Chapter- III

Method and Procedure
A theoretical framework of variables, significance of problem, development, related literature and description of the tools have been discussed. The present chapter focuses on the sample, design, tools, procedure used in the study and statistical techniques employed. The method of the study has been discussed under following sub headings:

3.1 Sample
3.2 Design
3.3 Controls in experimental design
3.4 Tools used
3.5 Procedure
3.6 Statistical techniques used

3.1 SAMPLE

Sampling is an important aspect of life in general and enquiry in particular. The adequacy of sample i.e. the lack of bias depends on our knowledge of the population as well as method used for drawing the sample. Population refers to all cases under investigation and a sample is an actual subset of observation drawn from population. The sample can thus be described by a distribution of proportions propelling the probability distribution of function. The sampling distribution can be thought of as the result of repeating a sampling operation many times with a fixed sample size, and calculating a statistic like from each sample. At the same time, the sampling distribution of statistics gives us a way of relating the sample estimate to the population parameter. It provides a way of determining the significance level of a given result under the null hypothesis. The sample in the present study was drawn at the school and student level.

3.1.1 THE SCHOOL SAMPLE

The school sample was drawn from representative secondary schools of Amritsar district affiliated to Central Board of Secondary Education, New Delhi. A list of the schools under the administration of Amritsar district was procured from the District Education Officer. The schools were compared with regards to the criteria that schools had almost same class climate, physical facilities, teacher taught ratio, sex ratio etc. The names of schools were written down on slips of equal size. The names were folded into six symmetrically equal parts and put in an enclosed container. The lid was then covered and the box was
shaken up many times for easy shuffling. Then the investigator drew out the first four cards one by one bearing the names of each school which represented the population under investigation, which is given below:

(i) Ajanta Public School, Basant Avenue, Amritsar.
(ii) Government Girls High School, Mall Road, Amritsar.
(iii) Capt. Amardeep Singh, Government High School, Majitha.
(iv) Baba Desa Singh Public School, Majitha.

3.1.2 THE STUDENT SAMPLE

The study was initiated on a random sample of 400 students of class IX of English medium schools of Amritsar district. These were English medium schools affiliated to Central Board of Secondary Education, New Delhi. Most of these students belonged to middle class families. A list of schools was collected from the District Education Officer. Out of the total schools of Amritsar district, four schools were selected. After selecting the schools the student sample was drawn randomly. The school wise breakup of the sample is given in table 3.1.

Table 3.1: School- wise breakup of the sample

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the School</th>
<th>Experimental Group</th>
<th>Control Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ajanta Public School, Basant Avenue, Amritsar.</td>
<td>50</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Government Girls High School, Mall Road, Amritsar.</td>
<td>50</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Capt. Amardeep Singh, Govt. High School, Majitha.</td>
<td>50</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>Baba Desa Singh Public School, Majitha.</td>
<td>50</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>200</strong></td>
<td><strong>200</strong></td>
<td><strong>400</strong></td>
</tr>
</tbody>
</table>

Table 3.1 shows that 100 students were selected from each school of experimental and control group to be included in the sample for the study. The structure of initial sample has been presented in the table 3.2.

Table 3.2: The structure of initial sample according to instructional treatment

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Group allocation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Experimental Group</td>
<td>200</td>
</tr>
<tr>
<td>2</td>
<td>Control Group</td>
<td>200</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>400</strong></td>
</tr>
</tbody>
</table>

Table 3.2 shows that 200 students were divided each into experimental group and control group for the conduct of the experiment.
3.2 DESIGN

The present study was experimental in nature. A pre-test and post-test factorial design was employed. In order to analyze the data 2×2×3 Analysis of Variance was used. The study covered three independent variables i.e. instructional strategies, computer anxiety and self-concept. The variables of instructional strategies was studied at two levels i.e. computer based multimedia instructional strategy and conventional teaching strategy. The variable of computer anxiety was studied at two levels such as high computer anxiety and low computer anxiety. The variable of self-concept was studied at three levels viz., high, average and low self-concept. The main dependent variable was achievement gain which was calculated as the difference in post-test and pre-test score for the subject. After 30 days same achievement test was administered as retention test and the scores obtained comprised the retention test scores. Experimental and control group scores were compared according to their pre-test and retention test scores and difference was called retention scores. The schematic layout of the factorial design has been given below in fig. 3.1:

**Fig 3.1: The schematic layout of factorial design (2×2×3)**

Sample (400)

Experimental Group (A₁)

(200)

B₁ (54)

C₁ (15) C₂ (24) C₃ (15)

Control Group (A₂)

(200)

B₂ (54)

C₁ (15) C₂ (24) C₃ (15)

Where:

A₁ stands for computer based multimedia instructional strategy
A₂ stands for conventional teaching strategy
B₁ stands for high computer anxiety
B₂ stands for low computer anxiety
C₁ stands for high self-concept
C₂ stands for average self-concept
C₃ stands for low self-concept
3.3 CONTROLS IN EXPERIMENTAL DESIGN

In the present investigation, the control was exercised using the following techniques of controlling extraneous variables:

(i) Randomization was exercised at the initial stage of selecting schools. Out of a list of total schools only four were chosen randomly. Sections were also randomly selected.

(ii) Matching the group was one of the controls wherein all the relevant variables were controlled. The matching of groups was done on all the relevant variables like age, gender, socio-economic status and entry behavior etc. of learner. The essentiality of this act was done in four schools to ensure equality in group.

(iii) Method of counter balancing was used by observing same sequence in administration of all tools. By keeping up similar time limits for all events in the experimental and control group and no time gap was allowed for data collection in the experimental and control group. Simultaneous occurrence in events was ensured.

To ensure constancy across conditions, similar sequence and conditions were followed to administer pre-test, instructions and post-test in similar conditions of classroom environment and instructions. The experimenter herself simultaneously administered the computer based multimedia lessons and delivered the lessons in the control group using the conventional teaching strategy. So that the conduction of the experiment was totally matched by the time period and schedule of control group learning so as to avoid contamination.

3.4 TOOLS USED

The following tools were used for collecting data:-

(i) A Criterion Referenced Test in English Grammar.

(ii) An Achievement Test in English Grammar was developed by the investigator herself.

(iii) Instructional Material on Computer Based Multimedia Instructional Strategy in English Grammar was developed by the investigator herself.

(iv) Instructional Material on Conventional Teaching Strategy in English Grammar was prepared by the investigator herself.

(v) Computer Anxiety Scale was developed by the investigator herself.

(vi) Self-Concept Questionnaire by Saraswat (1999) was used.

3.5 PROCEDURE

After the selection of the sample and allocation of students in two groups for instructional strategies, the experiment was conducted in five phases as following:-
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Firstly, the investigator made necessary arrangements with the principals of schools selected for the experiment. An achievement test as a pre-test measure was administered on the total sample. The students were assigned to two groups such as experimental and control group on the basis of pre-test scores to make equivalent groups. Before implementing the computer based multimedia instructional strategy, the two groups i.e. experimental and control groups were randomly decided and matched on the basis of pre-test scores so that equivalent groups could be formed. The answer-sheets were scored to obtain the information regarding the previous knowledge of the students.

Secondly, The computer anxiety scale and self-concept questionnaire were administered in each school of the experiment and control groups. The answer-sheets were scored as per the scoring key to obtain the scores of learners on the variables.

Thirdly, treatment was given to the experimental group. The experimental group was taught through computer based multimedia instructional strategy and the control group was taught by conventional teaching strategy. The same content was taught to both the groups for the same duration of time. The duration of instructional treatment was twenty sessions in each case with each session of 45 minutes. The investigator had already contacted the heads of the schools taken for study and informed them that grammar portion of IX class syllabus would be taken by her. The investigator personally requested the concerned subject teachers of the schools for leaving grammar portion of IX class syllabus from Central Board of Secondary Education, New Delhi and had taken the time for experimental phase as per their suitability without disturbing their schedules.

Fourthly, after the completion of the instructional program, the same achievement test in English grammar was administered as post-test to the students of both the groups. The students were given 45 minutes to complete the test. The answer-sheets were scored with the help of scoring key. After the completion of test students were thanked for their full cooperation. The experiment and control group scores were compared according to their pre-test and post-test scores and difference was called as gain achievement scores of the experiment and control group.

Fifthly, after a period of 30 days, same achievement test in English grammar was administered as retention test to the students of both the groups to get measures of their retention. The answer-sheets were scored with the help of scoring key and scores were obtained. The experimental and control group scores were compared according to their pre-
test and retention test scores. The difference was called retention scores. The schedule of experiment has been presented in table 3.4.

Table 3.3: The schedule for the experiment of all the four schools

<table>
<thead>
<tr>
<th>Activities</th>
<th>Ajanta Public School, Basant Avenue, Amritsar</th>
<th>Govt. Girls High School, Mall Road, Amritsar</th>
<th>Capt. Amardeep Singh, Govt. High School, Majitha</th>
<th>Baba Desa Singh Public School, Majitha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administered Pre-Test</td>
<td>Sept. 03, 2012</td>
<td>Sept. 04, 2012</td>
<td>Sept. 05, 2012</td>
<td>Sept. 06, 2012</td>
</tr>
</tbody>
</table>

Source: Field Study, 2012

3.6 STATISTICAL TECHNIQUES USED

The following statistical techniques were employed to analyze the data obtained from the experiment in order to test the hypotheses:

(i) Descriptive statistical techniques such as mean, standard deviation, kurtosis and skewness were used to determine the nature of the distribution of the scores.

(ii) A three way Analysis of Variance (2×2×3) was employed on the scores of the students to test the hypotheses related to instructional strategies, computer anxiety and self-concept for immediate performance and retention test scores of the students.

(iii) For the significant F-ratios, t-test was used for testing the significance between the means related to different groups and different variables.

(iv) Graphical techniques were used for descriptive analysis and visual perception of the data.