Chapter 4

METHODOLOGY

- Introduction
- Methods adopted for the study
- Variables selected for the study
- Sampling design
- Preparation of tools
- Experimental study
- Design of the study
- Achievement test construction
4.1. Methodological guidelines

Research is an organized activity designed for finding answers to questions which contribute to knowledge generation process. It is an intellectual and creative endeavor to discover, develop and verify knowledge (Merten).

Methodology of research is the description and rational of the diverse phases of conducting a research. In order to tackle any kind of problem, suitable methods should be adopted related to the objectives of the study. The decision about the method or methods to be employed depends upon the nature of the problem and the type of data needed for its solution.

4.2. Specificity of methodological exploration

The present study is titled as ‘Facilitations and constraints to the modernization of Hindi teaching in the schools of Kerala’. The peculiar nature of the topic demands the application of mixed methodology coinciding both qualitative and quantitative approaches of research.

Mixed method of research is a blend of the applications of both qualitative and quantitative methods of research simultaneously. Teshakkori and Greswel (2007) define mixed method as ‘research in which the investigator collects and analyses data, integrates findings and draws inferences using both quantitative and qualitative approaches or methods in a single study or programme of inquiry’ (cited in Mertens, 2010). Mixed methods have particular value when an investigator is trying to solve a problem that is present in a complex educational social context. (Teddlie and Takkakori, 2009, as reported by Mertens, 2010). The investigator made use of qualitative method in the initial stage of the study and then applied quantitative methods.

Qualitative approach is placed in the interpretivist paradigm that consists of a set of interpretive, naturalistic material practices that makes the world around as vivid or visible. Drew et al. (2008) defines qualitative studies as research that involves collecting data in the forms of words or a narrative that describes the topic under study and emphasized collecting
data in natural settings. Details regarding the prevailing instructional practices were collected through unstructured interview. Instructional practitioners’ concrete suggestions to modernize the teaching of Hindi were also collected. While preparing the tools for the descriptive study, the opinions and suggestions of the teachers were taken into consideration.

Quantitative method was evolved in the post positive paradigm, which holds that a particular knowledge claim about an educational phenomenon is true or false by collecting evidence in the form of objective observations of relevant phenomena (Gall, Gall and Borg, 2013). Quantitative research primarily delineates the use of quantifiable form of empirical material. The investigator used both descriptive and experimental methods under quantitative research.
The schematic phases of the investigation is presented in Figure 4.1

**Schematic Phases of Investigation**

**Phase 1**
- Introduction Phase
- Un-structured Interview
- 1. Major facilitations and constraints to the modernization of Hindi teaching prevalent in Kerala.

**Phase 2**
- Inquiry Phase
- Questionnaire
- Attitude scale
- 1. Awareness regarding modern instructional methods, strategies and approaches
- 2. Techno-pedagogical skills of teachers
- 3. In-service courses
- 4. Instructional support
- 5. Administrative and supervisory support
- 6. Attitude towards Mod. Instructional strategies
- 7. Facilitations and Constraints to modernization

**Phase 3**
- Evaluative Phase
- Statistical Tools
- Mean
- Standard deviation
- Chi-square test and ‘t’ test, Anova and Ancova

**Phase 4**
- Application Phase
- Suggestive strategies
- 1. Role play Model
- 2. Synectics Model
- 3. Inquiry Training Model

**Phase 5**
- Testing Phase
- Critical Ratio, Anova, Ancova
- 1. Role play Model
- 2. Synectics Model
- 3. Inquiry Training Model
- 4. Activity oriented approach
4.3. Descriptive section of the study

Descriptive research is concerned with identifying the current status of something. This kind of research describes the achievements, attitudes or other characteristics of a group. Descriptive research is generally concerned with the present and does not involve manipulation of independent variables (Mac Millan and Schumacher, 1987).

4.4. Survey method

Survey method was adopted for collecting data. As the title shows the study was designed to identify the factors which act as facilitations and constraints to the modernization of Hindi teaching in the schools of Kerala. Along with these two crucial aspects, important areas related with the teaching of Hindi like, attitude of Hindi teachers towards selected modern instructional methods, strategies and approaches, techno-pedagogical skills of teachers, awareness of secondary school Hindi teachers regarding modern instructional methods, strategies and approaches, status of in-service training programmes, availability of instructional support for teaching Hindi in the schools of Kerala, administrative and supervisory support available in the secondary schools of Kerala for promoting Hindi teaching, were also intended to be studied. So the survey method is the most apt one for gathering the necessary data. The sample was selected from six revenue districts of Kerala. The sample consists of teachers from government schools as well as aided schools. Due representation was given to rural and urban school teachers.

4.4.1. Variables selected for the study

Variables are the conditions or characteristics that the experimenter manipulates, controls or observes in a research study. In the present study gender, age and service of the sample, their educational qualification, type and place of schools where they work were treated as variables.

4.4.2. Sampling Design

The sampling technique employed for the survey was simple random sampling. The details are shown in Table 4.1
Table 4.1
Details of the sample selected for the study

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Name of Districts</th>
<th>Number of Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Thiruvananthapuram, Kollam</td>
<td>192</td>
</tr>
<tr>
<td>2</td>
<td>Kottayam, Ernakulam</td>
<td>161</td>
</tr>
<tr>
<td>3</td>
<td>Kozhikode, Kannur</td>
<td>135</td>
</tr>
</tbody>
</table>

Total 488

The sample was conceptually designed to get a picture of the whole State of Kerala. Sample was selected randomly from the select six districts of Kerala representing the southern, middle and northern parts. Two districts were selected from each of the three geographical areas. Majority of the sample is from Thiruvananthapuram and Kollam Districts (192), followed by Kottayam and Ernakulam (161) 135 of the sample is from the northern districts Kozhikode and Kannur. Even though a total number of 560 questionnaires were mailed to the sample, only 520 of them were received back and 32 among them were found to be incomplete and finally 488 were taken for analysis.

Table 4.2
Break-up of the sample of Hindi teachers at secondary level selected for the study

<table>
<thead>
<tr>
<th>Sl.no.</th>
<th>Extraneous Variables</th>
<th>Group</th>
<th>Total no.teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Type of management of school</td>
<td>Govt</td>
<td>203</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aided</td>
<td>285</td>
</tr>
<tr>
<td>2</td>
<td>Gender</td>
<td>Male</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>394</td>
</tr>
<tr>
<td>3</td>
<td>Place of school</td>
<td>Urban</td>
<td>134</td>
</tr>
</tbody>
</table>

107
<table>
<thead>
<tr>
<th></th>
<th>Qualification of teachers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rural 354</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Graduate 330</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P.G. 158</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;=35 66</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Age</td>
<td></td>
</tr>
<tr>
<td></td>
<td>36-40 156</td>
<td></td>
</tr>
<tr>
<td></td>
<td>41-45 143</td>
<td></td>
</tr>
<tr>
<td></td>
<td>46-50 80</td>
<td></td>
</tr>
<tr>
<td></td>
<td>51-55 43</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;=10 120</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Service</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10-15 189</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16-20 103</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20+ 76</td>
<td></td>
</tr>
</tbody>
</table>

Out of the total sample of 488 teachers, 394 were females. The total number of aided school teachers is 285 and that of government school teachers is 203. Majority of the teachers are from the rural areas of Kerala(354). Maximum number of teachers fall in the age group of 36-40(156). In the sample selected, majority of the teachers (189) fall in the category with 10-15 years experience.

### 4.5. Preparation of Tools

Research will require many data-gathering tools or techniques which may vary in their complexity, design, administration and interpretation. It is very important to select from the
available tools, which will provide data for testing the hypotheses. Each tool is appropriate for the collection of certain type of information. In some occasions modification of research tools becomes a necessity owing to the new situations faced in the research work.

The major data-gathering tools used in the present study are, 1. Questionnaire and 2. Attitude scale.

4.5.1. Questionnaire

According to Goode and Hatt (1952) ‘The word questionnaire refers to a device for securing answers to questions by using a form which the respondents fills-in himself,’ Barr, Davis and Johnson (1953) define questionnaire as a ‘systematic compilation of questions that are submitted to a sampling of population from which information is desired’. It is a written set of questions that are given to people in order to collect facts or opinions about something (Webster)

Development of the Questionnaire

The instruments to collect data from the field are essential for all types of research studies. Objectives 1, 2, 3, 4, 5, and 6 of the present study are to identify the factors which act as facilitations to the modernization of Hindi teaching in the schools of Kerala, to identify the factors which act as constraints to the modernization of Hindi teaching in the schools of Kerala, to check the techno-pedagogical skills of secondary school Hindi teachers, to check the status of present system of inservice programmes conducted for secondary school Hindi teachers, to check the availability of instructional support available in the government and aided secondary schools in Kerala, to check the administrative and academic support provided to secondary school Hindi teachers. As far as these aspects are concerned questionnaires were considered to be the appropriate tool for gathering the required data. As it is difficult to visit each school and to interview each teacher, the questionnaires were selected as tools for getting information about the above mentioned areas.

For the preparation of the Questionnaires, 40 secondary school Hindi teachers were asked to provide the information about the items, especially about facilitations and constraints to the modernization of Hindi teaching, that ought to be included in the questionnaire. On the basis of information obtained from them, some items were prepared. Along with the interaction
with teachers, good number of books, journals, dissertations, thesis and other relevant literature necessary for the preparation of different questionnaires were referred thoroughly for the selection of suitable items. Discussion was also conducted with experts and experienced teachers of Hindi, in order to select appropriate items that has to be included in the questionnaire.

4.5.1.1 Dimension of the questionnaire seeking information about the awareness of secondary school Hindi teachers regarding modern instructional methods, strategies and approaches

Relevant literature on methods and strategies of teaching was thoroughly referred for the selection of items that has to be included in the dimension of the questionnaire. The B.Ed syllabus (Optional subject-Hindi) of Kerala, Mahatma Gandhi, Kaladi Sankaracharya and Kannur universities were thoroughly analysed to understand the place of modern instructional methods/strategies/approaches in their syllabus. The syllabus of Hindi teacher training courses conducted by other government and non-government agencies were also analysed. Initially 25 modern instructional methods/strategies/approaches were included in the dimension of the questionnaire.

4.5.1.2 Dimension seeking information about techno-pedagogical skills of secondary school Hindi teachers.

This dimension of the questionnaire is designed for collecting information about techno pedagogical skills of secondary school Hindi teachers. There were 8 items in this questionnaire. For each item in the questionnaire two columns were given to express teacher’s response. Teachers were directed to mark ‘yes’ if if they had that particular skill and ‘no’ if they did not have that skill.

4.51.3 Dimension seeking information regarding in-service courses conducted for secondary school Hindi teachers.

The first question in this section was to state whether the respondent has attended any in-service course during the current academic year. Only those respondents who has got opportunity to participate in in-service courses were asked to answer the rest of the questions. Eleven questions were included in this questionnaire. For each item 3 options were provided: yes, no and to a certain extent.
4.51.4. Dimension seeking information about teacher empowerment programmes conducted for secondary school Hindi teachers.

This dimension contains 8 items related with the teacher empowerment programme conducted for secondary school Hindi teachers. For each item 3 options; yes, no and to a certain extent, were provided for marking option.

4.5.1.5. Dimension of questionnaire seeking information about the availability of instructional support in the schools.

This dimension contains 21 items related to the availability of instructional support available in schools. Three choices; adequate, inadequate and nil, were given to the sample teachers to mark their option.

4.5.1.6. Dimension of the Questionnaire seeking information about the support of school administration to Hindi teaching.

There were 5 questions included in this section. For the first 3 questions three choices were given. The choices were yes, no and to a certain extent. Four options were given to the remaining two statements. These options were in-accordance with the nature of the statements.

4.5.1.7. Dimension seeking information about the support of experts/resource persons to Hindi teaching.

This consists of 4 questions seeking information about the support provided by experts/resource persons to Hindi teaching. Three choices- yes, no and to a certain extent were provided for the respondents to express their option.

4.5.1.8. Dimension of the questionnaire seeking information about the factors which act as facilitations to the modernization of Hindi teaching in the schools of Kerala.

This dimension consists of 28 statements from seven major areas of Hindi teaching. These areas are teaching methodology, curriculum, in-service programmes, pupil related factors, instructional support, evaluation and co-curricular activities. Three options were given to the respondents to express their opinion. The options were High extent, Some extent and Nil.
4.51.9. Dimensions of the questionnaire seeking information about the factors which act as constraints to the modernization of Hindi teaching.

This consists of 26 statements selected from seven important areas. The areas included in the questionnaire were related to methodology of teaching, teacher, classroom related, instructional support, teacher training, students’ home related factors and syllabus.

Three options were given to the respondents to express their opinion. The options were High extent, Some extent and Nil.

4.5.2. Pilot study

The aim of the pilot study was to find out whether the items included in the questionnaire were relevant, direct and easily understandable. The pilot study was planned with utmost care and carried out with a sample of 50 randomly selected secondary school Hindi teachers from Kottayam and Alappuzha districts. At the end of each dimension the respondents were requested to mark their opinion and criticism freely regarding the items in the questionnaires. Some irrelevant items and ambiguities were identified as a result of this. In the light of this experiences and discussion with senior teachers, some items were discarded and some minute changes were made to improve clarity in the wording of some items.

In the first dimension of the questionnaire, 25 methods, strategies and approaches were provided. But during the pilot study, majority of the teachers expressed the view that 4 among them were not relevant. So these 4 items were discarded and the rest 21 retained. In the second dimension i.e. techno pedagogical skills of Hindi teachers, one item was discarded and the final form consisted of 7 questions on various dimensions of techno-pedagogical skills. In the third dimension of the questionnaire, meant to seek information regarding in-service courses conducted for secondary school Hindi teachers, initially ten items were given. Only those teachers who had got opportunity to participate in Hindi in-service courses were asked to attend this dimension. Initially there were ten items; but during pilot study the respondents recommended one more item. Thus 11 items related with the conduct of in-service course of long duration was included in this dimension. No change was suggested by the sample selected for pilot study regarding the conduct of teacher empowerment programmes conducted for secondary Hindi teachers. This dimension contains 8 items. Initially there were 21 items included in the dimension seeking information about the availability of instructional support in the schools. Based on the suggestions of the respondents in the pilot study, two items were discarded from the the final form. The
dimension seeking opinion about the support of school administration, experts/ resource persons was also retained without any change.

Initially there were 25 items in the section of the questionnaire seeking information about the factors which act as facilitations to the modernization of Hindi teaching in the schools of Kerala. After conducting the pilot study it is felt that two items included in the questionnaire as facilitations are not very relevant and they were excluded. The final form of the questionnaire contains 23 items.

The dimension of the questionnaire used for the pilot study in connection with the factors which act as constraints to the modernization of Hindi teaching contained 26 items. After conducting the pilot study it was felt that 3 items included as constraints are not very important or relevant. These three items were excluded and the final form of the questionnaire contained 23 items.

4.6. Attitude scale

The inquiry form that attempts to assess the attitude or belief of an individual is known as opinionnaire or attitude scale. For the modernization of Hindi teaching, along with knowledge about modern instructional strategies, favourable attitude in teachers towards modern instructional strategies is a must.

In order to prepare the attitude scale, the investigator referred several books, magazines, journals, attitude scales and questionnaires that have already been constructed and used by other researchers in different fields. Discussions were held with experts in the field of Hindi education. After obtaining their suggestions an attitude scale containing 38 items was prepared. After scrutiny, statements were selected and were given to experts for comments. After consultation with experts some items were eliminated and others were modified according to experts’ suggestions.

Even though some of the irrelevant items in the attitude scale had been eliminated through the above procedures, it was impossible to eliminate all such items. So the attitude scale was administered on a small but representative sample for eliciting comments about ambiguities that had not been previously detected so that the investigator could make necessary corrections prior to the preparation of the final form of the Attitude Scale.
After finalising the statements atmost care was taken to ensure that equal number of favourable and unfavourable items were included. After selecting the items the next step was to decide/assign scale values for the statements. Mainly there are two methods for assigning scale values to the statements. They are Thurstone’s method and Likert’s method. The investigator selected Likert’s method to collect the data.

4.6.1. Likert Scale (Summated scale)

This was developed by Likert, R in 1932. It requires the individuals to make a decision on their level of agreement, generally on a five-point scale (ie. Strongly Agree, Agree, Disagree, Strongly Disagree) with a statement. The number beside each response becomes the value for that response and the total score is obtained by adding the values for each response, hence the reason why they are also called 'summated scales' (the respondents score is found by summing the number of responses).

Suppose there are a large number of statements for which the scale values are unknown. It is assumed that we can obtain agreement in classifying statements into two classes, favourable and unfavourable with approximately the same number of statements in each class. These statements are given to the sample and are asked to respond to each one in terms of their own agreement or disagreements. Respondents are free to use/select any one of the 5 categories: ‘strongly agree’, ‘agree’, ‘undecided’, ‘disagree’, or ‘strongly disagree’. For any statement, the proportion of subjects giving each of the 5 categories of response in such a way that the response made by individuals with the most favourable attitude will always have the highest positive weight. For favourable statements we assume that this is the ‘strongly agree’ category and for the unfavourable statements, the ‘strongly disagree’ category.

In the case of favourable statements, the ‘strongly agree’ response will be given a weightage of 5, the ‘agree’ response, a weight of 4, the ‘undecided’ response a weightage of 3, the ‘disagree’ response a weightage of 2 and for the last response ‘strongly disagree’ weightage of 1 is given. As far as unfavourable statements the scoring system is made reversed, with the ‘strongly disagree’ response being given a weightage of 5 and the strongly agree’ response
the weightage of 1. Each person’s total score is determined by adding his item scores. The scores of low scoring subjects (bottom 27% rank holders) and the scores of high scoring subjects (top 27% rank holders) for each item are analysed. That items that do not discriminate well between the high and low groups are discarded.

4.6.2. Administration of the pilot test

As a part of the present study, it was intended to measure the attitudes of secondary school Hindi teachers towards certain modern instructional strategies. The preliminary draft of the scale was administered to a sample of hundred secondary school Hindi teachers, working in government as well as aided schools in Kerala, who were asked to respond to each statement in it in terms of their agreement or disagreement with the statements. They were asked to choose any one of the 5 categories relating to each item.

Strongly agree (SA), Agree (A), Undecided (U), Disagree (D) and strongly disagree (SD).

4.6.3. Scoring

The scoring was done using the procedure given below:

Table. 4.3

<table>
<thead>
<tr>
<th>Statements</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>A</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favourable</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Unfavourable</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

The scores of individual statements were summated to arrive at the total score.

4.6.4. Selection of criterion groups

The proportion of the total subject-population to be included in each criterion group can be set at the upper and lower thirds, the upper and lower 25% or the upper and lower 27% or any other desired figures.
On the basis of scores based upon the responses to all statements, 27 percent of the subjects with the highest total scores and 27 percent of the subjects with the lowest total scores are taken. These two groups provide criterion groups in terms of which to evaluate the individual statements. The use of upper and lower 27% offers the best compromise between the two variables which can affect the reliability of the results. (Leonard Ferguson, 1952). These two variables are the number of cases and the scalar distance between the two groups. These variables are inversely related. As the number of cases is increased, the scalar distance contracts and as the scalar distance is increased, the number of cases diminishes.

### 4.6.5. Item analysis

According to Ferguson, (1952) item analysis is meant ‘any of the many processes by which one can find which items differentiate and which do not differentiate between the contrasting criterion groups’.

Item analysis is an important step in the construction of attitude scales and it is used as a basis for the final selection of statements in the method of summative ratings. The method used in the present study for item analysis is given below.

First of all the total scores were arranged in the ascending order. The 27% of the subjects with the highest scores, and the 27% of the subjects with the lowest scores were taken as the criterion groups, in terms of which to evaluate the individual statements. After selecting the 27 highest scoring subjects (the top 27%) and the 27 lowest scoring subjects (the bottom 27%) as criterion groups, the numerical values of their mean responses to each statement was computed.

To evaluate the responses of the high and low groups to the individual statements ‘t’ values were calculated using the formula,
\[ t = \frac{X_H - X_L}{\sqrt{\frac{\varepsilon (X_H^2 - X_H^2) + (X_L - X_L^2)}{N(N - 1)}}} \]

XH = the mean score of the high group for a given statement
XL = the mean score of the low group for a given statement
XH = the score of a given individual for the statement in the high group
XL = the score of a given individual for the statement in the low group
N = number of subjects in the criterion group

The value of ‘t’ is a measure of the extent to which a given statement differentiates between the high group and low group. ‘t’ value of about 1.75 indicates that the average responses of the high and low group to a statement differs significantly; provided \( n = 25 \).

4.6.6. Validity of the attitude scale

The final form of the attitude scale was submitted to experts in the field of Hindi education. Discussions were also held with them and modifications were made in the light of their comments. Every possible efforts were taken to make the language of the attitude scale simple.

4.6.7. Reliability of the attitude scale

Split-half method was used for determining the reliability of the attitude scale. The scores obtained by each individual in the sample were divided into two groups by grouping odd number items and even number items. Correlation was found for the half-tests. From the reliability of the half-tests, the reliability coefficient of the whole test was estimated by the Spearman-Brown prophecy formula

\[ R = \frac{2r}{1 + r} \]

where ‘r’ is the reliability coefficient of the half test. (0.821)
The value of R obtained is 0.902, which shows that the test has high reliability.

4.7. Experimental study

In the experimental part of the study the achievement scores of students taught through three different Models of teaching i.e Role play, Synectics and Inquiry Training model which are considered to be suggestive facilitations to the modernization of Hindi teaching, are compared with the scores of students taught through the Activity method.

Models of teaching are a pattern or plan which can be used to shape a curriculum or course to select instructional material and to guide a teacher’s action. They are primarily oriented towards a classroom teacher who is interested in increasing his instructional effectiveness in an interactive method of teaching. A teaching model can be considered as a type of blue print for teaching. It provides structure and direction for the teacher. Models are perspective teaching-strategies designed to accomplish particular instructional goals.

The experimental study was designed to compare the effectiveness of Role play Model, Synectics Model and Inquiry Training Model with the Present Activity oriented method of teaching. Pre-test post-test design was adopted for the study. Four groups of students were selected both from government as well as aided schools. Out of the four groups in each type of school one group was taught through the present Activity oriented method and the other three groups through Role play model, Synectics model and Inquiry Training Model of teaching. At the end of the experimental treatment post-test was conducted and the achievement of the students were compared with the pre-test using appropriate statistical techniques. The Models selected for the experimental study are from the two important families of Models of teaching: Role play from Social Interaction family and Inquiry Training Model and Synectics Model from Information Processing family.
4.7.1. Design of the study

A research design of an experimental study is considered as the blueprint of the procedure that enables the researcher to test the hypotheses by reaching valid conclusions about relationships between independent and dependent variables. For the purpose of the present study, the pre-test post-test Non Equivalent Groups Design (Specified by Best and Kahn, 2007) were adopted.

Pre-test post-test Non-Equivalent Groups

<table>
<thead>
<tr>
<th>Pre test</th>
<th>Treatment</th>
<th>Post test</th>
</tr>
</thead>
<tbody>
<tr>
<td>CXO</td>
<td>TO Activity oriented method</td>
<td>CYO</td>
</tr>
<tr>
<td>CX1</td>
<td>T1 Role play Model</td>
<td>EY1</td>
</tr>
<tr>
<td>CX2</td>
<td>T2 Synectics Model</td>
<td>EY2</td>
</tr>
<tr>
<td>CX3</td>
<td>T3 Inquiry Training Model</td>
<td>EY3</td>
</tr>
</tbody>
</table>

Here CXO represents pre test scores of Control group
TO the treatment given to the Control group
CYO the post test scores of the Control group
4.7.2 Schools selected for conducting the Experimental study

Table No. 4.4

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Name of Schools</th>
<th>Type of Management</th>
<th>Control</th>
<th>RolePlay</th>
<th>Synectics</th>
<th>Inquiry Training</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N.S.S High School, Perunnai, Changanacherry</td>
<td>Aided</td>
<td>36</td>
<td>36</td>
<td>36</td>
<td>36</td>
<td>144</td>
</tr>
<tr>
<td>2</td>
<td>Government Higher Secondary school, Anchal, West.</td>
<td>Government</td>
<td>36</td>
<td>36</td>
<td>36</td>
<td>36</td>
<td>144</td>
</tr>
</tbody>
</table>

4.7.3. Variables selected for the experimental study

According to Best (1992) variables are the conditions or characteristics that the researcher manipulates, controls or observes.

4.7.4 Independent variable

Independent variables are the variables that the experimenter manipulates or changes. In the present study, the independent variables are Role play model, Inquiry Training model, Synectics model and the Activity oriented model.

4.7.5. Dependent variable

A dependent variable is defined as what the experimenter actually measures (Nation, 1997). The dependent variable is measured before and after the manipulation of the independent variable. The dependent variable of the present study is the achievement of 8th class students in Hindi poetry.
4.7.5. Extraneous variables

The extraneous variables are those that operate in the experimental situation in addition to the independent variables such that it is difficult to determine the effects of each. In the present study type of management of school where the sample study is considered as the extraneous variable which affect the experimental study.

4.7.6. Selection of the class for conducting the experimental study

After conducting discussions with experts in the field of education, standard 8 was selected as the class to conduct the experimental study. The reason for selecting this particular class is that the students of standard 8 belong to the 12+ age group, who are under formal operation stage. According to the principle of Piaget the pupil at this stage have the capacity to solve different types of problems, think systematically, solve complex verbal and hypothetical problems and their cognitive structure are mature. (Wordsworth 1989).

4.7.7. Selection of schools for conducting the experimental study

Four groups of students were selected both from government schools and aided schools, out of which one group was selected as control group and the rest experimental groups. The government school selected to conduct the experimental study was Government Higher Secondary school, Anchal west, Kollam District and the Aided school selected was N.S.S High school, Perunna, Changanacherry, Kottayam District.

4.7.8. Selection of Sample

Around 40 students were present in all the eight groups. It was not possible to equate students owing to administrative reasons. Even though around 40 students were there in all the groups at the beginning of the experimental study, 3to 4 students were unable to attend the post-test. So such students were exempted from the experimental study and the scores of only 36
students were taken for analysis. This number was maintained in all the eight groups. There were a total number of 288 students in the experimental study.

4.7.9. Selection of Unit for conducting the experimental study

After deciding the class in which the experimental study is conducted, the Hindi reader of standard VIII is thoroughly analyzed. Discussions were also held with subject experts and senior teachers, a poem ‘Patni’ written by the famous Hindi poet Kamal Kumar was selected. Since the intention of the study was to test the effectiveness of different models in teaching Hindi, a poetry lesson was found to be the most appropriate since it is helpful in developing creative thinking skills in students.

4.8. Preparation of Lesson designs

Lesson manuals based on Role play Model, Inquiry Training Model and Synectics Model were prepared after thoroughly referring different books on models of teaching and innovative teaching strategies. Discussions were also held with senior and experienced teachers in this regard.

4.8.1. Role play

Role playing, a derivative of a socio-drama, is a method for exploring the issues involved in complex social situations. It may be used for the training of professionals or in a classroom for the understanding of literature, history, and even science subjects.

4.8.1.1. Syntax

In the first phase of this Model the teacher introduces the problem and explains the details of Role playing. In phase two the teacher describes the details of various characters and select participants to act in the role play. In phase three, the role players plan the scene related to the role play but do not prepare any specific dialogue. The teacher helps to set the stage by asking the students a few simple questions about where the enactment is taking place, what it is like, and so on. In the fourth phase observers become actively involved so that the entire group experiences the enactment and later analyses the play. At phase five, enacting, the players assume the roles and ‘live’ in the situation spontaneously, responding realistically to
one another. At phase six, discussing and evaluating, the discussion will probably begin spontaneously. Initially the discussion may focus on different interpretations of the portrayal and on the disagreements over how the roles should have been carried out. In phase seven, re-enacting, the re-enactment may take place many times. The students and teachers share new interpretations of roles and decide whether new individuals should play them. If found necessary; the whole role play procedure is repeated involving new participants.

4.8.1.2. Social System

The social system of Role play model is moderately structured. Eventhough teachers are responsible, at least in the initial stage, for starting the phase and guiding students through activities within each phase; the particular content of the discussions and enactments is determined largely by the students. During the activities related with role playing, teachers are mainly reflective and supportive and they assume directions. They often select the problem to be explored, lead the discussion, choose the actors, make decisions about when the enactments are to be carried out and help to design the enactments.

4.8.1.3. Principles of Reaction

There are five major principles of reaction that are important to this model. First, teachers should accept student responses and suggestions, especially their opinions and feelings. Second, teachers should respond in such a way that they help students explore various dimensions of the problem situation, recognizing and contrasting alternative points of view. Third, by reflecting, paraphrasing, and summarizing responses of students, teacher increases students’ awareness of their own views, feelings and emotions. Fourth, the teacher should emphasize that there are different ways to play the same role and that different consequences result when they are explored in varied ways. Fifth, there are alternate ways to resolve a problem; no single way is correct. The teacher helps the students look at the consequences to evolve a solution and compare it with alternatives.
Steps involved in Role Play Model

The benefits of role playing depend on the quality of the enactment and especially on the analysis that follows. They depend also on the students’ perceptions of the role as similar to real-life situations. Shaftel’s (1967) suggest that the role playing activity consist of nine steps (1) Warm up the group, (2) Select participants, (3) Set the stage, (4) Prepare observers, (5) Enact, (6) Discuss and evaluate, (7) Re-enact, (8) Discuss and evaluate and (9) Share experiences and generalize. Each of these steps or phases has a specific purpose that contributes to the richness and focus of the learning activity. Together, they ensure that a line of thinking is pursued throughout the complex of activities, that students are prepared in their roles that goals for the role play are identified, and that the discussion afterwards is not simply a collection of diffuse reactions, though these are important too.

Phase- one

4.8.2.1. Warm up the Group

This involves introducing students to a problem so that they recognize it as an area that necessitates attention from their side. The warm-up can began by identifying a problem within the group. The second part of the warm up is to express the problem vividly through examples. These may come from student descriptions of imaginary or real situations that express the problem, or from situations selected by the teacher and illustrated by a film, television programme, or a problem story. The last part of the warm up is to ask questions that make the children think about and predict the outcome of the topic selected for role playing.

Phase- two

4.8.2.2. Select Participants

The students and the teacher describe the various characters—what they are like, how they feel, and what they might do. The students are then asked to volunteer to role play; they may even ask to play a particular role. Teacher makes commend and provides necessary suggestions in connection with student’s performances at the initial stage.
Phase- three

4.8.2.3. Set the Stage

The role players plan the scene but do not prepare any specific dialogue. They simply sketch the setting and perhaps one person's line of action. The teacher helps to set the stage by asking the students a few simple questions about where the enactment is taking place, what it is like, how they are going to present the theme in an effective manner and so on.

Phase-four

4.8.2.4. Preparing the Observers

The observers have a significant role in role play activities. It is important that the observers become actively involved so that the entire group experiences the enactment and can later analyse the play. The teacher has to involve observers in the role play by assigning them tasks, such as evaluating various aspects of the role playing, commenting on the effectiveness and the sequences of the role players' behaviour, and defining the feelings and ways of thinking of the persons being portrayed. The observers should determine what the role players are trying to accomplish, what actions the role players took that were helpful or not, and what alternative experiences might have been enacted.

Phase-five

4.8.2.5. Enact

The players assume the roles and "live" the situation spontaneously, responding realistically. The role playing is not expected to be a smooth dramatization, nor is it expected that each role player will always know how to respond in a particular situation. This uncertainty is part of the role. A person may have a general idea of what to say or do but not be able to enact it when the time comes. The action now depends on the imagination power of students and emerges according to the demands of the situation. Personal experiences help the students a lot in effective participation in the role play.
Phase- six

4.8.2.6. Discuss and Evaluate

If the problem selected for the role play is an important one and the participants and the observers are intellectually and emotionally involved, then the discussion will probably begin spontaneously. At the initial stage, the discussion may focus on different interpretations of the portrayal and on disagreements over how the roles should have been carried out. More important are the consequences of the actions of the participants and their motivation.

Phase- seven

4.8.2.7. Re-Enact

The re-enactment may take place many times. The students and the teacher can share new interpretations of roles and decide whether new individuals should play them. The activity alternates between discussion and acting. As much as possible, the new enactments should explore new possibilities for causes and effects. In the discussion that follows the second enactment, phase eight, discuss and evaluate, students are willing to accept the solution, but the teacher urges for a realistic solution by asking whether they think this ending could really happen. Teacher gives another opportunity to present the role play in a different angle.

Phase-eight

4.8.2.8. Discuss and Evaluate

As stated in Phase-six, teacher motivates students to further re-think about the situation and critically analyse the performance of the participants. Teacher provides opportunity to reflect upon possible changes they have to make in the structural frame work of the role play inorder to find feasible solutions to the problems highlighted in the subject under consideration.
Phase-nine

4.8.2.9. Debriefing stage

The debriefing stage is an important element of the role play. It is important that students come out of their roles fully for the debrief session so that they might reflect on their role and others objectively. Teacher has to provide opportunity to discuss what happened in the role play. Emphasis should be given on drawing out underlying patterns and dynamics and how this affected climax of the activity. Students should be motivated to reflect on what was learned from the role play, focussing not only on the situation that was simulated but also the skills adopted by students during the role play to put their position across.

4.9. Inquiry Training Model

The Inquiry Training Model was developed by Suchman R. Inquiry is an attempt to find some answers or solution to a problem. This model aims at in developing student’s inquiry skills of inferring, predicting, recording data, controlling variables, experimenting etc. The underlying assumption of this model is that individuals, when puzzled, need to explore the data surrounding the puzzling situation and put these data together in new ways. Inquiry Training is effective in promoting cognitive development, increasing content achievement, enhancing inquiry skills achievement and producing gains in mental ability scores. This model also encourages group activities in the class room.

4.9.1.2 Syntax

In phase one of inquiry training model, an area of investigation is presented to the students. The methodology of investigation is also explained to them. In phase two, the problem is structured so that the student identifies a difficulty in the investigation. In phase three, students are asked to speculate about the problem, so that the learner can identify the difficulty involved in the inquiry. In phase four, the student is asked to speculate on ways of clearing up the difficulty, by redesigning the experiment, organizing data in different ways, generating data, and so on.
4.9.1.3. Social system

A co-operative and rigorous climate is very much needed for implementing this model. The students need to hypothesize rigorously, challenge evidence and so forth. In addition to accepting the need for rigor, students must also recognize the tentative and emergent nature of their own knowledge as well as that of the discipline.

4.9.3.1. Principles of Reaction

The teacher’s duty in this model is to nurture the inquiry by emphasizing the process of inquiry and inducing the students to reflect on it. Care should be taken that the identification of facts does not become the central issue and should encourage a good level of rigor in the inquiry. The teacher should aim to turn the students toward the generation of hypotheses, the interpretation of data, and the development of constructs, which are seen as emergent ways of interpreting reality.

4.9.3.2. Support system

The support system that can be used in this model comprises a set of confronting materials, a teacher who understands the intellectual process and strategies of inquiry.

4.9.4. Steps in Inquiry Training Model

The steps in the Inquiry Training Model are grouped into five phases. They are confrontation with the problem, data gathering and verification, data gathering and investigating the problem, organizing, formulating and explanation and the inquiry process.

4.9.4.1. Phase One: Confrontation with the Problem

Teacher explains inquiry procedures and presents problems or discrepant events.

4.9.4.2. Phase Two: Data Gathering-Verification

Students gather information about the problem [event] they see or experience.
4.9.4.3. Phase three: Data Gathering- Investigating the Problem

Students develop predictions and design a plan to test predictions based on information gathered about the problem. Teacher facilitates the implementation of student’s plan.

4.9.4.4. Phase Four: Organizing, Formulating and Explanation

Teacher instructs students to organize and interpret their results.

4.9.4.5. Phase Five: Analysis of the Inquiry Process

Students analyze their pattern of problem solving by:

- Determining the questions that were most effective, identifying the lines of questioning that were productive and those that were not, identifying the type of information needed to solve problem but was unavailable.

4.10. Synectics Model of Teaching

Synectics is a structured group activity that students use as a way to think creatively. They solve problems through analogies and metaphors. The term Synectics is from Greek language which means the joining together of different and apparently irrelevant elements. Synectics model help the students develop creative responses to problem solving to retain new information, to assist in generating writing and to explore social and disciplinary problems.

4.10.1. Syntax

In phase one teacher asks students to describe the situation as they see it at the moment. In phase two (Direct analogy) students suggest direct analogies, select one and describe it further. In phase three students ‘become’ the analogy they selected in phase two. In the fourth phase (Compressed conflict) students take their descriptions from phases two and three, suggest several compressed conflicts, and chose one. In the fifth phase (Direct analogy) students generate and select another direct analogy, based on the compressed conflict. In the last phase (Re-examination of the original task) teacher asks students move back to original
task or problem and use the last analogy and / or the entire synectics experience.

4.10.2. Social system

Synectics model is moderately structured, with the teacher initiating the sequence and guiding the use of the operational mechanisms. The teacher also helps the students intellectualize their mental processes. Students have freedom in their open-ended discussions as they engage in metaphoric problem solving. Norms of co-operation, ‘play of fancy’ and intellectual and emotional equality are essential to establishing the setting for creative problem solving.

4.10.3. Principles of Reaction

Teachers note the extent to which students seem to be tried to regularized patterns of thinking, and they try to induce psychological states likely to generate a creative response. In addition, the teachers themselves must use the non-rational to encourage reluctant students to indulge in irrelevance, fantasy, symbolism, and other devices necessary to break out of set channels of thinking. Because teachers as models are probably essential to the method, they have to learn to accept the bizarre and the unusual. Teachers must accept all student responses to ensure that students feel no external judgement about their creative expression.

4.10.4. Support System

Assistance by the facilitator or teacher is of at most importance as far as Synectics model is concerned. The class requires a work space of its own and an environment in which creativity will be prized and utilized. A typical class room can probably provide these necessities, but a class sized group may be too large for many synectics activities, and smaller groups would need to be created.
**Steps of the Model to be followed in the Classroom**

**4.10.1 Step I: Describing the topic**

The teacher asks the students to describe a given topic. This can be done orally or the students can write down the topic. Descriptive words are then listed on the board.

**4.10.2 Step II: Create direct analogies**

Students examine the descriptive words and form analogies between the words and an unrelated category such as plants, animals or machines. After all students have given an analogy, the best one is voted on by the class.

**4.10.3 Step III: Describing personal analogies**

The teacher asks students to think about how he/she would feel to be the object chosen in Step II. Students must also tell why they have that particular feeling. Student’s responses are recorded.

**4.10.4 Step IV: Identify compressed conflicts**

The students are asked to review their responses to find pairs of words which seem to ‘fight’ or are in opposition to one another.

The class votes for the pair of words that represent the best compressed-conflict.

**4.10.5 Step V: Create new direct analogy**

The teacher asks for another category for a direct analogy and the class must think of example of that category which is best described by the compressed category chosen in Step IV.

**4.10.6 Step VI: Re-examine the original topic**

The class talks about the original topic by comparing the last direct analogy to the original topic and new images are created.
4.10.6 Step VII: Evaluate

Students evaluate the writing done before and after the model to see if more creative insight has been added. They must also analyse the thought process involved.

Achievement test construction

4.11. Conduct of the experimental study

After preparing lesson designs on Role play Model, Synectics Model and Inquiry Training Model, permission was obtained from the head masters of both government and aided schools where the experimental study was conducted. The Hindi teachers working in both the schools were very co-operative in conducting both pre-test and post-tests. The test items were prepared based on the poem lesson ‘Pathni’ written by famous Hindi poet Kamal Kumar (From VIIIth standard Hindi Reader). This lesson was taught through Role play model, Synectics model and Inquiry Training model.

Standardization of the Test

To test the effectiveness of the selected models i.e. Role play, Synectics and Inquiry Training with that of the prevailing Activity oriented approach, the achievement of students in Hindi language was measured with the help of an achievement test. As no specific performance test was available on the selected topic, the investigator prepared and standardized an achievement test and administered it for the VIIIth standard students.

In order to standardize the test, a draft form comprising sixteen items were initially prepared. Pilot test was conducted on a sample of 75 high school students. The ‘facility value and’ ‘Discrimination index’ of the questions were calculated using the formula specified by the Examination Reform Committee, Calicut University (1974).

\[
\text{Facility value of a question} = \frac{\text{total marks obtained by all students on the particular question}}{\text{no. of students} \times \text{maximum marks allotted for the question}} \times 100
\]

\[
\text{Discrimination index} = (\text{Facility value of top ranking 27% students} – \text{Facility value of low ranking 27% students}).
\]
The items having facility value between 0.35 and 0.65 and discrimination index ranging between 0.2 and 0.6 were selected for the final form of the test. Fourteen questions were thus selected for the test.

**Reliability of the test**

Reliability is the consistency with which a measure assesses whatever it is measuring. The investigator prepared a parallel form of the achievement test and the two tests were administered in two consecutive days. The scores of the tests were collected and correlated using Pearson’s product moment correlation coefficient. The coefficient obtained is 0.68 indicating the reliability of the test.

**Validity of the Test**

Validity concerns the extent to which an assessment actually assesses what it is supposed to be assessing. Most commonly, validity is determined by the opinions of those knowledgeable persons in the subject area concerned. Content validity and empirical validity are of prime importance as far as the conduct of achievement test is concerned.

**Content validity**

Content validity is determined by the judgement of experts. It checks whether the test includes all the important aspects of the target and that the investigator wish to measure and whether the various aspects are for the purpose of the present study, the investigator discussed about the different items included in the test with experts in the field of Hindi education and made appropriate modifications in the test items and ensured content validity.

**Empirical validity**

Empirical validity is determined by establishing relationship between scores of the test prepared by the investigator and scores on some established test or criterion. The investigator has selected the average scores of students in two Hindi test papers as criterion scores for establishing validity. The correlation coefficient between these two was established and was found to be 0.84, which indicates that the test has reasonable validity.

There were a total number of fourteen items in the achievement test. Four multiple choice questions were included in part 1(1/2 marks allotted for each question).
In the second part there were six very short answer type questions having one mark each. Students were directed to answer these questions in a sentence. In part 3 there were four essay type questions. The first and second questions (question numbers 11 and 12) carry three marks each, third question in the C section carries 2 marks and the last question in this section carries 4 marks (question number 14) and students were asked to write answers of all these four questions in one page. Sample question paper for the achievement test is given in Appendix. All the answer scripts were strictly evaluated by the researcher using the scoring key.

4.11.1. Statistical techniques used

The statistical techniques employed in the present study are:

1. Analysis of variance and analysis of covariance, followed by ‘t’ test were used to study whether there is any significant difference among the treatment groups, with regard to achievement in Hindi for the whole sample.

2. Analysis of variance and analysis of covariance followed by ‘t’ test which is used to study any significant difference among the treatment group with regard to achievement in Hindi for various subsamples.

4.11.2. Design of the Question paper

a. weightage to the content

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<th>Content</th>
<th>Mark</th>
<th>Percentage</th>
</tr>
</thead>
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<td>Patni (Poem)</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
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<td>100</td>
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b. Weightage to the objectives

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<td>12.5</td>
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<td>17.5</td>
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<td>Application</td>
<td>3</td>
<td>15</td>
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<tr>
<td>4</td>
<td>Analysis</td>
<td>5</td>
<td>25</td>
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<tr>
<td>5</td>
<td>Evaluation</td>
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<td>10</td>
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<tr>
<td>6</td>
<td>Creativity</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Total</td>
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<td>100</td>
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c. Weightage to form of questions

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<td>2</td>
<td>Very short answer</td>
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<td>30</td>
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<tr>
<td>3</td>
<td>Short answer</td>
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<td>Essay</td>
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d. Weightage to the difficulty level

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II. Blue- Print of the Question Paper

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<th>Evaluation</th>
<th>Creativity</th>
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</table>

‘O’ - Stands for Objective Type Questions
‘VS’ - Stands for Very Short Answer Type Questions
‘SA’ – Stands for Short Answer Type Questions
‘E’  - Stands for Essay Type Questions

Number outside the bracket shows marks.

Number inside the bracket shows the number of questions.
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<th>Difficulty level</th>
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