administered on a sample of 380 upper Primary School Students who were randomly selected. Separate Response Sheets were provided to the Students. The average time taken by the students to answer all questions was noted to estimate the time required for the Final Test.

As per the instructions in the Draft Inventory, students were required to tick mark (✔) Yes/No against each item in the Response Sheet. Each correct response was awarded one score and zero score for incorrect response. More than 98% of the students completed the test and the answer scripts were collected and valued. Incomplete Response Sheets were rejected and thus 370 Response Sheets were taken for analysis.

**Item Analysis**

It is the process of establishing the suitability of an item for inclusion in the final tool. The procedure suggested by **Ebel and Frisbie (1991)** was used for this purpose. In accordance, the Response Sheets were arranged in descending order from highest to the lowest. The Upper Group (the 27%
from the higher level) and the Lower Group (27% from the lower level) were separated. These two Groups were used for treated as Higher and Lower Sheets respectively. These two Groups were used for item analysis. The two important characteristics, the Difficulty Index (DI) and Discriminating Power (DP) were found out and the suitability of the item for the final test was established. DI and DP were calculated using the formulae,

Index of Item Difficulty, \( \text{DI} = \frac{U + L}{2N} \), and

Index of Discriminating Power, \( \text{DP} = \frac{U - L}{N} \), where

\( U \) is the number of correct responses in the Upper Group,

\( L \) is the number of correct responses in the Lower Group, and

\( N \) is the number of students.

**The Final Inventory**

The items with DI values falling between 0.35 and 0.65 and DP values 0.4 and above were selected for the Final Inventory. Thus, 30 questions were selected for the Final Inventory and 20 items were rejected. The Difficulty Index and Discriminating Power of Items in Inventory on Reading Habit (Draft) are provided as Appendix G.

The time limit for the Final Inventory was fixed as 60 minutes. The items were organized in the order of their level of difficulty. Clear directions were provided in the question paper. The Scoring Key of the Final Inventory was prepared.

The Inventory on Reading Habit (Final), its Response Sheet and Scoring Key are provided as Appendix H.
**Methodology**

**Administration and Scoring of the Final Inventory**

The Inventory on Reading Habit was administered on 284 students under ideal conditions. The time limit of 60 minutes was strictly followed. The Response Sheets were valued strictly according to the Scoring Key prepared and total scores were arrived at.

**Validity of the Inventory**

Validity accurately reflects the nature of the concept it is intended to measure. Validity of the Inventory was taken care of while preparing items in the Inventory. During preparation of items, opinion of experts were also given due importance. Thus content validity of the Inventory was ensured.

**Reliability of the Inventory**

Reliability refers to the degree of consistency in the performance of the examinees. The reliability of the Inventory was established using the **Test-Retest Method**. Three weeks after conduct of the Final Inventory, the same Inventory was re-administered on the same set of students. Correlation coefficient between these sets of scores was found to be 0.82, which shows that the Inventory is highly reliable.

**Objectivity and Practicability**

Objectivity demands definiteness in the answer expected. The Inventory was made cent percent objective by including only Yes/No type items. Besides this, the Inventory was conducted under ideal conditions and the Response Sheets were valued strictly according to the Scoring Key. So objectivity was ensured to its fullest extent. Practicability is the feasibility of the Inventory. The time fixed for the Inventory was 40 minutes, which was sufficient. The Inventory Booklets were reusable, since the Response Sheets were provided separately. Thus practicability of the Inventory was ensured.
Determination of Norms

Norms provide average standards of specific groups, with a view to make comparisons and thereby take instructional as well as other decisions. The values of Arithmetic Mean and Standard Deviation of the Inventory were 21.10 and 4.54 respectively on the basis of which three groups were formed, viz. upper, average and lower groups. The norms of the Inventory on Reading Habit were calculated as follows:

Upper Group: Students with scores 26 and above
Average Group: Students with scores from 17 to 25
Lower Group: Students with scores below 17.

5. Scale on Attitude towards English

The term attitude refers to a learned predisposition to react consistently in a given manner to certain persons, objects or concepts. Attitudes are positive or negative feelings that an individual holds about objects, persons or ideas and are generally regarded as enduring though modifiable by experience.

In the absence of an appropriate Scale for measuring the Attitude of students towards English, at Upper Primary School level, it was decided to construct a Scale on Attitude towards English for the research work.

The Scale on Attitude towards English, developed by Jaise and Thomas (2011), consists of 50 items which encompasses the measure for assessing the attitude of standard VI students. The Scale was prepared following the Likert method and is a three-point scale. The Draft Scale on Attitude towards English was based on the general attitude of students towards English. The Scale is designed to produce quantifiable data that may be subjected to statistical analysis to draw inferences. A brief explanation of the steps involved in the construction of the Attitude Scale follows.
The Draft Scale on Attitude towards English

As a preliminary step, the items for the draft Scale on Attitude towards English was prepared after a thorough review of relevant literature and also with the advice of experts in the field. After discussions with the experts in the field of English and Education, 50 statements both positive and negative were prepared and it was again given to another group of experts for comments and suggestions. As per the comments and suggestions received, some of the statements were deleted and others were modified.

The Scale on Attitude towards English (Draft) and its Response Sheet are provided as Appendix I.

Try out of the Draft Scale

The Draft Scale, comprising 50 items, was administered on a sample of 380 Upper Primary School Students who were randomly selected. Instructions in the Draft Scale on Attitude towards English requires respondents to answer on a three point scale - ‘Agree’, ‘Undecided’, or ‘Disagree’. For positive items in the Scale, a score of three was given for the response ‘Agree’, two score for the response ‘Undecided’, and one score for the response ‘Disagree’. For negative items, the scoring scheme was reversed.

Item Analysis

For item analysis, 370 Response Sheets, complete in all respects were selected. The item analysis was carried out using the methods suggested by Ebel and Frisbie (1991). In order to facilitate computational procedures, 370 sheets were randomly drawn and arranged in descending order of scores. The upper 100 sheets (27%) and lower 100 sheets (27%) were treated as higher and lower groups respectively and used as extreme groups for item analysis.
Methodology

Under each group for each item, the number of pupils making response to Agree, Undecided, and Disagree were found out and presented in the form of a frequency table. Then the \( t \) value for each item was calculated to find out the Discriminating power. The \( t \) value showed the extent to which the Higher group and Lower group are differentiated on a given item in the Attitude Scale. The following formula was used to calculate the \( t \) value.

\[
t = \frac{\bar{X}_H - \bar{X}_L}{\sqrt{\frac{\sigma_H^2}{N_1} + \frac{\sigma_L^2}{N_2}}}
\]

Where,

- \( \bar{X}_H \) = The Mean score of the Upper group for a given statement
- \( \bar{X}_L \) = The Mean score of the Lower group for a given statement
- \( N_1 \) = Number of students in the Upper group
- \( N_2 \) = Number of students in the Lower group
- \( \sigma_H \) = Standard Deviation of the Upper group for a given statement
- \( \sigma_L \) = Standard Deviation of the Lower group for a given statement

The \( t \) values of Items in Scale on Attitude towards English (Draft) is provided as Appendix J.

Preparation of the Final Scale

For the preparation of the final Scale on Attitude towards English, the items having ‘\( t \)’ value equal or above 1.75 were selected, as the ‘\( t \)’ value is a measure of the extent to which a given statement differentiates between the high and low groups. Edward’s (1957) opined that “as a crude and approximate rule of thumb, we may regard any ‘\( t \)’ value equal to or greater than 1.75 as indicating that the average response of the High and Low groups to a statement differs significantly, provided we have 25 or more subjects in the High group and Low group”. After computing the ‘\( t \)’ value
the best 30 items were selected. The final form of the Scale on Attitude towards English with 30 items was prepared.

The Scale on Attitude towards English (Final) and its Response Sheet are given as Appendix K.

Validity of the Scale

Evidence regarding the validity of a Scale on Attitude towards English lies mainly, in the procedure adopted for developing the Scale. The Scale on Attitude towards English was prepared very carefully following the principles of scale construction. The item selection procedure was a clear indication of the internal validity. The face validity of the Scale on Attitude towards English was ascertained by giving the Scale to experts for their comments.

Reliability of the Test

Reliability refers to the degree of consistency in the performance of the examinees. The reliability of the Scale on Attitude towards English was set up by using Test-Retest Method. Correlation coefficient between these sets of scores was found to be 0.85, which shows that the Scale is highly reliable.

Objectivity and Practicability

Objectivity demands definiteness in the answer expected. The Scale was made cent percent objective by including Agree, Undecided, and Disagree items. Besides this, the Scale was administered under ideal conditions and the Response Sheets were valued strictly according to the Scoring Key. So objectivity was ensured to its fullest extent. Practicability relates to the feasibility of the Scale. The time fixed for the Test was 40 minutes, which was sufficient. The Test Booklets were reusable, since the Response Sheets were provided separately. Thus practicability of the Scale was ensured.
Methodology

For positive items in the Scale, a score of three was given for the response ‘Agree’, a score of two for the response ‘Undecided’, and one score for the response ‘Disagree’. For negative items, the scoring scheme was reversed. The maximum score of the Scale is 90 and the minimum score is 30.

**Determination of Norms**

Norms provide average standards of specific groups, with a view to make comparisons and thereby take instructional as well as other decisions. The values of Arithmetic Mean and Standard Deviation of the Scale were 55.52 and 12.65 respectively, on the basis of which three groups were formed, viz. upper, average and lower groups. The norms of the Scale on Attitude towards English were calculated as follows:

Upper Group: Students with scores 68 and above

Average Group: Students with scores from 43 to 67

Lower Group: Students with scores below 43.

**6. Instructional Plans using Mental Modelling based on Multiple Strategy**

Instructional Plans, for the Units “Children with Strong Will”, and “Chubari, Our Horse” from the English Reader of Standard VI, were prepared by Jaise and Thomas (2011) for teaching in the Experimental Group. The lesson units selected for the experiment were subjected to a thorough analysis. The Competencies to be developed, the procedure adopted for developing these Competencies, and the process leading to Reading Competency in English were carefully identified.

In developing the Instructional Plans, the theoretical constructs presented by Kenneth Craik (1943) and the strategies prescribed by National Reading Panel (2000) were used. Students were encouraged to take part in the reading process enthusiastically and efficiently using Multiple Strategies. The instructional plans were based on twelve strategies, viz. Active listening,
Comprehension Monitoring, Prior Knowledge, Mental Imagery, Mnemonics, Graphic Organizers, Vocabulary Instruction, Question Answering, Question Generation, Story Structure, Summarization, and Co-Operative Learning by Peers, which are presented diagrammatically in Figure 4.3.

**Figure 4.3**

**Multiple Strategy Instruction**

The Instructional Plans using Mental Modelling based on Multiple Strategy were designed by employing the twelve strategies in Seven Phases. The
general format of the Instructional Plans prepared for the experiment is presented in Figure 4.4.

**Figure 4.4**

**Phases of Instructional Plans using Mental Modelling based on Multiple Strategy**

**Phase I: Preparation**

It is the process that activates prior knowledge about a particular topic. This method is used to get students to think about the topic they are about to work on. It is much easier to retain knowledge about a subject when the student is familiar with the subject area. Predicting involves previewing parts of the text to be read. The portions of text, which are helpful in previewing, can be pictures, titles, or the cover of the book. As the students think about what will happen based on their knowledge of the subject and the book, they focus their thoughts on the assignment to come, which leads to better comprehension.
Methodology

Phase II: Visualization

It is asserted that, when visual and verbal processes are incorporated, children are much more engaged during reading because they can actively utilise their prior knowledge more efficiently. Thus, successful comprehenders tend to be imaginative readers and users of language who are able to actively select and organise information from complex texts. Drawings and illustrations are the best ways of visualising of the text.

Phase III: Organization

Organization is the process of selecting important details and building relationships from them. It includes identifying the main idea and topic sentences, classifying information, deciding which information is relevant, sequencing and summarizing. Each of these steps is complex and methods for improving them need to be taught starting from basic ideas and gradually getting more difficult. Summarizing, in particular, has been identified as a difficult skill to develop.

Phase IV: Manipulation

Manipulations enable linking of words to objects as well as requiring the reader to visualize story elements and relationships as directed by the narrative syntax. Having readers manipulate objects to emulate characters and their actions in a text greatly enhances comprehension as measured by both recall and inference tests. A story character’s world becomes more concrete, comprehensible, and subject to discussion when objects, items, pictures, and maps are used in conjunction with stories that are read.

Phase V: Elaboration

Elaboration is the additional processing of the text, by the reader, which may increase comprehension. It involves forming connections between the text and the reader’s background knowledge of the subject. Making inferences, picturing images and asking questions are all types of
elaboration techniques. The association between three steps of the procedure is: describing what is Known, what is to be Known, and what is Learned.

**Phase V: Characterization**

One effective way for readers to decipher a complex plot thread in narratives is to try and understand the protagonist’s perspective through story events. A ‘characters’ beliefs, desires, feelings, and thoughts are the glue that holds the story together’. The inter-relationships of the main characters provide coherence between several sub-plots or incidences within the narrative structure. It is the inner character traits that give the most insights on story plots and themes.

**Phase VI: Monitoring**

Monitoring is being aware of one’s own mental processes when reading. Monitoring is an advanced technique that involves a great deal of independent thinking. Monitoring occurs when a reader is aware that they do not understand what was just read. The act of monitoring is knowing how to go back and find a way to gain understanding of the topic.

Instructional Plans using Mental Modelling based on Multiple Strategy were developed based upon these seven phases.

**Validation of the Instructional Plans**

The Instructional Plans were exposed to a Pilot Study by teaching a group of ten students. The Instructional Plans were finalized by making modifications on the basis of the students’ response during the Pilot Study and the suggestions made by Senior School Teachers of English.

An Instructional Plan using Mental Modelling based on Multiple Strategy is given as Appendix L.
7. Instructional Plans using Activity Oriented Method

Instructional Plans were also prepared by Jaise and Thomas (2011) based on the Activity Oriented Method, which was the method prevalent in the schools of Kerala state during the period of study. Thus, Instructional Plans using Activity Oriented Method were prepared for the Units “Children With Strong Will”, and “Chubari, Our Horse” of Standard VI English Reader of Kerala State Syllabus. These Instructional Plans were also validated by Senior School Teachers of English.

An Instructional Plan using Activity Oriented Method is given as Appendix M.

The List of Experts who validated the tools for the study is provided as Appendix N.

4.6 PROCEDURE FOR COLLECTION OF DATA

After finalizing the samples and tools to be used, data was gathered for the Experiment. The procedure adopted for the collection of data is detailed below.

The heads of the schools, class teachers as well as the teachers of English were met so as to ensure their co-operation for the experimental study.

Two intact divisions from each of the five schools were selected randomly and one fixed as the Experimental Group and the other as the Control Group. A short explanation of the aim and scope of the study was given to the Students and their cooperation was solicited.

Before starting the experiment, the previous Achievement in English was gathered from the respective Class Teachers and the Raven’s Coloured Progressive Matrices was administered to compare the students in the Experimental and Control Groups. The Test on Reading Competency in English, the Inventory on Reading Habit, and the Scale on Attitude towards English were administered to students in both the Experimental and
Control Groups during the administration of the tools. Necessary directions were given to both the Experimental and Control Groups during the administration of the tools. The rules and procedures prescribed for each of the Tests was strictly followed. The Response Sheets were gathered after the prescribed time and scored in accordance with the respective Scoring Keys/Marking Scheme. The scores thus obtained were considered as the Pre-Test Scores. The Experimental Groups were exposed to the Mental Modelling based on Multiple Strategy Instruction, while the Control Groups were exposed to the Activity Oriented Method of Instruction. All the Groups underwent 20 Instructional periods of 40 minutes duration each in the same content area. After completion of the experimental treatment, all the three Tests were again administered as Post-tests to both the Groups. The scores obtained thus were considered as Post-test scores. All the scores were then tabulated and subjected to statistical analysis.

4.7 STATISTICAL TECHNIQUES EMPLOYED

Suitable statistical techniques were employed to analyse the data collected. In this study, the Pre-Test and Post-Test Scores of the Experimental and Control Groups were consolidated for the following statistical analysis.

- A preliminary analysis was done using Critical Ratio (t test).
- The Analysis of Variance was used to compare the Pre- and Post-Test Scores of the Experimental and Control Groups.
- The Analysis of Covariance was used to find out the effectiveness of Mental Modelling based on Multiple Strategy Instruction.

The software MS-Office, developed by Microsoft, was employed to estimate the statistical values. The details of analysis using these relevant statistical techniques have been compiled in the next chapter.