CHAPTER III

METHOD AND PROCEDURE
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In the previous chapters, problem of the study, review of related literature and the description of tools have been discussed in detail. The present chapter is committed to the method and procedure used in the study. In this chapter the design, data collection, sample, tool used, procedure and statistical techniques used for the analysis of data have been discussed in detail. No doubt that methodology plays an important role in any kind of research. It is also a well known fact that without it research cannot carry out its function properly. It is methodology only that lays out the way that formal research is to be carried out and it also outlines the detailed descriptions of variables and procedures adopted. So, methodology can be defined as the depiction of procedures or techniques adopted by the investigator to conduct his research study or investigation appropriately. It outlines the entire research plan. The method of the study has been discussed under following headings:

3.1 Identification of Variables
3.2 Sample
3.3 Design
3.4 Tool Used
3.5 Procedure
3.6 Statistical Techniques Used

3.1 IDENTIFICATION OF VARIABLES

A variable is the situation that the investigator manipulates, controls or observes for the successful research. According to Damato (1970), variable may be defined as those attributes of objects, events, thing and beings, which can be measured. It is to be noted that nature of a variable whether it is independent or dependent depends upon the problem, a variable may be and variables are given below:

(i) Independent Variable: The independent variable is the state or individuality that the investigator manipulates or controls in his attempt to establish its relationship to scrutinize the phenomena. In the present study, instructional strategy was taken as an independent variable. Two instructional strategies i.e. online mastery learning strategy and conventional teaching strategy were taken for this purpose. The present study has two classifying independent variables such as intelligence and academic stress.
Method and Procedure

(ii) Classifying Independent Variable: A classifying independent variable is that which identifies or classifies groups within a given population based on biological, social, physical, economic or other characteristics. Classifying variable helps us for targeting sub-division of the population. In the present study as already stated, intelligence and academic stress were identified as two classifying independent variables.

(a) Intelligence: The students were divided into two levels on the basis of scores they obtained on the tool of intelligence i.e. high and low intelligence group.

(b) Academic Stress: The students were divided into three levels on the basis of scores they obtained on the tool of academic stress i.e. high, average and low academic stress group.

(iii) Dependent Variable: The dependent variable is the state or characteristics that appears, disappears or changes as the investigator introduces, removes or changes independent variable. In the present investigation achievement in English was taken as the dependent variable. Beside the independent and dependent variables, the present study has extraneous as well as intervening variables.

(iv) Extraneous Variables: An extraneous variable is an unwanted variable that affects the relationship between the variables that an experimenter is examining. This is the variable only that adds error to an experiment. In the present study, school, physical environment of classroom, computer laboratory and content were considered extraneous variables. All the above mentioned variables were either controlled experimentally or were equalized by way of matching.

(v) Controlling Extraneous Variables: In a well designed study, different factors that may affect the outcome of experiment must be controlled if sound conclusions are to be drawn. In the present study the investigator tried to control the following extraneous variables to the maximum extent that they were likely to affect the final achievement of students such as:

(a) Prior Knowledge: Pre-experimental achievements of both the groups were controlled by equating the groups on pre-test scores prior to the experimentation.

(b) School Environment: All the schools selected for the experiment were affiliated to Central Board Secondary Education, New Delhi and have more or less same physical environment such as ventilation and light arrangement, local area network facility etc.
(c) **Teacher Behaviour:** The investigator assisted by teachers of the schools for the conduct of the experiment. Control groups of all the four schools were taught by the investigator herself at different times allotted by the respective. Hence, this eliminated inter-teacher variation.

(d) **Content:** The same content was taught to both the groups such as experimental and control group, hence, controlling the content variables.

(vi) **Intervening Variables:** In a study an intervening variable is just like extraneous variables that can affect the results of research. This variable is much more difficult to control. In this study, motivation, fatigue, boredom and any other factor that arose during the course of research were the intervening variables.

### 3.2 SAMPLE

For drawing an adequate sample the researcher should have knowledge about the methods to draw a sample so that it could prove unbiased. According to Calfee (1975) a population is the theoretical set of all possible observations or a particular experiment. Different type of techniques can be used to obtain an appropriate sample. In the present study, in order to satisfy the real effort in experimental research, the logical statistical inference of purposive sampling was initially employed to select those schools which have Local Area Network Facility and then random sampling technique was used. The sample in the present study was drawn at two levels i.e. the school sample and the student sample.

#### 3.2.1 THE SCHOOL SAMPLE

The sample was drawn from representative secondary schools of Mohali in Punjab which were affiliated to Central Board of Secondary Education, New Delhi. The schools were fulfilling the basic requirements for the present study i.e. computer facilities and English as a medium of instruction, yet these schools were not included in the study as their number is insufficient in the state to represent the total population. The schools affiliated to Central Board of Secondary Education, Mohali are fairly good in terms of English language education and computer facilities. The investigator delimited her study to private schools affiliated to Central Board of Secondary Education in the state of Punjab. The school sample comprising of 9th class students was drawn from the representative secondary schools of Mohali district which have the local area network facility. The average age of students ranged from 15-16 years. The names of schools were written down on slips of equal size. The names
were folded into six symmetrical equal parts and put in an enclosed container. The lid was then covered and the box was shaken up many times for easy shuffling. The investigator drew out the first four slips one by one bearing the names of each school which represented the population under investigation:

(i) St. Attri Public School Lalru, Mohali.
(ii) Guru Nanak Public School Zirakhpur, Mohali.
(iii) G.S.Memorial Public School Zirakhpur, Mohali.
(iv) Vivek High Public School Mohali.

3.2.2. THE STUDENT SAMPLE

After selecting the schools, students were drawn randomly from the above four schools. The study was conducted on 400 students of 9th class senior secondary schools studying in the Mohali district. The investigator selected 100 students i.e. 50 for control group and 50 for experimental group students from each school. The school wise breakup of the sample has been presented in Table 3.1

Table 3.1: School-wise breakup of the sample

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Name of the school</th>
<th>Control Group</th>
<th>Experimental Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>St. Attri Public School, Lalru, Mohali.</td>
<td>50</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Guru Nanak Public School, Zirakhpur, Mohali</td>
<td>50</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>G. S. Memorial Public School, Zirakhpur, Mohali</td>
<td>50</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>Vivek High Public School, Mohali</td>
<td>50</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>200</td>
<td>200</td>
<td>400</td>
</tr>
</tbody>
</table>

Table 3.1 shows that 400 students were selected from different schools of Mohali district. The structure of initial sample have been presented in the following table 3.2 & fig. 3.1

Table 3.2: The structure of initial sample for instructional treatment

<table>
<thead>
<tr>
<th>Sr. 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></td>
<td>Total</td>
<td>400</td>
</tr>
</tbody>
</table>
Fig 3.1: Pie diagram representing the structure of initial sample for instructional treatment

Table 3.2 and fig 3.1 shows that 200 students were divided each into experimental and control group for the conduct of the experiment. The test of intelligence was administered and high and low intelligence groups on the variables were formulated. According to Kelley’s criteria of taking up top 27% and bottom 27% students as constituting the experimental and control group respectively. Then the test of academic stress was given to the students. It was assured that the treatment group and control group had adequate number of different academic stress.

3.3 DESIGN

The present study was an experimental study in nature the investigator employed 2×2×3 factorial design for gain scores. First group was considered as experimental group and the second group was considered as control group. The experimental group was taught topics related to English grammar through online mastery learning strategy. The experimental group got its treatment through online only and the control group was taught same topic with conventional method of teaching. The study covered three variables such as instructional treatment, intelligence level and academic stress. The variables of instructional strategies were studied at two levels i.e. teaching with online mastery learning strategy and conventional teaching strategy. The variable of intelligence group was studied at two levels such as high and low intelligence groups. The variables of academic stress were studied at three levels such as high, average and low academic stress. These variables will work as independent variables. The schematic layout of the factorial design for performance gain has been given below in fig 3.2.
Method and Procedure

Fig 3.2: Schematic layout of the factorial design (2x2x3)

Sample (400)

A

▼ t

A1 (200) A2 (200)

▼ ▼ ▼ ▼ ▼

Bi (54) B2 (54)

▼ ▼ ▼ ▼ ▼ ▼

C1 C2 C3 C1 C2 C3 C1 C2 C3

(15) (22) (17) (17) (20) (17) (12) (22) (20)

Where:
A1 stands for online mastery learning strategy
A2 stands for conventional teaching strategy
B1 stands for high intelligence,
B2 stands for low intelligence
C1 stands for high academic stress
C2 stands for average academic stress
C3 stands for low academic stress

3.4 TOOLS USED

Tools have been considered as the techniques which are appropriate for the collection of certain type of evidence or information for conducting the research. The tools used for the present study are given below:

(i) Standard Progressive Matrices (SPM) by Raven, Raven and Court (2000) was used to measure the intelligence level of the students.

(ii) Scale of Academic Stress by Bisht (1987) was used.

(iii) A Criterion Referenced Achievement Test on selected units of English grammar was developed by the investigator herself.

(iv) An Achievement Test in English Grammar was developed by investigator herself to measure the performance of the students before and after the treatment.

(v) Instructional Material based on online mastery learning strategy and conventional teaching strategy was developed by the investigator herself.

(vi) Instructional Material based on conventional teaching strategy was developed by the investigator herself.
3.5 PROCEDURE

After the selection of adequate sample and distribution of students in two groups for the implementation two strategies, the present experimental study was conducted in four phases as following:

First Phase: in this phase achievement test as a pre-test measure was administered on the tool sample. On the basis of pre-test scores the whole sample was divided into two groups i.e. experimental and control group. Before implementation of the online mastery learning strategy package, the two groups i.e. experimental and control groups were randomly decided. The answer-sheets were scored to obtain the information regarding the previous knowledge of the students.

Second Phase: in this phase the investigator made necessary arrangements accordingly. Standard Progressive Matrices (SPM) was administered in each school of the experimental and control group. The groups were divided on the basis of intelligence levels attained by the students at two levels i.e. high and low intelligence. Kelley (1939) consideration of taking up 27% up and 27% bottom for consulting the high and low intelligence of the students respectively was taken care of while formulating the two groups. The academic stress scale was also administered in each school. On the basis of the frequency of stress the groups of academic stress were divided at three levels i.e. high, average and low academic stress. The answer-sheets were scored according to answer key to obtain knowledge of learners about the variables.

Third Phase: in this phase treatment was given to the experimental group. The experimental group was taught through online mastery leaning strategy and control group was taught by conventional teaching strategy by the investigator herself. The same content was taught to both the group for the same duration of time. The duration of instructional treatment was thirty sessions in each group with each session of 45 minutes. Regarding the experimental period, the investigator had already contacted with the heads of the schools taken for study and informed them that English grammar portion of 9th class syllabus would be taken by her. The investigator personally requested the concerned subject teachers of the schools for leaving English grammar portion of 9th class syllabus prescribed by Central Board of Secondary Education, New Delhi. It had taken time for experimental phase as per their suitability without disturbing their schedules. In experimental group, each student worked independently with the help of compact disc.

Fourth Phase: in this phase after the completion of the instructional programme, the same achievement test in English was administered as post-test to the students of both the groups. The students were given one hour 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. 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 scores of the experiment and control group. The schedule of experiment has been presented in table 3.3.

<table>
<thead>
<tr>
<th>Activities</th>
<th>St. Attri Public School Lalru, Mohali</th>
<th>Guru Nanak Public School Zirakhpur, Mohali</th>
<th>G. S. Memorial Public School Zirakhpur, Mohali</th>
<th>Vivek High Public School Mohali</th>
</tr>
</thead>
</table>

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 skewness and kurtosis were used to determine the nature of distribution of the scores.

(ii) Analysis of Variance (2 × 2 × 3) was employed on the gain achievement scores of the students, to test the hypotheses related to the strategies of teaching, intelligence levels and academic stress scores.

(iii) For the significant F-ratio, the t-test was used to find out the significance of difference between means related to different groups and different variables.

(iv) Product Moment Correlation was calculated to find out the relationship between learning outcomes with intelligence and academic stress at different taxonomic levels on learning outcomes.

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