CHAPTER - II
DESIGN OF THE STUDY
CHAPTER II
DESIGN OF THE STUDY

The present study aims at studying the effectiveness of self-learning modules on achievement in Geography in relation to mastery and non-mastery teaching strategies, intelligence and study habits. For this purpose, pre-test, post test, three way factorial design (2x2x2) was employed. The treatment variable was teaching strategies viz. self-learning module with non-mastery and self-learning module leading to mastery.

The two classifying variables intelligence and study habits were studied at two levels each. Intelligence was grouped as above average and below average. Similarly study habits were grouped as good study habits and poor study habits.

In this study, criterion was the scores of achievement test.

2.1 Dimension Of The Factorial Design

The factorial design (fixed model) was used, as it permits to evaluate the combined effect of two or more independent variables simultaneously. The dimensions of a factorial design refer to the number of levels of each factors. The experimental method followed was based upon a 2 x 2 x 2 factorial design. The layout of the factorial design used in the present study is given in Figure 2.1.
TEACHING STRATEGIES (A)

Mastery

IBA
B₁

PSH
C₁
GSH
C₂

Non-Mastery

IAA
B₂

PSH
C₁
GSH
C₂

IBA = Intelligence Below Average
IAA = Intelligence Above Average
PSH = Poor Study Habits
GSH = Good Study Habits

Figure 2.1: Layout of factorial design

Figure 2.1 depicts teaching strategies designated as A and its two strategies viz. Mastery and Non-Mastery as A₁ and A₂ respectively. Intelligence is designated as B and its two levels B₁ and B₂ represents below average and above average intelligence. Third variable is study habits and is designated as C and has two levels. C₁ and C₂ representing poor and good study habits respectively. The total number of Combinations came out to be 2 x 2 x 2 = 8 as shown (Fig.2.1 & 2.2).
Figure 2.2: SHOWING NUMBER OF COMBINATIONS IN 2 X 2 X 2 DESIGN
2.2 SAMPLING

Sampling is the process by which a relatively small number of individuals or subjects are selected in order to find out something about the entire population from which it is selected. Sampling procedures provide generalisations on the basis of relatively small proportion of the population.

Two samples were chosen, one for validation of achievement test and the other for conducting the experiment. For validation of achievement test, a sample of 100 students was raised from one school in U.T., Chandigarh.

The experiment of the study was conducted on a sample of 200 students selected from eight schools in U.T., Chandigarh. Purposive-cum-randomised sampling technique was employed to select 8 schools out of 12 senior secondary schools where Geography was being taught as a subject. Different schools were taken for the two strategies of teaching in order to avoid interaction among themselves. The break-up of the sample selected for the present study is given in Table 2.1 and the Geographic location of these schools is given in Figure 2.3.
Figure 2.3 SKETCH SHOWING LOCATION OF SCHOOLS SELECTED FOR EXPERIMENT.
Table 2: Distribution of Sample

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the School</th>
<th>No. of students</th>
<th>No. of students selected</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>1</td>
<td>Shivalik Public School, Sector 41</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>2</td>
<td>Govt. Model Sr. Sec. School, Sector 10</td>
<td>04</td>
<td>06</td>
</tr>
<tr>
<td>3</td>
<td>DAV Sr. Sec. School, Sector 8</td>
<td>15</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Govt. Model Sr. Sec. School, Sector 37</td>
<td>14</td>
<td>21</td>
</tr>
<tr>
<td>5</td>
<td>Govt. Model Sr. Sec. School, Sector 20</td>
<td>08</td>
<td>18</td>
</tr>
<tr>
<td>6</td>
<td>Govt. Model Sr. Sec. School, Sector 18</td>
<td>-</td>
<td>27</td>
</tr>
<tr>
<td>7</td>
<td>Govt. Model Sr. Sec. School, Sector 21</td>
<td>-</td>
<td>05</td>
</tr>
<tr>
<td>8</td>
<td>Kendriya Vidyalaya, Sector 31</td>
<td>19</td>
<td>23</td>
</tr>
</tbody>
</table>

2.3 TOOLS USED

A researcher will require many data gathering tools which may vary in their complexity, design, administration and interpretation. Each tool is appropriate for the collection of certain type of information. The researcher has to select from the available tools which will provide data he seeks for testing the hypotheses. The researcher should familiarize himself with the nature, merits and limitations of the existing research tools; and should
also develop skill in the construction and use of these research tools.

In the present study the following tools were employed to collect the relevant data:

1. An Achievement Test developed and standardized for local use by the investigator. The test was used to test the performance of the learners before and after treatment.

2. The Group General Mental Ability Test developed by Jalota A, published by National Psychological Corporation, Agra was used to measure the intelligence of the learners.

3. Study Habit Inventory developed by Wrenn and Larsen, published by Stanford University Press, California was used to measure study habits of learners.

4. Five self Learning Modules in Geography were developed to study the effectiveness in relation to mastery and non-mastery teaching strategies.

2.3.1 Description of Tools

2.3.1.1 Achievement Test

To measure knowledge, understanding and application in Geography, an achievement test was constructed by the investigator. The test consisted of two major types of items. Section (A) consists
of 30 multiple choice questions and section (B) consists of 30 fill in the blanks. The detail of the development of achievement test is discussed in Chapter III. Each right answer carries 1 mark. The reliability of the test was calculated by test-retest method and was found to be 0.87. The validity of the test was determined as content validity.

2.3.1.2 Group Intelligence Test

Jalota’s Group test of General Mental Ability was used to measure the intelligence of the sample. The test consists of 100 different items pertaining to numerical ability, reasoning, similarities, analogies and language ability. The time limit for this test was 25 minutes. Separate answer sheets were provided to the students so as to reuse the test booklets. The author refers to the reliability and its concurrent validity coefficient ranging from .50 to .78 against the examination marks as criteria. The test was administered and scored strictly in accordance with the instruction given in the manual.

2.3.1.3 Study Habits Inventory

It was decided to measure the study habits of the learners by employing the Study Habit Inventory developed by Wrenn and Larsen. In this
inventory a list of situations, habits and conditions were given which affects the use of study time and consequent success in school work and study. Learners were asked to state their habits with regard to these items. The inventory contains 28 statements under four sub-heads namely (A) reading and note taking techniques; (B) habits of concentration (C) distribution of time and social relationship in study and (D) general habits and attitudes of work.

After each statement, there were three columns. If the statement has rarely or never true learners were asked to tick mark in column 1; if the statement was sometimes true to tick mark in Column 2; if the statement was often or always true then to tick in column 3.

Scoring was done with the help of scoring key developed by the authors. The composite score was obtained by adding the total positive and negative scores.

2.3.1.4 Self Learning Modules

In addition to the above mentioned three tools five 'Self Learning Modules' in Geography on following topics were developed.

1. Soils
2. Volcanoes
3. Underground water
The development of self-learning module is discussed in Chapter-III.

2.4 Procedure
The present study was conducted in three phases. In Phase I pre-test as achievement test, intelligence and study habits tests were administered to the sample strictly in accordance to the instruction given in the respective manuals by the concerned authors.

In Phase-II eight selected schools were randomly assigned to two teaching strategies. Students in Group A₁ of four schools were exposed to Self-learning Modules and Mastery Criterion was employed to move from one topic to another. Criterion test was given. The students who attained the criterion in the topic were then given the next module. Students in group A₂ of another four schools were administered self-learning module, but without mastery learning criteria.

In Phase-III, achievement test was administered as post test.

2.5 Collection of data
The tests were scored in strictly according to the instructions given in the respective manuals. The data yielded the following set of scores:

1. Pre-test (Achievement Test) scores
2. Intellectual test scores
3. Study habits scores
4. Post test (Achievement test) scores

2.6 Statistical Analysis of Data
Descriptive statistics like mean, median, mode, skewness and kurtosis were computed to study the nature of the data. Frequency curves were drawn to describe the raw data. ANOVA and t-tests were computed to test the hypotheses.

2.7 Operational Definitions of the Terms Used
1. Achievement
Achievement as measured by the achievement test developed and standardised by the investigator in the form of scores.

2. Intelligence
Intelligence as measured by Jalota’s Group test of general mental ability.

3. Study habit
Study habit as measured by Wrenn and Larsen’s Study habit inventory.

2.8 Lay out of the Thesis
Chapter I Introduction
Chapter II Design of the Study
Chapter III Development of Self-learning Modules and Achievement Tests
Chapter IV Analysis and Interpretation of Data
Chapter V Summary and Conclusions
Bibliography

Appendix - I Achievement Test

Appendix - II Self-learning Modules on

1. Soils
2. Volcanoes
3. Underground water
4. Earthquakes
5. Atmosphere