Chapter – IV

DESIGN OF THE STUDY
4.1 Introduction
In order to fulfill the objectives in chapter three specific methods and procedures are followed. The details are given under the caption of design, sample, tools used, experimental and control group, data collection and statistical techniques used etc. This chapter consists of three section, Section-I deals with experimental design, Section-II deals with construction and standardization of English language creative test, Section-III deals with conducting experiment.

4.2 Research Design
The present study is an experimental design of parallel pre-test and post-test experimental design which is used for the development of creativity in English which is involved control groups (teaching through conventional method), Experimental Group-I (teaching through Synectics Model of Strategy-I) and Experimental Group-II (teaching through Synectics Model of Strategy-II). Effect of different treatments is determined by pre-test and post-test on creativity. The procedure and design for conducting experiment is shown in the following flow chart.

4.3 Treatments Employed for the Present Study
Group-I Experimental Group-I: Synectics Strategy-I (SMS High School, Kodagu)
Group-II Experimental Group-II: Synectics Strategy-II (Kodagu Vidyalaya, Kodagu)
Group-III Control Group-I: Conventional Method (SMS High School, Kodagu)
Group-IV Control Group-II: Conventional Method (Kodagu Vidyalaya, Kodagu)
4.3.1 Treatment by Synectics Strategy-I
(Making the Familiar Strange):
 Implemented on the IX standard students of SMS high school Kodagu. Synectics model of teaching strategy-I (to making the familiar strange) synectics model of teaching strategy-II (Making the Strange Familiar) and control groups were taught through conventional method. All these treatments managed, controlled and conducted the experiments by the investigator herself. The treatment given to the experimental groups and the conventional groups have been mentioned below in the following treatment strategy-I (to making the familiar strange) was given to the students of SMS High School Kodagu. Students were taught in English. In other words they were helped to come out with imagination and new ideas. Three types of analogies were used in this process i.e., direct analogies, personal analogies and compressed conflict. To begin with, the students provoked by asking evocative questions in the classrooms so as to extend the initial metaphorical description. However, the treatments followed six phases, which are given in the following paragraphs.

4.3.2 Treatment Strategy-II (Making the Strange Familiar)
Kodagu Vidyalaya, Kodagu IX standard students were taken to taught through synectics model of teaching strategy-II. The students were helped in increasing their understanding and internalization of substantially new difficult materials. During this treatment also three types of analogies were used and the students were provoked by the evocative questions. This treatment was different from the treatment-I i.e., (Strategy-I) with respect to the use of metaphors. The students tried to connect two ideas and identify similarities and differences between both the ideas. These treatments follow seven phases. Each of these phases has been explained in the following paragraphs. 55 students were taken for Control group I and Experiment group I respectively.
4.3.3 Treatment-III (Conventional Method)

The students of IX standard of SMS High School, Kodagu were identified as control group-I and the students of IX standard of Kodagu Vidyalaya Kodagu were identified as control group-II for the strategy-I and strategy-II respectively. In the conventional method the investigator herself conducted and explained the subject matter. All the pros and cons of the particular topic were explained. At the same time the investigator explained and wrote the important points on the blackboard.

This method is called teacher centered one. Most of the time, teacher explains and writes on the blackboard. Little participation by the students. Most of the time they listen and wrote on their work sheet. 55 students were taken for Control group II and Experiment group II respectively.

4.4 Sample for the Study

The sample in the present experimental study was selected with three main criteria in view. Firstly the groups of the student should match their school environment, general home environment, physical conditions etc. Secondly the students who formed the particular group in the experiment should belong to different levels of independent variables. Thirdly extraneous variable which were concomitant to the dependent variables are co-related.

Keeping these conditions in view only two high schools were selected from Kodagu. IX standard A and C division students were taken from SMS high school, Kodagu to teach synectics strategy-I and control group-I. IX standard A and C division students were taken from Kodagu Vidayalaya, Kodagu to teach synectics strategy-II and control group-II. 55 students were taken as a sample for each group. In total 220 students were taken for the study. The students were selected by using random sampling techniques.
4.5 Tools Used for Data Collection

The study, being an experimental one, two types of tools are used, one being the treatment tools and the other were measuring tools. The measuring tools were employed to measure changes in students abilities viz., language creativity essay/paragraph writing and general creativity in the classroom and achievement motivation.

4.5.1 Treatment Tools

Treatment tools were used to impart instructions to the students. The instructions were given in synectics strategy-I model and synectics strategy-II model. Tools consisted of lesson plans, lesson plan formats and worksheets which were prepared according to assumptions, objectives and syntax of the instructional procedure.

a) Lesson Plan Format on Strategy-I

It is a design of the lesson plan that adheres to the teaching model as per its assumptions, objectives, syntax etc. The lesson plan format prepared by Bruce Joyce and Marsha Weil (1978) was adopted and revised according to the requirements of Inidan situations. For each of the treatment procedures, two lesson plan formats were prepared. Thus in all, 20 lesson plan formats were prepared. (Refer Appendix – III)

Lesson plan format for synectics-I has been divided into four parts. The first part consisted of educational objectives and specific behavioural objectives. In the next part stretching exercises is given, identifying teacher's role and students role. The third part, expository format, is devoted to give three types of analogies. In the last part are written items to evaluate the amount of new dimensions presented by the students.

Lesson plan format for synectics-II also has been divided into four parts which are similar to synectics-I. However, lesson planning is done according to the phases of synectics-II. In the lesson plan format of conventional method of teaching, the
investigator generally followed Herbertian steps. (Refer Appendix-II for lesson format of conventional method)

b) **Lesson Plans (Strategy-II Lesson Plan)**

It is a planned guide to impart instructions according to pre laid procedure. A set of 10 lesson plans for synectics-II treatment were prepared by using syntax of the synectics model. There were different subject matter or topics to the synectics-I treatment and synectics-II treatment. The topics were general in nature. The detail of the synectics strategy-I and strategy-II lesson plans are given in the Appendix – V and VI respectively.

c) **Work Sheets**

Worksheet is a data recording sheet used by the pupils during the instructional process. The purpose of the worksheet is to record information’s that originated as classroom interactions along with the name of pupil, the teacher, the data of the session, subject and topics, etc. The procedure for imparting instructions in two treatments (Synectics-I, Synectics-II) were different. For each of the treatment procedure, two formats of worksheets were prepared. Ten worksheets in synectics-I format and ten worksheet in synectics-II format. Thus in all twenty worksheet were prepared for synectics-I and synectics-II. Format of these worksheet have been given in Appendix-VIIA and VIIB.

4.5.2 **Measuring Tools**

The measuring tools like the Raven’s Progressive Matrices, the English creative test prepared by the investigator and achievement motivation scale by Dr. G. Gopal Rao and essay/paragraph analysis scale by Sucheta were used. (Refer Appendix – IX)
a) **The Raven's Progressive Matrices**

This test measures the intelligence of the students of different grade levels viz., VII and IX standards. This test was selected in comparison due to the following reasons.

- It is a standardized non-verbal test that can be administered with ease on subjects of any language.
- The problems are so interesting and absorbing that those provide necessary motivation to the students.
- It does not require separate instructions and time for sub-tests or sub-groups.
- The test does not require any elaborate arrangements to be made and can be administered under normal classroom conditions.
- The instructions are simple and easy.
- Largely, it is a powerful test aimed at testing ability rather than efficiency.

The Raven's progressive matrices consist of 60 problems divided into five (A, B, C, D and E) sets of 12 problems each. In each set, the first problem is self-evident as nearly as possible. Every problem in the test is readily the source of taught for the next. The problem which follows becomes progressively more difficult, hence the name 'Progressive Matrices'. This test has been given to equate the group. (Refer Appendix – I)

c) **The Essay/Paragraph Analysis Scale**

This is meant to evaluate the essays or paragraph. In order to assess the essays/paragraphs written by the students, the essay/paragraph analysis scale was developed and standardized by Malhotra and Sucheta. The scales consist of 20 items divided into four components viz., unity, coherence, originality, and avoidance of fallacies. It is a five point scale. After going through the essay or paragraph written by the students, the teacher evaluated the essay on each of the item on five points ranging from mostly generally,
occasionally, rarely and least. The intra-observer reliability of the scale ranges between 0.86 to 0.97 for paragraphs and 0.79 to 0.98 for essay in English. In Hindi it came out to be 0.85 to 0.96 and 0.82 to 0.97 for essay and paragraph respectively. A copy of essay analysis scale is given Appendix-VIII.

c) Achievement Motivation Scale

To test the achievement motivation the scale developed by Dr. G. Gopal Rao was used.

d) English Language Creativity Test

This test was constructed and standardized by the investigator. It consists of four variables i.e., plot building (story construction), poetic diction, descriptive style and vocabulary test.

It consists of 15 items which were found reliable and valid. It has high significant values of reliability and validity quotients. It also has content validity and intrinsic validity. (Refer Appendix – XII)

Reliability

\[ F = \frac{\sigma_1}{\sigma_2} \]

Intrinsic Validity = \[ \sqrt{r_{xy} Reliability} \]

4.6 Construction and Standardization of English Language Creativity Test

Creativity in writing can be called as language creativity. In simple words it may be defined as multi-dimensional attribute that is differently distributed among the people and includes mainly the factors of fluency, flexibility, originality and elaboration.

Language creativity test differ in two ways (i) First, this test is not like Science or Maths test. (ii) Secondly, language creativity test is divergent in nature.
4.7 Related Tools and Need for Developing this Test

Several tests of creativity were available for use. There were some tests constructed and standardized on Indian student population of different age groups like that of Mehdi (1973), Chauhan and Tewari (1974), B.K. Passi test of creativity verbal and non-verbal (1972). Kaul (1973), Ramchandra Achar – ‘Creative Response Matrices’ (1975), Kundley (1977).

There are other tests of creativity like creativity factor tests constructed by Guilford and his associates (1964a, 1967a), Heifner and Guilford (1965), Remote Association test of Mednick (1964) and Torrance test of creativity thinking (1966).

4.7.1 Verbal Test of Scientific Creativity

Gordon (1961) in one of his assumptions regarding creativity, explains that creativity in the Arts and Science is the same. ‘Verbal test of Scientific Creativity’ by Sharma and Shukla (1985) found that some of the exercises bring relation to ‘Synectics’ which deals with bringing in relationship between two concepts.

Language Creativity Test, (Hindi/English), by Malhotra and Sucheta (1989) was developed with a sole purpose of measuring language creativity of school and college going students. These two tests have five sub-test namely; (i) Plot building, (ii) Dialogue writing, (iii) Poetic diction, (iv) Descriptive style and (v) Vocabulary test.

Thus by referring to the related literature and studies involved, construction of test in creativity and measuring creativity observed as follows:

- Although good number of creative tests available, (verbal and non-verbal), very few on language creative tests are important.
- A few tests developed by Indian researchers, not suit the South Indian students.
- Based on Guilford’s factor analysis of thinking and the form of measurement of Guilford’s concept of operations are used.
On the basis of these observations the researcher decided to develop a test in English language creativity test for the following reasons.

- Students divergent nature of thinking and spirit must be developed.
- Creative writing in any forms namely, story writing, poetic diction, descriptive style and multiple use of words must be encouraged.
- Freedom of response is considered, instead of restricted to the lesson in the text book.

4.7.2 Rough Drafts of the Test

The researcher decided to use all the stream of writing viz., story, poetry, description and vocabulary test, but it is not possible to take at a time. Therefore, researcher has selected Guilford's (1952) multiple story plots, only four types of items are selected; i.e., story construction, poetic diction, descriptive style and vocabulary test.

Secondly, in poetic diction based on Guilford's (1952) expressional fluency and word pair, only two items are selected one writing a poem on a given topic, secondly, writing a poem from given words.

Thirdly, descriptive style, on the pattern of Guilford's (1952) controlled association, only four items are selected; one based on imagination, based on discretion, based on emotional experience and based on observation.

Fourth, vocabulary test based on Guilford's (1952) expressional fluency, multiple grouping, word pair and word fluency test. Four items are selected: i.e., writing equivalent words, writing the similes, writing opposites and test on concrete comparison.

4.7.3 Scoring Procedure:

Unlike objective tests the nature of four sub tests of language creativity test is totally different. These tests do not warrant any
single correct answer and it is expected that answer differ in nature, size and quality. So it is possible to employ ordinary stencil scoring system. Consequently a new procedure of scoring has to be devised. Further, each test has its own peculiarity. Hence a single scoring procedure evolved would not serve for all the tests. For this purpose experienced teacher and post-graduate students of the department of education were consulted and requested to act as judges. The investigator himself analyzed the relevance and categorization of responses. In case of conflicts, discussion with the judges was held in order to take final decision.

The details of scoring procedure is given as follows:

All the sub tests are based on four factors – fluency, flexibility, originality and elaboration, so the scoring has to be made on the basis of the factors involved in the tests.

a) **Fluency** – The scoring for the factor of fluency was followed as per researchers like Passi (1979) and Mehdi (1973). The scores on this factor are obtained by counting the total number of acceptable responses. Each of the relevant word, each of the meaningful idea expressed by the respondent is given 'one score'. The total scores represent the attainment of the subject on the factor of fluency.

b) **Flexibility** – In case of the factor of flexibility the scoring procedure suggested by other researchers has to be counted the 'Shift in response' whatever there is an assigning of a score to each of the shifted responses the same procedure is followed in the present creativity test.

c) **Originality** – The responses in case of originality are assessed on a continuum, of 'commonness to uniqueness' for which a five point scale is developed assigning – weightage from zero to four. The higher frequency of occurrence of the particular type of response in a group, considered lower in uniqueness this meriting lower score on originality and vice-versa. The novel and unusual responses characterized by ‘rarity’ are higher on
five point scale. Similarly most common idea would get zero and most unique idea in assigned score of 'Four'.

d) **Elaboration** – Elaboration means 'building upon given information to round out a structure, to make it more detailed or to explore new directions. While writing a story, a poem, a description the respondent perceives the design in such a way that it results in wholesomeness with necessary details of information while doing so he makes efforts to bring in some novelty, with interesting 'beginning', 'ending' and 'flavour'. The nature of the requisite details under elaboration differ from each other depending upon the nature of each constituent. Hence, separate criteria of valuation are followed for each of the sub-test while scoring the factor 'Elaboration'.

### 4.7.4 Screening of Items

While preparing content free English language creativity test, sub-test items in story plots, sub test items in poetic diction, sub tests items in descriptive style and sub test items in vocabulary test was placed before experts consisting of three English methods masters and two experienced teachers and the research guide for judging the appropriateness of items. English method masters and experienced English teachers carefully examined the items. Suggestions were given to modify the words, change of proverbs and provide different topic for description. The best items were modified and carefully taken on the following types –

- Whether the items and sub test items are interesting subjects to write in English language.
- Whether the items and sub tests or stories, description and multiple use of words are divergent nature of thinking and appreciation.
- Whether the items and sub test items are content free.
- Whether the English language was clear and simple.
The observers and experienced teachers went through the items and sub tests items in English language creativity test, made some useful suggestions to change the proverbs, change of words, change of style should be modified in different ways. Under the suggestions of experienced teachers, the investigator made some changes as per the experienced teachers' suggestions. It was also suggested to make the sub items tests, should be simple so that they are understood and below average students can also write.

### 4.7.5 Selection of Items

**Table-4.1: Selected Items for English Language Creativity Test**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Subjects</th>
<th>No.of. Items</th>
<th>S.No. of Items</th>
<th>Max. time required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Story Construction</td>
<td>2</td>
<td>1-2</td>
<td>20 min.</td>
</tr>
<tr>
<td>2</td>
<td>Poetic Diction</td>
<td>2</td>
<td>3-4</td>
<td>20 min.</td>
</tr>
<tr>
<td>3</td>
<td>Descriptive Style</td>
<td>4</td>
<td>5-8</td>
<td>40 min.</td>
</tr>
<tr>
<td>4</td>
<td>Vocabulary Test</td>
<td>4</td>
<td>9-12</td>
<td>10 min.</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>12</strong></td>
<td><strong>90 min.</strong></td>
<td></td>
</tr>
</tbody>
</table>

The above table is given spread of items. In total there are twelve items. These items are divided into sub tests. The total maximum time required for completion of the test is 90 minutes. The factors measured by the tests are fluency, flexibility, originality and elaboration.

All the items in the English language creativity test, is verbal in nature and can be administered in a group or individually. The sub tests in the English language creativity test can be administered collectively.

### 4.7.6 Pilot Study

The English language creativity test was cyclostyled and administered to 100 students of IX standard of two high schools of Virajpet with a view to know –
i) What are the problems faced by the students at the time of writing?

ii) What instructions are given to the students?

iii) Actual time taken for writing the test.

iv) Which clues can be given to each test?

The investigator made a note of observation on the above lines. As recorded by the researcher the time taken by the students to complete the test from 80-100 minutes.

In the light of the above observation, with the suggestion of experts and the researcher, conducted English language creativity test was improved. The time was fixed for 90 minutes. It was administered to 100 students of IX class students studying in two schools of Madikeri after one month. The obtained data was used for the purpose of reliability and validity.

4.7.7 Item Analysis

Another important step in construction of this test was item analysis. It is concerned with item difficulty and item discrimination. Item difficulty is taken in terms of proportion of individuals completing the items successfully and its discrimination index refers to the degree to which it differentiates between those obtaining high and low scores. But in the test of creativity like the present one indicates of item difficulty could not be determined in a conventional manner because the items in the language are varied.

Creativity tests were of divergent nature and truly speaking, there was no pass or fail on any item. Of course, an idea of productivity of an item, that is, its capability of generating adequate responses was taken into consideration at the pre-try out stage. Items were modified and substituted a numbers of items till they were found to be sufficiently productive. Analysis of items, therefore, was restricted to the discrimination indices of item validity or item discrimination.
Two different types of analysis were done for each item of the language creativity.

- The first test involved calculations of mean and SD and their level of significance with a view to ensure that such items could adequately elicit responses and demonstrate individual differences.

- The second type of analysis concerned with the calculation of item discrimination in terms of ‘t’ ratio by taking upper (U) and lower (L) percent cases of the sample.

- Creative tests were retained, the final draft was further subjected to the process of reliability and validity. The summary of item analysis of fluency, flexibility, originality and reliability are given in the Appendices – X.

4.8 Reliability and Validity

4.8.1 Reliability of the Test

The reliability and validity of the English language creativity test to determine its utility and efficiency. The reliability of English language creativity test was established through test-retest techniques. The test-retest reliability for the test was established; retest a sample of two hundred students belonging to IX standard taken. The gap between the first administration and second administration was one month. The stability of the creativity test was determined through ‘F’ value of 200 students. Two samples of Mean and SD of the ‘F’ value of significance of difference between the Mean scores of first and second administration. The same ‘F’ value was employed to four sub-tests viz. story construction, poetic diction, descriptive style and vocabulary test. The reliability results are given in Table 4.2.
Table – 4.2: Sub Tests of English Language Creativity
Test Showing F-value

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the Sub Test</th>
<th>F-value</th>
<th>Signi.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Story Construction</td>
<td>0.92</td>
<td>S</td>
</tr>
<tr>
<td>2</td>
<td>Poetic Diction</td>
<td>0.64</td>
<td>S</td>
</tr>
<tr>
<td>3</td>
<td>Descriptive style</td>
<td>0.76</td>
<td>S</td>
</tr>
<tr>
<td>4</td>
<td>Vocabulary Test</td>
<td>0.97</td>
<td>S</td>
</tr>
</tbody>
</table>

The above table refers sub test-retest are plot building 0.85, poetic diction 0.64, descriptive style 0.74 and vocabulary test 0.97. the test and re-test reliability of story construction, poetic diction, descriptive style and vocabulary test are given in the Appendices – XIA, XIB, XIC and XI D respectively.

The results of F-ratio for difference between mean scores on first administration and second administration and F-ratio was not significant, thereby implying that the test was stable. The review of literature concerned with reliability helped to evaluate the reliability of the language creativity test. Wodlka (1964) reported reliability co-efficient ranged from 0.28 to 0.75 for verbal creativity test battery. Hoepfner (1967) reported test retest reliability co-efficient of the Torrance test of creative thinking that ranged from 0.71 to 0.93 over two weeks interval and from 0.35 to 0.73 over three years interval. Moss and Duenk (1967) estimated the reliability of the Minnesota Test of creative thinking which ranged from 0.68 to 0.83. Passi (1979) reported the reliability co-efficient of the test creativity ranging from 0.68 to 0.91 for test-retest reliability. Please refer Appendix-9 for the creativity test

4.8.2 Validity of the Test
(i) Content Validity

The opinions of the experienced teachers were taken for examining the appropriateness of test items. The unanimous opinion
that the test items were appropriate and they actually assess the English language creative writing.

(ii) **Intrinsic Validity**

The intrinsic validity of English language creative test (test and re-test) method was found to be from 0.8058 to 0.9862.

4.9 **Collection of Data**

The tools used (adopted/developed) for the collection of data were as follows:

- Achievement Motivation Scale prepared by Dr. G. Gopal Rao.
- Synectics Strategy-I based lesson format and lesson plan in English prepared by the Investigator.
- Synectics Strategy-II based lesson format and lesson plan in English prepared by the Investigator.
- Conventional Method based lesson format and lesson plan in English prepared by the Investigator and
- Creativity Test in English developed by the Investigator.
- Paragraph Analysis scale of Mrs. Sucheta.

4.10 **Conclusion**

This chapter clearly gives the design and structure of the study. The details of the tests, the procedure of standardization of the tests and about the item analysis of the test. Hence, this chapter clearly indicates in which direction research goes.