Chapter III

Methodology of the Study

3.1.0 Introduction

Present study followed some specific method(s)/procedure(s) in order to achieve its objectives. The method(s)/procedure(s) of the present study provide(s) the blueprint about the manners/styles/processes of conducting the study. The details of the same method(s)/procedure(s) have been given here under different captions as follows -

i. Profile of the study area
ii. Sample
iii. Design of the experiment
iv. Tools used
   a. Instructional tools
   b. Testing tools
v. Techniques of Data analysis
vi. Factorial Design for Data analysis

3.2.0 Profile of the Study Area

The present study was concerned with the elementary school level and more specifically it was conducted on class VI students of three CBSE affiliated schools of Malda district.

Map 3.1: Malda District

These schools where experiments were conducted were Delhi Public School (D.P.S.), NTPC, Farakka; Kendriya Vidyalaya (K.V.), NTPC, Farakka; and Kendriya...
Vidyalaya (K.V.), Malda. All the schools are co-educational in nature. Students from class I to XII study in case of all these three schools. These schools admit students from varied backgrounds. These schools are well equipped with better infrastructural facilities. A map of the study area (district) i.e. Malda district is given in map no. 3.1, where the experiment for the present experimental piece of study had been carried out.

3.3.0 Sample

In the present study, the researcher had followed the purposive sampling method in order to select the sample. For the study, the researcher had taken the above mentioned three schools purposively for conducting the experiment. The researcher took two sections i.e. Section-A and Section-B of class VI of K.V., Malda; one section i.e. Section-A of class VI of K.V, NTPC; and one section i.e. Section-B of D.P.S. for her experiment. Section-A of K.V., Malda and Section-B of D.P.S., Farakka formed the experimental group for the study; and Section-B of K.V., Malda and Section-A of K.V., Farakka were taken as control group in the study. Total 128 students were there in the entire sampling group at the beginning of the experiment. However, 122 students were present in all the stages of experiment. Sixty students from Sec-A of class VI of K.V., Malda and Sec-B of class VI of D.P.S., NTPC constituted the members of experimental group, while sixty two students from Sec-A of class VI of K.V., NTPC and Sec-B of class VI of K.V., Malda formed the control group for the present study. Thus, 122 students comprised the final sample group of the present study. The details of the sample of the present study are given in Table-3.1.

Table 3.1 Description of the Sample

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Purposively selected schools</th>
<th>Name of the learning stage</th>
<th>No. of the sections/classes taken for experiment</th>
<th>Name/Category of sections</th>
<th>No. of students</th>
<th>Sections forming the Treatment groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>School-1 (K.V., MALDA)</td>
<td>Class VI</td>
<td>2</td>
<td>Sec-A</td>
<td>29</td>
<td>Experimental Group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sec-B</td>
<td>27</td>
<td>Control Group</td>
</tr>
<tr>
<td>2.</td>
<td>School-2 (K.V., NTPC, FARAKKA)</td>
<td>Class VI</td>
<td>1</td>
<td>Sec-A</td>
<td>35</td>
<td>Control Group</td>
</tr>
<tr>
<td>3.</td>
<td>School-3 (D.P.S., NTPC, FARAKKA)</td>
<td>Class VI</td>
<td>1</td>
<td>Sec-B</td>
<td>31</td>
<td>Experimental Group</td>
</tr>
</tbody>
</table>
3.4.0 Design of the Study

The present piece of research was an experimental type of research. Researchers usually equate the subjects of control and experimental groups or follow the randomization method for selecting samples for control and experimental groups before giving the treatment. However, many a time such methods create problems in the normal functioning of the system. For example, if the students of a class would be selected for the control or experimental group through randomization method for treatment, then it would hamper/disturb the normal functioning/setting of the class. So, it is wise in many cases to provide treatment without disturbing the natural classroom setting. Unequated or non-randomized methods of selecting the sample would be fruitful for this kind of study. That’s why the researchers generally select the sample for control group and experimental group purposively for conducting experiments in education/social sciences/behavioral sciences. In such kind of experiments, analysis of co-variance method (ANCOVA) becomes quite fruitful to analyze the data of the study. In the present study, the researcher had used ‘non-randomized/unequated-two-groups pretest and posttest design’. The paradigm of design of the present study is given in Table-3.2.

<table>
<thead>
<tr>
<th>Purposively assigned treatment groups</th>
<th>Pretest</th>
<th>Independent Variable</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>EG</td>
<td>(P_1LSTE) (P_1LCTE) (P_1APTE)</td>
<td>Teaching through TSL</td>
<td>(P_2LSTE) (P_2LCTE) (P_2APTE)</td>
</tr>
<tr>
<td>CG</td>
<td>(P_1LSTE) (P_1LCTE) (P_1APTE)</td>
<td>Teaching through ULM</td>
<td>(P_2LSTE) (P_2LCTE) (P_2APTE)</td>
</tr>
</tbody>
</table>

The details of the abbreviations used in the above table are given below:

EG- Experimental Group
CG- Control Group
\(P_1LSTE\)- Pretest (Linguistic Skills Test in English)
\(P_1LCTE\)- Pretest (Linguistic Creativity in English)
\(P_1APTE\)- Pretest (Academic Performance Test in English)
TSL – Technology Supportive Learning
ULM – Usual Learning Method
\(P_2LSTE\)- Posttest (Linguistic Skills Test in English)
\(P_2LCTE\)- Posttest (Linguistic Creativity in English)
\(P_2APTE\)- Posttest (Academic Performance Test in English)

3.5.0 Clarification of the Important Variables and Concepts Used in the Study
The meaning and interpretations of some of the key words/variables used in the study are given under the following sub points:

**a. Independent and dependent Variables**

Two important types of variables were identified and used in the present study. Such variables are -

i. Independent variables

ii. Dependent variables

*Independent variables:* The effect of Technology Supportive Learning for the development of Linguistic Skills, Linguistic Creativity, and Academic Performance in English learning of class VI elementary students was studied in the present study. In the present study, control group was taught through Usual Learning Method (ULM), and the experimental group was taught through Technology Supportive Learning (TSL). Both, the ULM and TSL were considered as the independent variables in the present study.

*Dependent variables:* Generally, the effects of independent variables are studied on dependent variables. In the present study, development of Linguistic Skills, Linguistic Creativity, and Academic Performance in English learning were considered as dependent variables.

**b. Controlling the Intervening Variables**

There are certain variables that cannot be measured directly but they may have some effect upon the dependent variables. The researcher always tries to control such variables and does not want to observe the effect of such variables on dependent variables. Such variables are called intervening variables. It is very difficult to control such variables completely. However, they are controlled to some extent either experimentally or statistically. There were many intervening variables like socio-economic status of the students/teachers, environment in the classroom, teacher’s competency, tuition of the students, contamination effects, study habits etc. that might have affected the present study. Therefore, the researcher had taken all sorts of care for keeping all these variables silent in the present study.

**c. Chapters Used in the Present Study**

In order to develop linguistic skills, linguistic creativity, and academic performance among class VI students through the teaching of English, nine chapters from class VI
English text books i.e. ‘Honeysuckle’ and ‘A Pact with the Sun’ (published by NCERT and being used by CBSE schools) were selected. The details of the chapters of class VI NCERT English textbooks used in the present study for developing linguistic skills, linguistic creativity and academic performance are given in Table 3.3.

Table 3.3  Details of the Chapters Used in the Present Study

<table>
<thead>
<tr>
<th>Name of the Subject</th>
<th>Name of the textbooks</th>
<th>Name of the content areas</th>
<th>Name of the Chapters</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>Honeysuckle</td>
<td>Prose</td>
<td>i. Who Did Patrick’s Homework</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ii. How Did The Dog Found Himself A New Master</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>iii. Taro’s Reward</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Poetry</td>
<td>i. A House, A Home</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ii. The Kite</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>iii. The Quarrel</td>
</tr>
<tr>
<td>A Pact with the Sun</td>
<td>Non detailed</td>
<td></td>
<td>i. A Tale of Two Birds</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ii. The Friendly Mongoose</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>iii. The Shepherd’s Treasure</td>
</tr>
</tbody>
</table>

d. Control and Experimental Groups

Any experimental situation is generally concerned with two types of groups. They are experimental group and control group. In an experimental situation, there may be one or more control groups and one or more experimental groups. In the present study, there were two experimental groups and two control groups. The description of such groups is given below:

Experimental Group: Sixty students from Sec-A of class VI of K.V., Malda and Sec-B of class VI of D.P.S., NTPC constituted the members of experimental group.

Control Group: Sixty-two students from Sec-A of class VI of K.V., NTPC and Sec-B of class VI of K.V., Malda formed the control group for the present study.

e. Pretests and Posttests

An experimental situation is concerned with different types of tests. Such types of tests are pretest, posttest, delayed posttest etc. The types of tests required for an experimental situation change according to the requirements of that particular experimental situation. In the present study, the researcher has used two types of tests, i.e. pretest and posttest. It is also to remember that the researcher has used the same test as pretest and posttest in the present study. The researcher has used three tests in the present study i.e. Linguistic Skills Test in English, Linguistic Creativity Test in English and Academic Performance Test in English as pretests and posttests
also. Pretests were administered before giving the treatment and posttests were given after the treatment.

3.6.0 Controlling the Confounding Factors of the Experiment

In the present study, the researcher had employed all the possible ways to control those factors that would otherwise create biasness in the present experiment. Along with using statistical controlling procedure, the researcher had followed the following attempts to control the confounding factors.

- The researcher herself provided treatment to the control group as well as the experimental group. It generally happens that the attitude and competence of the teacher create treatment effect. So, the researcher herself taught all the groups in order to control the inter group variation in providing treatment referring to the teacher competency.

- Every possible effort was made to keep all the experimental situations of both the groups equal except the treatment. The researcher was also cautious about other variations in the experimental condition except treatment that may affect the outcomes of the results of the groups.

- Sample mortality was taken into account. The subjects of both the groups were requested to maintain good attendance for the experimental period. The subjects who were irregular or non-serious in both the groups were kept outside the sample.

- The experimental process was controlled by keeping the classroom environment, experimental situation, mode of testing, duration of the experiment etc. same for all the groups.

- The researcher maintained a friendly, sympathetic, and encouraging classroom environment in the experimental situation in order to reduce social-personal differences among the subjects.

3.7.0 Experimental Process

The experimental process/procedure followed in the present experiment is as the followings.

a. Treatment Groups Selection: Purposively students from Sec-A of class VI of K.V., Malda and Sec-B of class VI of D.P.S., NTPC were selected for
experimental group whereas students from Sec-A of class VI of K.V., NTPC and Sec-B of class VI of K.V., Malda were selected for control group for the present study.

b. **Pre-testing:** Three pretests i.e. pretest on linguistic skills in English, pretest on linguistic creativity in English and pretest on academic performance in English were administered on all the subjects of control group and experimental group.

c. **Treatments:** Only after the administration of pretests to both the groups, treatments were given to them. The control group was taught through ULM whereas the experimental group was taught through TSL. The basic objective of both the methods was to develop linguistic skills, linguistic creativity and academic performance in English learning among the treatment groups. Without disturbing the normal classroom setting, the treatments were given. That means, both the sections of class VI (Sec-A of class VI of K.V., Malda and Sec-B of class VI of D.P.S., Farakka) of experimental group were taught through TSL separately. Similarly, both the sections of class VI (Sec-B of class VI of K.V., Malda and Sec-A of class VI of K.V., Farakka) of control group were taught through ULM separately. The experiment continued for five months. The specific chapters from class VI English text books i.e. ‘Honeysuckle’ and ‘A Pact with the Sun’ (published by NCERT and being used by CBSE schools) were taught through TSL and ULM to the experimental group and the control group for the development of their linguistic skills, linguistic creativity and academic performance in English learning.

d. **Post-testing:** Three posttests were administered on all the subjects of control group and experimental group after the treatment phase. Such posttests were - a posttest on linguistic skills in English, a posttest on linguistic creativity in English, and a posttest on academic performance in English. In the present study, the same tests on linguistic skills in English, linguistic creativity in English and academic performance in English were used as both pretests and posttests.

e. **Treatment effect analysis:** After data-collection, the data relating to all the subjects (Sec-B of class VI of K.V., Malda and Sec-A of class VI of K.V., Farakka) under the control group and all the subjects (Sec-A of class VI of K.V., Malda and Sec–B of class VI of D.P.S., Farakka) under experimental group were
pooled together for treatment effect analysis. The detail of the design of the study is given in chart no. 3.1.

**Chart 3.1 Design of the Study**

- **Learning Stage**: At Class VI Stage
- **Main Learning Area**: English learning (class VI English language textbook)
- **Learning Sub Areas**: Teaching of prose, poetry and non-detailed
- **Learning Topics**: Specific chapters relating to prose, poetry and non-detailed
- **Learning Objectives**: Development of linguistic skills, linguistic creativity and academic performance in English learning
- **Development of Pretests**: Development of Pretests on linguistic skills, linguistic creativity and academic performance in English learning
- **Formulation/Selection of Treatment Groups for learning**: Formulation of two unequated treatment groups i.e. Control group and Experimental group
- **Collection of baseline data**: Administration of all the Pretests to both Control and Experimental groups
- **Treatment Groups**: Taught through TSL (Technology Supported Learning) for Experimental Group and Taught through ULM (Usual Learning Method) for Control Group
- **Implementing the Treatment**: Development of Posttests on linguistic skills, linguistic creativity and academic performance in English learning
- **Administration of Posttests**: Collection of data at the Posttest level from both Control and Experimental groups
- **Analysis of Data and reaching at Conclusion**: Analysis of data with the help of appropriate statistical techniques and reaching at a conclusion
- **Further Research Direction**: Suggestions for further research
3.8.0 Tools Used

The study, being an experimental one, necessitated two types of tools as follows:

i. Instructional tools

ii. Testing tools

The detail descriptions of such tools are given below.

3.8.1 Instructional Tools

The instructional tools were used to impart instruction to the treatment groups. The two types of instructional tools used in this present study were –

A. Technology Supportive Learning (TSL)

B. Usual Learning Method (ULM)

(A) Development of Technology Supportive Learning (TSL)

Technology supportive learning is a new and innovative method of teaching learning developed by the researcher. The researcher has developed this strategy for the development of linguistic skills, linguistic creativity and academic performance in English learning among elementary school students.

a. Concept of Technology Supportive Learning

Technology Supportive Learning in the present study refers to the practice of teaching learning with the help of different technological devices (both hardware and software) like computer, slide presentation, power point presentation, use of tape recorder, use of models, charts, projectors etc. It is based on the communicative language teaching approach and more specifically on Nunan’s (2006) concept of task/activities. Several technology supportive activities were prepared by the researcher to develop linguistic skills, linguistic creativity and academic performance among the target group students.

b. Characteristics of Technology Supportive Learning (TSL) Approach

The followings are some of the important characteristics of Technology Supportive Learning (TSL) approach.

i. This approach uses a large number of technological devices (both software and hardware) like slide presentation, audio-tape, projector etc. in teaching learning process.

ii. Technologies used in the teaching learning process are student friendly in nature.
iii. In this approach, the technologies don’t dominate teaching learning process rather facilitate teaching learning process.

iv. Technology Supportive Learning (TSL) approach of teaching learning is an active process of teaching learning. Its success depends on the active participation of the students.

v. This approach aims to make teaching learning process easy, enjoyable and experience centered for the learners.

vi. The teacher has to facilitate learning process in this approach. Therefore, his/her role is that of a facilitator and friend but not that of a dictator.

vii. It aims to facilitate all round development of a child i.e. cognitive, affective, and conative aspect of a child’s personality.

viii. It promotes inventive thinking that induces the development of effective communication and leads to teaming and collaboration.

ix. It creates congenial classroom environment for the learners.

x. It makes teaching learning process a purposive and goal-oriented activity.

c. Importance of developing Technology Supportive Learning (TSL)

Information and communication technology is no longer a new terminology today. It is incorporated in the teaching learning process much before. Students are now more active in the teaching learning process and they play important role in teaching learning with the help of technologies. Therefore, the penetration of technological devices cannot be ignored and should be used to support teaching and learning. It is pointed out also that the implementation of technology in the classroom is both an ‘innovation in technology and teaching’. Technology Supportive Learning (TSL) is a combination feature of text, sound, animation, video-elements etc. in learning process which facilitates better learning. Vaughan (1997) showed that if students are stimulated with audio, they will have about 20% retention rate, with audio-visual they will have up to 30% and with multimedia, the retention rate is up to 60%. TSL tools can enhance many skills such as functional communication, creative and critical thinking etc. in language learning classroom. Research and practice suggest that, appropriately implemented technology supportive learning can contribute significantly to the teaching learning process. Therefore, the researcher has developed a new and innovative approach of teaching learning i.e. Technology
Supportive Learning (TSL) for facilitating English learning at elementary school stage.

d. Importance of Technology Supportive Learning (TSL) approach for developing Linguistic Skills, Linguistic Creativity and Academic Performance in English learning

Technology Supportive Learning (TSL) approach is a learner-oriented approach of teaching learning developed by the researcher herself. Especially in language learning classrooms, it can be used to achieve different types of learning objectives among the learners. For example, it can be used for developing linguistic skills, linguistic creativity, academic performance and many other such objectives in language learning classrooms. However, one very important point is that when one will go for developing linguistic skills, s/he will develop such Technology Supportive Learning (TSL) activities that would facilitate the development of linguistic skills. Similarly, when one will go for developing linguistic creativity, s/he will develop such Technology Supportive Learning (TSL) activities that would facilitate the development of linguistic creativity. In this way, the types of Technology Supportive Learning (TSL) activities would be changed according to the change in the types of objectives and change in the subject matter as well. For example, the activities followed in TSL approach for language learning will be different from the activities followed in TSL approach for science learning. Likewise, the nature/types of activities of TSL approach would change in accordance with the change of objectives of teaching learning and content matter as well.

Development of linguistic skills, linguistic creativity and academic achievement in English learning through Technology Supportive Learning (TSL) had been emphasized in the present experiment. Development of linguistic skills in English was understood in terms of four basic skills i.e. Listening, Speaking, Reading and Writing. Similarly, development of linguistic creativity in English learning was understood in terms of Fluency, Flexibility and Originality. Finally academic performance was understood in terms of the scores obtained by the participants in the academic performance test that was developed by the researcher herself.
e. Examples of some Technology Supportive Learning (TSL) activities used for the development of Linguistic Skills and Linguistic Creativity in English learning

Different Technology Supportive Learning (TSL) activities were being used by the researcher for the development of linguistic skills and linguistic creativity in English learning. However, the nature Technology Supportive Learning (TSL) activities used for the development of linguistic skills were somewhat different from the nature of Technology Supportive Learning (TSL) activities used for the development of linguistic creativity in English learning.

In the present study, the researcher had used the following types of activities (based on Technology Supportive Learning approach) for the development of linguistic skills in English learning:

- i. Miming
- ii. Role-playing
- iii. Temporal zooming in
- iv. Phonological discrimination
- v. Guided composition
- vi. Description/explanation
- vii. Matching
- viii. Riddles
- ix. Guessing game
- x. Marsupial words

- xi. Gap filling
- xii. Discussion
- xiii. Question-answer
- xiv. Crazigram
- xv. Recitation
- xvi. Simulation
- xvii. Transformation
- xviii. Re-ordering the sentences etc.

In the present study, the researcher had used the following types of activities (based on Technology Supportive Learning approach) for the development of linguistic creativity in English learning:

- i. Listing associated words /names/events/items
- ii. Brainstorming
- iii. Suggesting titles for a story
- iv. Finding similarities and dissimilarities
- v. Story writing
- vi. Writing consequences
- vii. Debating
- viii. Creative expansion of ideas
- ix. Paragraph writing
- x. Exploring lexical association

- xi. Providing reasons
- xii. Composing a poem
- xiii. Attribute Listing
- xiv. Visualization
- xv. Imagination
- xvi. Giving similes
- xvii. Looking ahead
- xviii. Drawing & Painting
- xix. Dialogue writing
- xx. Synectics
- xxi. Morphological Synthesis
- xxii. Alternative uses etc.

f. Design of Technology Supportive Learning activities for the development of Linguistic Skills and Linguistic Creativity in English learning
Chart No. 3.2: Designing Technology Supportive Learning for English Learning

What is main learning Area → English learning at class VI stage → A significant area of learning of school curriculum

What are the sub areas of learning → Prose, Poetry, Non-detailed → Areas based on instructional demands of language learning

What are the main learning objectives → Linguistic Skills, Linguistic Creativity, Academic Performance → Objectives relating to three domains of language learning

What is the strategy for achieving the learning objectives → Technology Supportive Learning (TSL) → An innovative and presently demanded learning Strategy

What are the different categories of the technology to be used → Hardware, Software → Categorization is made on the basis of structural and functional nature of technology

What are the different technological devices to be used → Projectors, tape recorders, Computers, graphics, pictures, charts, film strips, flash cards, Display boards, exhibitions etc → Devices selected having implications for learning at school stage

What way selection of the technologies for learning would be made → Selecting one or more than one technologies at a time for teaching learning of a particular unit/topic → Strength/limitations of the devices will be considered in the process of selection of technologies for Learning

Preparation for learning

What would be the process of learning → Societal demands, Learners’ demands → Creation of a technology supportive learning process/environment and implementation of the same

Demand of the topic/subject/Discipline → Demand of the time/situation of learning → An attempt for making a purposeful learning process/scenario
A number of technology supportive learning activities were prepared by the researcher for the development of linguistic skills and linguistic creativity in English learning. For the development of academic performance, no such separate activities (based on technology supportive learning approach) were used. But the effects of such activities which were based on technology supportive learning (and meant for the development of linguistic skills and creativity) on academic performance were studied. A design was followed for preparing such activities basing on the chapters from class VI textbooks i.e. ‘Honeysuckle’ and ‘A Pact with the Sun’ (published by NCERT and being used by CBSE schools) taken for the present experiment. In this present study, no separate activities for the development of academic performance in English learning were prepared by the researcher. The detail of such design is given in Chart no. 3.2.

(B) Usual Learning Method (ULM)
Usual learning method refers to the conventional method of teaching strategy in the present study. It is generally teacher dominated and to many extent passive in nature. The researcher has used this method in order to teach the control group.

3.8.2 Testing Tools
Three types of testing tools were used in the study. They were:
   A. Linguistic Skills Test in English
   B. Linguistic Creativity Test in English
   C. Academic Performance Test in English

However, it is to note that the same linguistic skills test, linguistic creativity test, and academic performance test were used as both pretests as well as posttests in the present study. The linguistic skills test used in the study is named as ‘Linguistic Skills Test in English’ (LSTE), the linguistic creativity test used in the study is known as ‘Linguistic Creativity Test in English’ (LCTE), and the academic performance test used in the study is named as ‘Academic Performance Test in English’ (APTE). The detailed descriptions of such tests are given below.

A. Linguistic Skills Test in English (LSTE)
   a. Nature of LSTE
One of the major objectives of the present study was to assess the effectiveness of TSL for development of linguistic skills in English learning. For this purpose, the
researcher had prepared a linguistic skills test in English with the help of experts. This test was used as both pretest and posttest in the present study. In other words, the same linguistic skills test was administered to the subjects before the treatment in order to collect the entry level/base line data and after the treatment as the posttest for knowing the development of linguistic skills among the learners due to the effect of the treatment. This linguistic skills test was based on selected nine chapters of class VI English textbook. These nine chapters were selected for the present research purpose. The researcher had taken all types of decisions regarding the present test with the help of a panel of experts.

b. **Focus of LSTE**
The basic language skills meant for class VI level were selected for the study as the test was meant for class VI students. These basic language skills are listening, speaking, reading and writing. Other language skills like grammar, vocabulary-development etc. were not chosen for the present test.

c. **Nature of test items of LSTE**
In accordance with the views of the experts, the researcher had taken three types of test items for the present test. Such types of test items are:

i. Long question type test items
ii. Short question type test items
iii. Objective question type test items

d. **Weightage of marks given to types of test items in LSTE**
According to the opinion of the experts, the researcher had given the following weightage of marks to the test items.

i. L.Q (Long question type) items = 4 marks
ii. S.Q (Short question type) items = 2 marks
iii. O.Q (Objective question type) items = 1 mark

e. **Initial draft of LSTE**
The present test is consisted of 100 marks. There were total 80 items at the initial stage of preparation of the test. Out of those 80 items, 15 were L.Q. items, 25 were S.Q. items, and 40 were O.Q. items. Finally, 10 L.Q. items, 15 S.Q. items, 30 O.Q type items were retained after item analysis. Item analysis was done following these three stages:
i. Item selection
ii. Item difficulty level
iii. Item discrimination

Item selection - Item selection was done according to the judgment of the researcher as well as the experts’ judgement. Item selection was made taking into consideration the objectives and purposes of test.

Item difficulty level – Only such items were selected for the final stage that were approaching to the middle difficulty level.

Item discrimination – Only such items were retained for the preparation of the final test, which had high positive discrimination values.

f. Final draft of LSTE

In the final draft of the test, the weightage to the different aspects of the test was given in the following manner in accordance with the experts’ judgments.

I. Percent of weightage in marks given to the different linguistic skills in LSTE is given in Table 3.4

Table 3.4 Percent of Weightage in Marks Given to the Different Linguistic Skills in LSTE

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Listening</th>
<th>Speaking</th>
<th>Reading</th>
<th>Writing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prose</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>40%</td>
</tr>
<tr>
<td>Poetry</td>
<td>7%</td>
<td>7%</td>
<td>8%</td>
<td>8%</td>
<td>30%</td>
</tr>
<tr>
<td>Non-Detailed</td>
<td>7%</td>
<td>7%</td>
<td>8%</td>
<td>8%</td>
<td>30%</td>
</tr>
<tr>
<td>Total</td>
<td>24%</td>
<td>24%</td>
<td>26%</td>
<td>26%</td>
<td>100%</td>
</tr>
</tbody>
</table>

II. Weightage in marks to different linguistic skills in LSTE is given in Table 3.5

Table 3.5 Weightage in Marks Given to Different Linguistic Skills in LSTE

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Listening</th>
<th>Speaking</th>
<th>Reading</th>
<th>Writing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prose</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>Poetry</td>
<td>7</td>
<td>7</td>
<td>8</td>
<td>8</td>
<td>30</td>
</tr>
<tr>
<td>Non-Detailed</td>
<td>7</td>
<td>7</td>
<td>8</td>
<td>8</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>24</td>
<td>26</td>
<td>26</td>
<td>100</td>
</tr>
</tbody>
</table>

III. The detailed blue print of the LSTE developed by the researcher with the help of experts is given in Table 3.6
Table 3.6 Blueprint of the LSTE

<table>
<thead>
<tr>
<th>Skills Content-Areas</th>
<th>Listening</th>
<th>Speaking</th>
<th>Reading</th>
<th>Writing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prose</td>
<td>LQ (1)</td>
<td>SQ (4)</td>
<td>OQ (2)</td>
<td>LQ (4)</td>
<td>22 (40)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Poetry</td>
<td>LQ (4)</td>
<td>SQ (2)</td>
<td>OQ (2)</td>
<td>LQ (1)</td>
<td>17 (30)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1 X</td>
<td></td>
</tr>
<tr>
<td>Non-Detailed</td>
<td>LQ (2)</td>
<td>SQ (1)</td>
<td>OQ (1)</td>
<td>LQ (4)</td>
<td>16 (30)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>13 (24)</td>
<td>12 (24)</td>
<td>16 (26)</td>
<td>14 (26)</td>
<td>55 (100)</td>
</tr>
</tbody>
</table>

*Number within bracket indicates marks and number without Bracket indicates number of questions.

**g. Manual of the LSTE**

The present test contains 100 marks which were distributed among the four language skills (listening, speaking, reading, and writing), and three subject areas of English learning (prose, poetry, and non-detailed) according to the judgment of the researcher as well as the experts. The test contained three types of items, i.e. Long question type (LQ), Short question type (SQ), and Objective question type items (OQ). Each LQ carries four marks, each SQ carries two marks, and each OQ carries one mark. Scoring was done according to the weightage of marks given to different types of questions. The total number of questions mentioned in the blueprint was 55 but such questions were kept under four headings i.e. listening, speaking, reading and writing in actual test. Out of 12 questions in actual test, the content area of prose contains three questions, the content area of poetry contains three questions, and the content area of non-detailed contains three questions. Similarly, out of these 12 questions in actual test, listening skill contains three questions, speaking skill contains three questions, reading skill contains three questions, and writing skill contains three questions. The detailed of test questions used of LSTE is given in Table 3.7 and 3.8.

Table 3.7 Detailed Nature of the Test Questions in Different Content Areas of LSTE

<table>
<thead>
<tr>
<th>Subject</th>
<th>Content areas</th>
<th>Types of questions</th>
<th>Question numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGLISH</td>
<td>Prose</td>
<td>LQ</td>
<td>Nos-1a, 1b, 1c, 1d</td>
</tr>
<tr>
<td></td>
<td>SQ</td>
<td>Nos-2a, 3a, 2b, 2c, 2d</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OQ</td>
<td>Nos-4a, 3b, 3c, 3d</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poetry</td>
<td>LQ</td>
<td>Nos-2.1a, 2.1b, 2.1d</td>
</tr>
<tr>
<td></td>
<td>SQ</td>
<td>Nos-2.2a, 2.2b, 2.1c</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OQ</td>
<td>Nos-2.3a, 2.3b, 2.2c, 2.2d</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-Detailed</td>
<td>LQ</td>
<td>Nos-3.1b, 3.1c, 3.1d</td>
</tr>
<tr>
<td></td>
<td>SQ</td>
<td>Nos-3.1a, 3.2b</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OQ</td>
<td>Nos-3.2a, 3.3b, 3.2c, 3.2d</td>
<td></td>
</tr>
</tbody>
</table>
### Table 3.8  Detailed Nature of the Test Questions in Different Content Areas in Relation to Four Linguistic Skills of LSTE

<table>
<thead>
<tr>
<th>Subject</th>
<th>Content areas</th>
<th>Skill-areas</th>
<th>Types of question</th>
<th>Question numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Listening</td>
<td>LQ</td>
<td>Nos-1.1a</td>
</tr>
<tr>
<td>Prose</td>
<td></td>
<td></td>
<td>SQ</td>
<td>Nos-1.2a</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OQ</td>
<td>Nos-1.3a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Speaking</td>
<td>LQ</td>
<td>Nos-1.1b</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>Nos-1.2b</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OQ</td>
<td>Nos-1.3b</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reading</td>
<td>LQ</td>
<td>Nos-1.1c</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>Nos-1.2c</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OQ</td>
<td>Nos-1.3c</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Writing</td>
<td>LQ</td>
<td>Nos-1.1d</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>Nos-1.2d</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OQ</td>
<td>Nos-1.3d</td>
</tr>
<tr>
<td>Poetry</td>
<td></td>
<td>Listening</td>
<td>LQ</td>
<td>Nos-2.1a</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>Nos-2.2a</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OQ</td>
<td>Nos-2.2a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Speaking</td>
<td>LQ</td>
<td>Nos-2.1b</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>Nos-2.2b</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OQ</td>
<td>Nos-2.3b</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reading</td>
<td>LQ</td>
<td>Nos-x</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>Nos-2.1c</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OQ</td>
<td>Nos-2.2c</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Writing</td>
<td>LQ</td>
<td>Nos-2.1d</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>Nos-x</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OQ</td>
<td>Nos-2.2d</td>
</tr>
<tr>
<td>Non-Detailed</td>
<td></td>
<td>Listening</td>
<td>LQ</td>
<td>Nos-x</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>Nos-3.1a</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OQ</td>
<td>Nos-3.2a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Speaking</td>
<td>LQ</td>
<td>Nos-3.1b</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>Nos-3.1b</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OQ</td>
<td>Nos-3.1b</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reading</td>
<td>LQ</td>
<td>Nos-3.1c</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>Nos-x</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OQ</td>
<td>Nos-3.2c</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Writing</td>
<td>LQ</td>
<td>Nos-3.1d</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>Nos-x</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OQ</td>
<td>Nos-3.2d</td>
</tr>
</tbody>
</table>

**h. Reliability and Validity of LSTE**

Any psychological test is a device for quantitative measure of a given characteristic or a number of characteristics. Therefore, it is essential to determine the efficiency of any such tool before it is put to use. Validity and reliability are the most important aspects of efficiency of a psychological test. A sample of 35 students of Sec-A of class VI of K.V., NTPC, Farakka, were taken to estimate the reliability and validity of the present linguistic skills test.

Reliability: The reliability of the LSTE was estimated through test-retest method. At first, the test was administered upon the sampling group. A gap of one week was
given to the subjects after the test had been administered. Then the same test was re-administered upon them. The test retest reliability co-efficient of correlation was found to be 0.78.

Validity: The validity of the present linguistic skills test was estimated through the following methods.

Content Validity: The theoretical validity of the test was established through content validity procedure. The content validity of the test was established on the basis of experts’ judgment. In order to achieve the content validity of the test, the items were selected as well as analyzed on the basis of objectives and nature of the test.

Item Validity: The statistical validity of the items was calculated by applying the principles of item difficulty and item discrimination. The following formula was followed for calculating item difficulty and item discrimination.

\[
\text{Item difficulty} = \frac{R}{N} \times 100
\]

R= Number of testees answered correctly
N= Total number of testees

\[
\text{Item discrimination} = \frac{R_u - R_l}{\frac{1}{2}N}
\]

R_u = Number of testees in the upper group who answered the item correctly
R_l = Number of testees in the lower group who answered the item correctly
N = Total number of testees

As discussed earlier, the items that were approaching the middle difficulty values, and the items that were approaching the highly positive discrimination values were selected for the final test.

The test itself is given in Appendix-D.

(B) Linguistic Creativity Test in English (LCTE)

a. Nature of LCTE

One of the significant objectives of the present study was that the study aimed at studying the effectiveness of TSL over ULM in developing linguistic creativity in English learning of elementary school students. For studying linguistic creativity in English learning, the researcher has developed a linguistic creativity test. This self-developed linguistic creativity test in English learning was named by the researcher as ‘Linguistic Creativity Test in English’. The same LCTE was used as pretest as well as the posttest in the present study. That means, the same LCTE was administered on the
subjects as the pretest in order to collect the base line data before giving the treatment to them, and was administered as posttest on the subjects after giving to them the treatment to assess the extent of development of linguistic creativity.

This LCTE was based on the nine chapters of English textbooks of class VI (published by NCERT and being used by CBSE schools), which were taken for the research work. The names of the chapters are mentioned in the earlier part of this chapter. The most important characteristic of this LCTE is that the items included in this test generally require divergent answers. In clear cut words, one can say that the items included in the test yield the answers that are divergent/not fixed. In this linguistic creativity test, every item requires the responses that are not fixed. Each examinee of this test is free to give/ provide as many as responses that s/he can give for the particular item. While the researcher had taken the decision regarding this linguistic creativity test, she was assisted by a panel of experts in the area of psychology and creativity.

b. Content areas on which LCTE is based

This LCTE is a subject related creativity test. While the test items for this LCTE were prepared, they were prepared on the basis of nine chapters of class VI English textbooks. The chapters on which LCTE is based are given below:

Table 3.9 Details of the Chapters on Which LCTE is Based

<table>
<thead>
<tr>
<th>Name of the subject</th>
<th>Name of the content areas</th>
<th>Name of the chapters</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGLISH</td>
<td>Prose</td>
<td>i. Who Did Patrick’s Homework</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ii. How Did the Dog Found Himself a New Master</td>
</tr>
<tr>
<td></td>
<td></td>
<td>iii. Taro’s Reward</td>
</tr>
<tr>
<td></td>
<td>Poetry</td>
<td>i. A House, A Home</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ii. The Kite</td>
</tr>
<tr>
<td></td>
<td></td>
<td>iii. The Quarrel</td>
</tr>
<tr>
<td></td>
<td>Non-Detailed Prose</td>
<td>i. A Tale of Two Birds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ii. The Friendly Mongoose</td>
</tr>
<tr>
<td></td>
<td></td>
<td>iii. The Shepherd’s Treasure</td>
</tr>
</tbody>
</table>

c. Competencies are to be measured through LCTE

The present LCTE aims at measuring three competency areas of creativity in English. Such competency areas are fluency, flexibility and originality. Fluency- Fluency refers to the ability to produce many numbers of unrepeated ideas for a given task.
Flexibility- Flexibility refers to the ability of the individual to produce different categories/varieties of ideas.

Originality- Originality refers to the ability to produce new or unusual ideas.

d. **Nature of the test items of LCTE**

Each test item of LCTE requires the answer which is divergent in nature. That means, the items included in LCTE do not have fixed answers. The participants/examinees of the LCTE are free to provide as many answers as possible for the same question/item according to their ability.

Another important characteristic of the items of present LCTE is that, from the same item three types of competencies (i.e. fluency, flexibility and originality) can be scored. Fluency can be scored on the basis of number of responses given by the respondent; flexibility can be scored on the basis of categories of responses given by the respondent; and originality can be scored on the basis of the unusual responses given by the respondent to the same item. In the test, no separate items was needed to measure the fluency, flexibility and originality competencies separately; rather from the particular item all these competencies can be measured.

e. **Initial draft of LCTE**

The present LCTE has been developed to measure linguistic creativity in English learning. While preparing the test items for LCTE, the following considerations were taken into account:

- The items are prepared in such a way that those items would help in measuring the linguistic creativity in English learning.
- The items seek divergent answers, which means the items don’t have single right answer.
- The items are effective to draw the best linguistic creativity of the students.
- The contents of the items are familiar to the students, and related more or less to the specific chapters of class VI English textbooks (published by NCERT and being used by CBSE schools).
- Some of the items of the test are hypothetical in nature whereas the others are memory based, understanding based, critical thinking based and so on.

Some of the limitations of the items included in the LCTE are-
The test is concerned only with the verbal items; no non-verbal item is included in the test.

The test is designed to measure only three types of creative competencies in English learning i.e., fluency, flexibility and originality whereas the other creative competencies in English learning like elaboration, imagination, curiosity etc. are not taken care of.

A fixed time limit was followed for the test items. However, many of the creativity tests do not follow the fixed time limit. But, for the convenience of administration, scoring and interpretations, such time limit is followed for the present test.

This LCTE was not like the general achievement test or I.Q. test or aptitude test. Neither large quantities of questions are available relating to the present test, nor are such items selected from the content areas in readymade way. Therefore, while preparing the items for LCTE, the researcher had tried her best to make such items open ended as well as chapter based. For this purpose, the researcher has faced many challenges. The researcher had also taken the challenge to re-design the course pattern/chapters that she taught for developing linguistic creativity and accordingly she formulated the items for this test. While preparing the initial draft as well as the final draft of the test, the researcher had taken the help of a panel of experts and resource persons.

At the initial stage, the researcher prepared total thirty items. Out of these thirty items, ten items each were from prose, ten items each were from poetry, and ten items each were from non-detailed study. However, out of these thirty items, eighteen items are chosen for the final draft. Out of these eighteen items, six items are from prose, six items are from poetry, and six items are from non-detailed area.

**f. Descriptions of the test items of LCTE**

When test items for LCTE were prepared by the researcher, the formats used by the Guilford, Torrance, Mehdi etc. for developing creativity tests are followed. The test items of linguistic creativity test are based on the action related tasks/words/sentences like ask as many as questions, write down all the causes, what would happen etc. The test itself is given in Appendix-E.

**g. Development of the test manual for LCTE**
The test manual emphasizes/includes the followings:

Target group: The present test is meant for class VI students. The test is meant for measuring the linguistic creativity of class VI students in English learning. Therefore, this is a creativity test in a specific area i.e. English learning/language area. Generally, the average age of class VI student is 11+. That means, the target age group for this test is 11+.

Selection of the items for the final test: After a rigorous analysis, the test items were selected for the final test. During preliminary draft stage, there were total thirty items. Out of these thirty items, ten items each were from prose, ten items each were from poetry, and ten items each were from non-detailed study. However, out of these thirty items, eighteen items were chosen for the final test. Out of these eighteen items, six items are from prose, six items are from poetry, and six items are from non-detailed area.

Item selection: Items were selected/ prepared on the basis of the judgment ability of the researcher as well the experts. While selection of the items were made, due care had been taken regarding the objectives of the test, nature of the groups, area/sub-area of the test etc. While items were selected, proper content analysis and factor analysis were done.

Item Analysis: Item analysis is an essential requirement for constructing a good test. Item analysis can be done for any test for selection, substitution and revision of the items. Item analysis can be done both quantitatively as well as qualitatively. Qualitative item analysis is done in terms of analyzing the contents and forms of a test; whereas quantitative item analysis is done in terms of its statistical properties. Item analysis is basically done in order to find out the validity of the test items. For item analysis of the present test, qualitative method was followed.

Validity of the Present Test: It is true that there is no well-established criterion of establishing the validity of creative thinking test. Therefore, qualitative methods are generally followed for establishing the validity of the creativity test. For the present test, qualitative method was followed to find out the validity. More specifically, content and construct validity methods were followed to establish the validity of the present test. In other words, when the test items were selected, a group of experts analyzed them properly to find out how far they confirm to the principles of
creativity and the nature of the content areas specified. So the present creativity test items support the following two points:

i. The test items are based on specific chapters of class VI English textbook (published by NCERT and being used by CBSE schools).

ii. Each test item seeks divergent answers.

**h. Procedure of administration**

Creative ability of an individual can be best elicited in a game like and playful situation. It is unlike intelligence or achievement test. Therefore, game like and playful situation has to be created for the administration of the present test. Generally, there is no fixed time limit for creativity test but many creativity specialists (Mehdi, 1973) have fixed time limits for their creativity tests. The present test contains 18 test items and the target clients of the present test are given five minutes for each test items to complete them. That means, in total ninety minutes i.e. one hour thirty minutes is given to the clients of this test to complete their answers.

**i. Procedure of scoring:**

As there is no fixed answer for the items of the test, so, one should be very careful while scoring. For the scoring of the present test, scoring procedure of verbal test of Baqar Mehdi style is followed with some sorts of changes/modifications. In case of scoring fluency and flexibility, exact Baqar Mehdi’s procedure would be followed but some changes are to be made to Baqar Mehdi’s procedure when scoring originality. How the researcher has found out the fluency, flexibility, and originality scores from the data collected through LCTE in her experiment is given below:

**Scoring of fluency:** For scoring the fluency, the researcher went through the responses of the test items carefully and stroke off those that were irrelevant and had been repeated. Then, she counted the remaining number of responses and entered that number as the fluency score for the item.

**Scoring of flexibility:** For scoring the flexibility, at first the researcher acquainted herself with the categories of responses for each item. The flexibility score was the total number of categories of answers given by the testee to a particular item. For example, if the testee answered 15 responses for a particular test item then this fifteen would be her/his fluency score. In addition, if these fifteen answers were grouped under four categories of
answers on the basis of their similar characteristics, then that four will be her/his flexibility score.

It is also a fact that no scorer can exactly say how many categories of answer should remain under one item. Actually, the categories depend upon nature of the students’ answers. Since, almost all the creativity test questions require divergent answers, so, it is very difficult to fix the categories of answers beforehand. While flexibility scoring was done for the present test, the researcher formulated the flexibility categories for a particular item according to her own perception, observation to the answers, responses referring to the test items etc. The researcher had not used any pre-fixed or pre-determined criterion or standardized criterion for determining the flexibility categories. However, while scoring flexibility, the exact pattern of Baqar Mehdi was followed for it.

Scoring of originality: It is discussed in the previous chapter that originality scoring is usually done on the basis of statistical un-commonness of the responses. The more the uncommon responses, the higher the originality weight becomes.

According to Baqar Mehdi’s manual, the weightage for originality scoring has been determined on the basis of the scheme given here. If a response is given by .1% to .99% of the testee, then the response will get an originality weight of 5; if a response is given by 1% to 1.99% of the testee, then the response will get an originality weight of 4; if a response is given by 2% to 2.99% of the testee, then the response will get an originality weight of 3; if a response is given by 3% to 3.99% of the testee, then the response will get an originality weight of 2; and if a response is given by 4% to 4.99% of the testee, then the response will get an originality weight of 1. Responses given by 5% or more of the testees will get an originality weight of zero. Same scoring procedure was followed in the present test for the scoring of originality. The procedure followed for scoring of originality of present LCTE is given in Table 3.10.

<table>
<thead>
<tr>
<th>A response given by the number of testees in percentage form</th>
<th>Originality score</th>
</tr>
</thead>
<tbody>
<tr>
<td>A response given by 1% of the testees</td>
<td>5</td>
</tr>
<tr>
<td>A response given by 2% of the testees</td>
<td>4</td>
</tr>
<tr>
<td>A response given by 3% of the testees</td>
<td>3</td>
</tr>
<tr>
<td>A response given by 4% of the testees</td>
<td>2</td>
</tr>
<tr>
<td>A response given by 5% of the testees</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 3.10  Procedure Followed for Scoring of Originality of LCTE
In the present test the number of sample in both the groups were quite small (60 in experimental group and 62 in control group). Therefore, while one would go for calculating the originality score of these groups, s/he would get a number of fractional originality score under a response group. In order to get rid of such difficulties, the researcher had taken the challenges to convert such fractional number of originality scores into whole number. Accordingly, the researcher had calculated the originality score. The following tables (Table 3.11 and Table 3.12) provide the guidelines for scoring originality scores for control group as well as experimental group referring to the present LCTE.

**Table 3.11 Procedure for Scoring Originality Score for Control Group (Number of Testees 62)**

<table>
<thead>
<tr>
<th>A response given by the number of testees out of 100 testees</th>
<th>Respective originality score</th>
<th>A response given by the number of testees out of present 62 testees</th>
<th>Their respective originality score</th>
<th>The respective originality score converted into whole form</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>1</td>
<td>5/100×62=3.10</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>2</td>
<td>4/100×62=2.48</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3/100×62=1.86</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>4</td>
<td>2/100×62=1.24</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>5</td>
<td>1/100×62=.62</td>
<td>1</td>
</tr>
<tr>
<td>More than 5</td>
<td>0</td>
<td>More than 5</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Table 3.12 Procedure for Scoring Originality Score for Experimental Group (Number of Testees 60)**

<table>
<thead>
<tr>
<th>A response given by the number of testees out of 100 testees</th>
<th>Respective originality score</th>
<th>A response given by the number of testees out of present 60 testees</th>
<th>Their respective originality score</th>
<th>The respective originality score converted into whole form</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>1</td>
<td>5/100×60= 3.00</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>2</td>
<td>4/100×60=2.40</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3/100×60=1.80</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>4</td>
<td>2/100×60=1.20</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>5</td>
<td>1/100×60=0.60</td>
<td>1</td>
</tr>
<tr>
<td>More than 5</td>
<td>0</td>
<td>More than 5</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

(C) **Academic Performance Test in English (APTE)**

a. **Nature of APTE**

One important purpose of the present study was to assess the effectiveness of Technology Supportive Learning method for developing academic performance of the students. The researcher had prepared an academic performance test in English for this purpose with the help of experts. The same academic performance test is used as pretest as well as posttest in the present study to collect the entry level data and to know the changes in academic performance of the learners due to the effect of the treatment.
This academic performance test is based on selected nine chapters of class VI English textbooks, the textbooks which were published by NCERT and being used by CBSE schools. The items included in the test are generally convergent in nature. In other words, they require the divergent answers in a very lesser scale or the divergent thinking had a very little role relating to such test items. The researcher had taken all types of decisions regarding the present test with the help of a panel of experts.

b. **Focus of APTE**

The lower order cognitive competencies were selected for the test as the test was meant for lower class (class VI) students. Such competencies were knowledge, understanding, skill and application. Higher order cognitive competencies like analysis, synthesis, evaluation etc. were not chosen for the present test. The brief description of the cognitive competencies chosen for the present test is given below:

- **Knowledge** - Relating to the facts, information etc. of the contents.
- **Understanding** - Relating to the meaningful comprehension of the learning materials of the contents.
- **Skill** - Relating to the performance abilities of the learners in the four basic language skills i.e. listening, speaking, reading and writing.
- **Application** - Relating to the appropriate use of the learned materials in other situations.

c. **Nature of test items of APTE**

In accordance with the views of the experts, the researcher had taken three types of test items for the present test. Such types of test items are:

a) **L.Q** = Long question type test items
b) **S.Q** = Short question type test items
c) **O.Q** = Objective question type test items

d. **Weightage of marks given to types of test items in APTE**

According to the opinion of the experts, the researcher had given the following weightage of marks to the test items:

a) **L.Q** (Long question type) items = 4 marks
b) **S.Q** (Short question type) items = 2 marks
c) **O.Q** (Objective question type) items = 1 mark

e. **Initial draft of APTE**
The present test is consisted of 100 marks. At the preliminary stage of preparation of the test, there were total 40 items. Out of those 40 items, L.Q. items were 10, S.Q. items were 12, and O.Q. items were 18. However, 29 items were retained after item-analysis; and out of 29 items, there is 7 items of L.Q., 9 items of S.Q., and 13 items of O.Q. Item-analysis was done following these three stages:

a) Item selection  
d) Item difficulty level  
b) Item discrimination

Item selection - Item selection was made on the basis of experts’ judgment. Judgments were made taking into consideration the objectives and purposes of test.

Item difficulty level - Only such items were taken/ selected for the final stages which were approaching to the middle difficulty level.

Item discrimination - Only such items were retained for the preparation of the final test, which were having highly positive discrimination values.

f. Final draft of APTE

In the final draft of the test, the weightage to the different aspects of the test was given in the following manner in accordance with the experts’ judgments.

I. Percent of weightage in marks given to the different competency areas in English is given in Table 3.13

Table 3.13 Percentage of Weightage in Marks Given to Different Competency Areas in APTE

<table>
<thead>
<tr>
<th>Competency areas</th>
<th>Knowledge</th>
<th>Understanding</th>
<th>Skill</th>
<th>Application</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prose</td>
<td>8%</td>
<td>10%</td>
<td>12%</td>
<td>10%</td>
<td>40%</td>
</tr>
<tr>
<td>Poetry</td>
<td>6%</td>
<td>8%</td>
<td>9%</td>
<td>7%</td>
<td>30%</td>
</tr>
<tr>
<td>Non-Detailed</td>
<td>6%</td>
<td>7%</td>
<td>9%</td>
<td>8%</td>
<td>30%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>20%</strong></td>
<td><strong>25%</strong></td>
<td><strong>30%</strong></td>
<td><strong>25%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

II. Weightage in marks to different competency areas in APTE is given in Table 3.14

Table 3.14 Weightage in Marks Given to Different Competency Areas in APTE

<table>
<thead>
<tr>
<th>Objectives Areas</th>
<th>Knowledge</th>
<th>Understanding</th>
<th>Skill</th>
<th>Application</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prose</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>Poetry</td>
<td>6</td>
<td>8</td>
<td>9</td>
<td>7</td>
<td>30</td>
</tr>
<tr>
<td>Non-Detailed</td>
<td>6</td>
<td>7</td>
<td>9</td>
<td>8</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>20</strong></td>
<td><strong>25</strong></td>
<td><strong>30</strong></td>
<td><strong>25</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
III. The detailed blueprint of the APTE developed by the researcher with the help of experts is given in Table 3.15

Table 3.15 Blueprint of APTE

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Knowledge</th>
<th>Understanding</th>
<th>Skill</th>
<th>Application</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prose</td>
<td>LQ SQ OQ</td>
<td>LQ SQ OQ</td>
<td>LQ SQ OQ</td>
<td>LQ SQ OQ</td>
<td>20 (40)</td>
</tr>
<tr>
<td></td>
<td>1 (4) X</td>
<td>4 (4) 1 (4)</td>
<td>3 (6) X</td>
<td>1 (4) 2 (4)</td>
<td></td>
</tr>
<tr>
<td>Poetry</td>
<td>LQ SQ OQ</td>
<td>LQ SQ OQ</td>
<td>LQ SQ OQ</td>
<td>LQ SQ OQ</td>
<td>17 (30)</td>
</tr>
<tr>
<td></td>
<td>X X 6 (6)</td>
<td>1 (4) 2 (4)</td>
<td>X 1 (4)</td>
<td>2 (4) 1 (1)</td>
<td></td>
</tr>
<tr>
<td>Non-Detailed</td>
<td>LQ SQ OQ</td>
<td>LQ SQ OQ</td>
<td>LQ SQ OQ</td>
<td>LQ SQ OQ</td>
<td>16 (30)</td>
</tr>
<tr>
<td></td>
<td>1 (4) X</td>
<td>2 (2) 1 (4)</td>
<td>1 (1) X</td>
<td>3 (6) 3 (3)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>14 (20)</td>
<td>10 (25)</td>
<td>17 (30)</td>
<td>12 (25)</td>
<td>53 (100)</td>
</tr>
</tbody>
</table>

*Number within Bracket indicates ‘Marks’ and Number without Bracket indicates ‘Number of Questions’

**Manual of the APTE**

The present test contains 100 marks. According to the experts’ judgments, these 100 marks are divided on the basis of content areas and competency areas. The test contains three types of items, i.e. Long question type (LQ), Short question type (SQ), and Objective question type items (OQ). Each LQ carries four marks, each SQ carries two marks, and each OQ carries one mark. Scoring was done according to the weightage of marks given to different types of questions. The total number of questions mentioned in the blueprint was 53 but such questions were kept under the 29 headings in actual test. It is so because many questions of similar type came under the heading of one question. For example, three/four objective type questions came under one heading i.e. objective type question.

Out of these 29 questions in actual test, the subject area of prose contains nine questions, poetry contains nine questions, non-detailed contains 10 questions. Similarly, out of these 29 questions in actual test, knowledge competency contains 5 questions, understanding contains 7 questions, skill contains 11 questions, and application contains 6 questions. The detailed nature of the actual test questions used in Academic Performance Test in English is given in Table 3.16 and 3.17.
Table 3.16  Detailed Nature of the Test Questions of Different Content Areas of English in APTE

<table>
<thead>
<tr>
<th>Subject</th>
<th>Content-areas</th>
<th>Types of questions</th>
<th>Question numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGLISH</td>
<td>Prose</td>
<td>LQ</td>
<td>No’s- 1, 3, 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SQ</td>
<td>No’s- 6, 9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OQ</td>
<td>No’s- 2, 5, 7</td>
</tr>
<tr>
<td></td>
<td>Poetry</td>
<td>LQ</td>
<td>No’s- 11, 15, 17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SQ</td>
<td>No’s- 12, 13, 14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OQ</td>
<td>No’s- 10, 16, 18</td>
</tr>
<tr>
<td></td>
<td>Non-Detailed</td>
<td>LQ</td>
<td>Nos-19, 21</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SQ</td>
<td>No’s- 22, 24, 26, 28,29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OQ</td>
<td>No’s-20,23,25,27</td>
</tr>
</tbody>
</table>

Table 3.17  Detailed Nature of the Test Questions of Different Content Areas of English in Relation to Four Competency Areas of APTE

<table>
<thead>
<tr>
<th>Subject</th>
<th>Content areas</th>
<th>Competency-areas</th>
<th>Types of questions</th>
<th>Question numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGLISH</td>
<td>Prose</td>
<td>Knowledge</td>
<td>LQ</td>
<td>No’s-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>No’s-X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OQ</td>
<td>No’s-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Understanding</td>
<td>LQ</td>
<td>No’s-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>No’s-4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OQ</td>
<td>No’s-X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Skill</td>
<td>LQ</td>
<td>No’s-5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>Nos-6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OQ</td>
<td>Nos-7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Application</td>
<td>LQ</td>
<td>Nos-8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>Nos-9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OQ</td>
<td>Nos-X</td>
</tr>
<tr>
<td></td>
<td>Poetry</td>
<td>Knowledge</td>
<td>LQ</td>
<td>Nos-X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>Nos-10</td>
</tr>
<tr>
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<td></td>
<td></td>
<td>OQ</td>
<td>Nos-11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Understanding</td>
<td>LQ</td>
<td>Nos-12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>Nos-13, 14</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OQ</td>
<td>Nos-16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Skill</td>
<td>LQ</td>
<td>Nos-17</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>Nos-X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OQ</td>
<td>Nos-18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Application</td>
<td>LQ</td>
<td>Nos-19</td>
</tr>
<tr>
<td></td>
<td>Non-Detailed</td>
<td>Knowledge</td>
<td>LQ</td>
<td>Nos-X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>Nos-20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Understanding</td>
<td>LQ</td>
<td>Nos-21</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>Nos-22</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OQ</td>
<td>Nos-23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Skill</td>
<td>LQ</td>
<td>Nos-X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>Nos-25</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OQ</td>
<td>Nos-24, 26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Application</td>
<td>LQ</td>
<td>Nos-27</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SQ</td>
<td>Nos-29</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OQ</td>
<td>Nos-28</td>
</tr>
</tbody>
</table>

h. Reliability and Validity of APTE

Any psychological test is a device for giving a quantitative measure for a given characteristic or a number of characteristics. Therefore, it is essential to determine
the efficiency of any such tool before it is put to use. Validity and reliability are the most important aspects of efficiency of a psychological test. A sample of 30 students of Sec-A of class VI of K.V., NTPC, Farakka were taken to estimate the reliability and validity of the present APTE.

Reliability: The reliability of the present APTE was estimated through test-retest method. At first, the test was administered upon the sampling group. A gap of one week was given to the subjects after the test had been administered. Then the same test was re-administered upon them. The test retest reliability co-efficient of correlation was found to be 0.82.

Validity: The validity of the present APTE was estimated through the following methods.

*Content-Validity:* The theoretical validity of the test was established through content validity procedure. The content validity of the test was established on the basis of experts’ judgment. In order to achieve the content validity of the test, items were selected as well as analyzed on the basis of objectives and nature of the test.

*Item-Validity:* The statistical validity of the items was calculated by applying the principles of item difficulty and item discrimination. The following formula was followed for calculating item difficulty and item discrimination.

**Item Difficulty** = \( \frac{R}{N} \times 100 \)

\( R = \) Number of testees answered correctly
\( N = \) Total number of testees

**Item Discrimination** = \( \frac{R_u - R_l}{\frac{1}{2}N} \)

\( R_u = \) Number of testees in the upper group who answered the item correctly
\( R_l = \) Number of testees in the lower group who answered the item correctly
\( N = \) Total number of testees

The items that were approaching the middle difficulty values and the items that were approaching the highly positive discrimination values were selected for finalization.

*Concurrent Validity:* The present test was co-related with the test result of a general classroom achievement test in English of the same group of 30 students of Sec-A of class VI of K.V., NTPC, Farakka. Here, the present scores (the scores achieved through test which was developed by the researcher) were known as test scores, and the test scores of classroom achievement test in English (administered by the teacher
of the school) were regarded as criterion scores. When the test score was correlated with the criterion score, the validity co-efficient was found to be 0.75.
From this validity co-efficient of correlation and reliability co-efficient of correlation, the researcher concluded that the achievement test developed by her is highly valid as well as reliable.
The test itself is given in Appendix-F.

3.9.0 Data Collection Procedure
The researcher administered pretests on all the groups before giving treatments to them. After that, she taught the experimental group through technology supportive learning and control group through as usual learning method. After the treatments were over, the researcher administered the same pretests as posttests to all the groups. This is how data collection was done.

3.10.0 Techniques of Data Analysis
For the present piece of research work, the researcher has used descriptive statistics like mean, standard deviation, graphical representation of data etc. and the inferential statistics like ‘t’ test, ANOVA, ANCOVA etc. for analysis of the data.

3.11.0 Factorial Design for Data Analysis
The factorial designs for data analysis regarding the present study are given in chart no. 3.3, 3.4, 3.5, and 3.6.
Chart-3.3

FACTORIAL DESIGN FOR DATA ANALYSIS RELATING TO OBJECTIVES OF LEARNING, METHODS OF LEARNING AND PERFORMANCE LEVEL (To meet 2nd objective)

EL

(Objectives of learning)
LS
LC
AP

(Methods of learning)
TSL
ULM
TSL
ULM
TSL
ULM

(Performance level)
PT POT PT POT PT POT PT POT

Abbreviations used
EL-English Learning
LS-Linguistic Skills
LC-Linguistic Creativity
AP-Academic Performance
TSL-Technology Supportive Learning
ULM-Usual Learning Method
PR-Prose
PO-Poetry
ND-Non Detailed
PT-Pretest
POT-Posttest
L-Listening
S-Speaking
R-Reading
W-Writing
FLU-Fluency
FLE-Flexibility
ORI-Originality
Chart-3.4

FACTORIAL DESIGN FOR DATA ANALYSIS RELATING TO OBJECTIVES OF LEARNING, COMPONENT WISE OBJECTIVES OF LEARNING, METHOD WISE OBJECTIVES OF LEARNING AND PERFORMANCE LEVEL (To meet 3rd objective)
Chart-3.5

FACTORIAL DESIGN FOR DATA ANALYSIS RELATING TO OBJECTIVES OF LEARNING, METHOD WISE OBJECTIVES OF LEARNING, CONTENT WISE OBJECTIVES OF LEARNING AND PERFORMANCE LEVEL (To meet 4th objective)
Chart 3.6
FACTORIAL DESIGN FOR DATA ANALYSIS RELATING TO OBJECTIVES OF LEARNING, COMPONENT WISE OBJECTIVES OF LEARNING, METHOD WISE OBJECTIVES OF LEARNING, CONTENT WISE OBJECTIVES OF LEARNING AND PERFORMANCE LEVEL (To meet 5th objective)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

(Objecives of learning)

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