Chapter III

Method of Study...
CHAPTER III

METHOD OF STUDY

In the preceding chapter, the theoretical rationale of the problem review of related studies, emergence of problem, objectives, hypotheses and the tools along with their development were discussed. The present chapter has been developed to discuss the method of study under the following heads:

• TOOLS USED
• THE SAMPLE
• DESIGN OF THE STUDY
• CONTROL OF VARIABLES
• PROCEDURE AND
• THE STATISTICAL TECHNIQUES

TOOLS USED

Factual material or data unknown or untapped so far is essential in every study. Relevant data, adequate in quantity and quality and also reliable and valid in every respect is a must. Thus, the selection of suitable instruments is of vital importance for successful research, especially in an experimental research study of present type.

Following tools were used for collecting data:

• ENTRY BEHAVIOUR TEST
  (Developed and validated by the investigator)

It consisted of:
  o English Language Background Questionnaire
  o Parent-Child Interaction Scale

Two versions of the scale were developed
  • Students’ Version
    (To be filled by students)
  • Parents’ Version
    (To be filled by parents)

  o Prerequisite Skills Test

• ENGLISH SELF-EFFICACY SCALE
  (Developed and validated by the investigator)
It was a rating scale used for measuring Cognitive, Motivational, Affective and Selection dimensions of Self-efficacy in English.

- **INSTRUCTIONAL PACKAGES FOR MASTERY LEARNING**
  (Developed and validated by the investigator)
  These were based upon
  - Bloom's Mastery Learning Strategy
  - Keller's Personalized System of Instruction
  - Eclectic Mastery Learning Strategy
  - Material for Conventional Group Learning
    (Analysed by the investigator)

- **FORMATIVE TESTS**
  (Developed and validated by the investigator)

- **CRITERION TEST FOR SUMMATIVE EVALUATION**
  (Developed and validated by the investigator)

Details of each one of the above tools have been discussed in Chapter II of the report. These tools have been given vide Appendices 2(i) to 2(vi).

**THE SAMPLE**

According to the *Cambridge Dictionary of Statistics* (1998), sample is a selected subset of a population chosen by some process usually with the objective of investigating particular properties of the parent population. The process of selecting some part of a population to observe so as to estimate something of interest about the whole population is known as sampling. Some obvious questions for the investigator are how to obtain the sample and make observations and, once the sample data are to hand, how best to use them to estimate the characteristics of the whole population.

Sampling is critical to external validity—the extent to which findings of a study can be generalized to people or situations other than those observed in the study. To generalize validly the findings from a sample to some defined population requires that the sample has been drawn from that population according to one of several probability sampling plans. By a probability sample is meant that the probability of inclusion in the sample of any element in the population must be given a priori. All probability samples involve the idea of random sampling at some stage (Shavelson, 1988). In experimentation, two distinct steps are involved.

- Random selection—participants to be included in the sample have been chosen at random from the same population. Define the population and indicate the sampling plan in detail.

- Random assignment—participants for the sample have been assigned at random to one of the experimental conditions.
Another reason for being concerned with sampling is that of internal validity—the extent to which the outcomes of a study result from the variables that were manipulated, measured, or selected rather than from other variables not systematically treated. Without probability sampling, error estimates cannot be constructed (Shavelson, 1988). The key word in sampling is representative. One must ask oneself, how representative is the sample of the survey population (the group from which the sample is selected) and how representative is the survey population of the target population (the larger group to which we wish to generalize)?

PROCEDURE OF SAMPLE SELECTION

The research investigation was carried out on the students of class IX, of the age ranging between 13-15 years. The sample was selected from the representative co-education English medium senior secondary schools located in Chandigarh and Panchkula. The schools were chosen on the basis of availability and that of favourable climate for research. A list of schools was procured from the office of D.E.O. Four schools were randomly selected from the list of schools available for data collection.

Intact sections of Grade-IX were randomly selected for different experimental treatments. One group of students was selected as control group. The students of each of the experimental groups and control group were categorized into Adequate, Average and Inadequate groups of Entry Behaviour. This grouping of students into Adequate, Average and Inadequate Entry Behaviour groups was done by administering Entry Behaviour Test, which consisted of three dimensions viz. English Language Background, Parent-Child Interactions and Prerequisite Skills. The scores on these three tools were pooled to derive cumulative Entry Behaviour Scores. On the basis of these scores students were categorised as follows:

- Q3 & above: Adequate Entry Behaviour Group
- Between Q3 & Q1: Average Entry Behaviour Group
- Below Q1: Inadequate Entry Behaviour Group

The distribution of the sample sub-groups in respect of schools has been reported in Table 3.1.

### Table 3.1

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the School</th>
<th>Adequate EB</th>
<th>Average EB</th>
<th>Inadequate EB</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>D.C Model School, Sec-7, Panchkula</td>
<td>12</td>
<td>30</td>
<td>25</td>
<td>67</td>
</tr>
<tr>
<td>2.</td>
<td>Guru Nanak Public School, Sec.36, Chandigarh</td>
<td>25</td>
<td>35</td>
<td>15</td>
<td>75</td>
</tr>
<tr>
<td>3.</td>
<td>Shishu Niketan School, Sec.22, Chandigarh</td>
<td>14</td>
<td>41</td>
<td>18</td>
<td>73</td>
</tr>
<tr>
<td>4.</td>
<td>D.A.V. Sr.Sec. School, Panchkula</td>
<td>20</td>
<td>22</td>
<td>12</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>71</strong></td>
<td><strong>128</strong></td>
<td><strong>70</strong></td>
<td><strong>269</strong></td>
</tr>
</tbody>
</table>
The investigator started with a total Sample of 269 but the final sample was reduced to 235 as total number of 34 students dropped out at one or the other stage of instructional programme. From the sample of 67 students selected for Bloom's Mastery Learning Strategy, six students dropped out after the first lesson owing to their selection for Gurpurab Shabad Gayan and four others left during the following lessons so 57 students were finally left in Bloom's Mastery Learning Strategy Group. Similarly owing to absence due to one reason or the other 13, 07 and 04 students from samples of 75, 73, and 54 students of Keller’s Personalized System of Instruction Group, Eclectic Mastery Learning Strategy and Conventional Group Learning, dropped out leaving behind 62, 66, and 50 students in each of these groups respectively.

The distribution of the final sample on which analysis was done, has been given below in the following table No. 3.2.

Table 3.2
Treatment Group-wise Distribution of the Final Sample

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Instructional Group</th>
<th>Adequate EB</th>
<th>Average EB</th>
<th>Inadequate EB</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>BMLS</td>
<td>10</td>
<td>26</td>
<td>21</td>
<td>57</td>
</tr>
<tr>
<td>2.</td>
<td>KMLS</td>
<td>22</td>
<td>30</td>
<td>10</td>
<td>62</td>
</tr>
<tr>
<td>3.</td>
<td>EMLS</td>
<td>12</td>
<td>39</td>
<td>15</td>
<td>66</td>
</tr>
<tr>
<td>4.</td>
<td>CGL</td>
<td>18</td>
<td>21</td>
<td>11</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>59</td>
<td>118</td>
<td>58</td>
<td>N=235</td>
</tr>
</tbody>
</table>

DESIGN OF THE STUDY

Educational research is described as experimental when the researcher has firstly, specified the finite set of researchable hypotheses and secondly, has established a systematic programme of data gathering, under precisely defined conditions in an effort to test these hypotheses (Ingersoll, 1982).

The present study was designed to investigate into the effect of Mastery Learning strategies on achievement and self-efficacy in English in relation to Entry Behaviour. For the study two pre-test – post-test 4x3 factorial designs were employed. One 4x3 factorial design was employed for analysing achievement gain scores and another 4x3 factorial design was employed for analysing Self-efficacy Gain Score. Achievement and Self-efficacy were the two dependent variables. Different strategies of Mastery Learning constituted one of the treatment variables. This variable was studied at four levels viz. Bloom’s Mastery learning Strategy, Keller’s Personalized System of Instruction, Eclectic Mastery learning as against a Control Group of Conventional Group Learning. Entry Behaviour, which was another independent variable, was used for categorizing students into three levels of Entry Behaviour viz. Adequate, Average and Inadequate. This second independent variable was studied at three levels. The schematic layout of the design has been presented in Figure 3.1f and Figure 3.2f.
Method of Study.

KPSI: Keller's Personalized System of Instruction
CGL: Conventional Group Learning
BMLSi: Bloom’s Mastery Learning Strategy
EMLS1: Eclectic Mastery Learning Strategy
EB1: Entry Behaviour

Fig. 3.1f: Schematic Layout of the Design for Achievement as Dependent Variable

Achievement

Entry behaviour

Adequate EB
Average EB
Inadequate EB

Instructional Strategies

BMLSi KPSi EMLSi CGLi BMLSj KPSj EMLSj CGLj BMLSk KPSk EMLSk CGLk

BMLSi: Bloom’s Mastery Learning Strategy
KPSi: Keller’s Personalized System of Instruction
EMLSi: Eclectic Mastery Learning Strategy
CGLi: Conventional Group Learning
EB1: Entry Behaviour
Method of Study

Bloom's Mastery Learning Strategy (KPSI) vs. Keller's Personalized System of Instruction (KPSI)
Eclectic Mastery Learning Strategy (CGL) vs. Conventional Group Learning (CGL)

Entry Behaviour

BMLS, KPSI, EMLS, CGL

Fig. 3.2f: Schematic Layout of the Design for Self-efficacy as Dependent Variable

Self-efficacy

Entry behaviour

Adequate EB

Average EB

Inadequate EB

Instructional Strategies

BMLS₁, KPSI₁, EMLS₁, CGL₁

BMLS₂, KPSI₂, EMLS₂, CGL₂

BMLS₃, KPSI₃, EMLS₃, CGL₃

BMLS: Bloom's Mastery Learning Strategy
KPSI: Keller's Personalized System of Instruction
EMLS: Eclectic Mastery Learning Strategy
CGL: Conventional Group Learning
EB: Entry Behaviour
CONTROL OF VARIABLES

In order to reduce the contamination and study the clear effect of variables certain controls were introduced. A brief explanation of these experimental controls is as follows.

ORGANISMIC VARIABLES

In research, frequent use is made of response-inferred organismic variables (Edwards, 1968) which means a classification based upon prior observation of responses. No organismic variable was involved in the present investigation hence the investigator focused her attention on stimulus and response/behavioural variables.

STIMULUS VARIABLES

The general class of things related to an environment, situation or conditions of stimulation are referred to as stimulus variables (Edward, 1968) Control on this experimental variable was exercised by assigning the same teacher to all treatment groups. The activities involved in treatment were exactly similar in different schools. Randomized administration of treatment also ensured the control on stimulus variable. In the present experiment, it was desired to see the difference in attainment scores when subjects were involved under Group-Based, Teacher-Paced i.e. Bloom’s Mastery Learning Strategy, Self-Paced, Individual-Based i.e. Keller’s Personalized System of Instruction or a modified Mastery Learning Strategy i.e. Eclectic Mastery Learning Strategy. Role of teacher varied, but all the other aspects of the stimulus situation were maintained uniformly.

RESPONSE/BEHAVIOURAL VARIABLES

It refers to any variable, which involves some action or response of an organism. To control such variables, Criterion Test was administered for a pre-test as well as post-test measurement. Every effort was made to administer the pre-test and post-test under the similar conditions of room and instructions etc. It was not possible for the experimenter to administer the treatments to all the groups during the same treatment period. The gap between the pre-test of the two schools was about 40 days. However, this limitation was overcome by the application of 4x3 ANOVA, where the initial differences were taken care of by the statistical analysis.

PROCEDURE

Procedure of the experiment comprised of two main stages, which are:

- Selecting the Sample
- Conducting the Experiment

SELECTING THE SAMPLE

Process of Sample Selection has already been discussed under the heading Sample in the preceding paragraphs of this Chapter.
CONDUCTING THE EXPERIMENT

The experiment was conducted in four phases as presented in the following paragraphs.

- Phase I Administration of the Entry Behaviour Test.
- Phase II Administration of the Pretest on English Self-efficacy Scale & Criterion Test.
- Phase III Implementing Instructional Programme.
- Phase IV Administration of Post test on English Self-efficacy Scale & Criterion Test.

Phase I: Administration of the Entry Behaviour Test

The investigator obtained two separate lists of schools of Union Territory of Chandigarh and its satellite town Panchkula from the D.E.O s office. From these lists, all the co-educational English medium senior secondary schools were picked up. The investigator fixed appointments and discussed the proposed instructional programme with the principals and coordinators of these schools. Availability and favourable climate for research were the criteria for final selection of the schools. A meeting with class teachers and subject teachers helped in chalking out the date and time schedules for the implementation of the programme. After this the investigator established a rapport with class 1X Students of these schools. An informal introduction and orientation into the mechanism of Mastery Learning strategies was then provided to students.

Before starting with the instructional programme, all the students were given the entry behaviour test consisting of English Language Background Questionnaire, Parent-Child Interaction Scale, (comprising of two versions with one to be filled in by the student and the other by the parent) and a Prerequisite Skills test. The parents’ version was got filled by approaching the parents’ through students. The teacher also sent a note to parents’ that the forms be completed. Almost 95 percent parents returned their filled up proformas to the teachers, from whom the investigator collected them later. The parents who did not return the filled up scales were approached personally by calling them on phone and later at their residences. All the four tools were scored and a cumulative Entry Behaviour score was derived for each and every learner. On the basis of total scores on Entry Behaviour Test students were divided into three groups each for each strategy. These groups were of Adequate, Average and Inadequate Entry Behaviour.

School-wise date schedule for administering these tests has been presented in Table 3.3.
### Method of Study

#### Table 3.3
School-wise Schedule of Entry Behaviour Test Administration

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the School</th>
<th>English Language Background Questionnaire</th>
<th>Parent-Child Interaction Scale</th>
<th>Prerequisite Skills Test</th>
</tr>
</thead>
</table>

#### Phase II: Administration of the Pretest on English Self-efficacy Scale & Criterion Test

**English Self-efficacy Scale**

Pre-test of English Self-Efficacy Scale was administered to all the students of selected groups. Separate answer sheets were provided. Students were given thirty minutes to mark their responses. Scoring was done to obtain the information regarding English Self Efficacy of the students before entering into the instructional programme.

**Criterion Test**

Pre-test of Criterion test was administered to all the students of selected groups. Space for answers was provided with the questions. Three hours time was given to complete the tests. Scoring was done to obtain the information regarding pre-treatment knowledge of the students on the selected content.

This was repeated in all the selected schools before implementing the treatment. The school-wise schedule of administration of pre-tests on English Self-efficacy Scale and Criterion Test is presented in Table 3.4.

#### Table 3.4
School-wise Schedule of Pre-tests on English Self-efficacy Scale and Criterion Test

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the School</th>
<th>English Self-efficacy Scale</th>
<th>Criterion Test</th>
</tr>
</thead>
</table>
Phase III: Implementing Instructional Programme

Orientation was provided to students before entering into the instructional programme. Since the students are not used to Mastery Learning approaches, they were told the purpose of the experimental treatment and what is expected of them as the final learning outcomes.

For implementing the instructional programme four components listed by Anderson & Block (1987) provided the framework. These components have been listed as follows:

- Defining Mastery
- Planning for Mastery
- Teaching for Mastery
- Grading for Mastery

The framework of these components required completion of tasks summed up by Ahuja, M. (2000) detailed already in Chapter I of the report, under above mentioned components. The implementation of the instructional programme was carried out in light of Torshen’s Mastery Implementation Evaluation Model. Torshen’s model was viewed in three phases viz:

- Phase I Planning for Mastery
- Phase II Defining and Designing of Mastery Learning Instructional Packages
- Phase III Implementing and Monitoring of Mastery Learning Instructional Packages

Planning, defining and designing of Mastery Learning strategies had already been carried out. The investigator developed instructional packages for Blooms Mastery Learning Strategy, Keller’s Personalized System of Instructional and Eclectic Mastery Learning Strategy exactly as specified by their propounders. The instructional packages were validated also. Eleven lessons were developed along with two sets of formative tests. A final summative test was also developed. Enrichment and remedial materials had been designed for each unit and for each trial. The investigator now was mainly concerned about Phase III i.e. implementing these Mastery Learning Strategy. Since it was ascertained earlier from school records of these children that the schools had almost matched groups with similar demographic, social and economic background. These schools had a wider coverage of society where children mainly from middle class were studying. With a very minor percentage of sample here and there these students were uniformly distributed in senior secondary schools of Chandigarh. Hence it was decided that one experimental treatment be implemented in one school so that there could not be any contamination effect of different treatments. It is quite imperative to point out here that before doing so the investigator had checked that each school had an adequate number of students at the three levels of Entry Behaviour.
The three groups i.e. Blooms Mastery Learning Strategy, Keller’s Personalized System of Instruction, and Eclectic Mastery Learning Strategy were taught directly by the investigator. The instructional sequences, procedures and measures incorporated in the Blooms Mastery Learning Strategy, Keller’s Personalized System of Instruction, and Eclectic Mastery Learning Strategy have been described below:

- For getting very effective results the investigator started with a brief orientation of the students.
- The students were informed of what they were expected to learn. For this, the investigator acquainted them with the instructional objectives.
- After this, teaching-learning process was introduced to explain how they were to learn.
- The students were then motivated to learn.
- They were detailed about the expected learning outcomes in terms of behaviours to give them knowledge about how would they demonstrate learning.
- The students were then enlightened about the ways in which the adequacy of their learning was to be judged. For this, the investigator gave them knowledge about the type of test they would be undertaking at the end of instruction.
- After the orientation of students the investigator started with initial instructional process which was different for the three Mastery Learning strategies. The instructional process has been explained under different headings in the following paragraphs.

**Implementing Bloom’s Mastery Learning Strategy**

- Investigator herself provided the initial teaching to the group following the guidelines developed in advance. This initial instruction was designed after Gagne’s specifications of instructional events.
- New stimulus material was presented without an overdose of new material. These materials were administered at a rate suitable for each pupil in a group learning situation.
- Chalkboard and coloured chalks were utilized for making tables and for writing notes.
- Visual Aids were also used along with teacher explanation.
- Content was recapitulated and summarized at moderate intervals.
- This initial instruction was followed by a unit formative test. The tests were immediately scored and a table was prepared where record of progress for each individual learner was maintained.
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- On the second day each student was given feedback for his previous day's performance.
- Those students who attained mastery (100 percent) were identified and enrichment material was suggested to them. Some of these students were told to prepare charts on the unit's material mastered by them. The enrichment material was also drawn from English Grammar and Composition by Wren & Martin, (1999), S.Chand & Company Ltd.; Collins Cobuild: Student's Grammar: Practice Material by Dave Willis, (1999), Harper Collins Publishers and Intermediate English Grammar: Reference and Practice for South Asian Students by Raymond Murphy, (1999) Cambridge University Press, to go to the library and fetch parallel materials or work on second unit test as an additional exercise.
- Some of these masters were requested for peer tutoring to non-masters as remedial instruction.
- The investigators approached each pair while the second tutoring was on. She guided and helped wherever it was required.
- The second set of formative test was used after monitors reported to have finished remediation.
- These tests were scored and on the third day feedback was provided. Some more students had qualified for the mastery attainment. They were routed to enrichment whereas, the students who had still not been able to attain mastery were given third trial. The cycle of remediation-diagnosis-remediation continued till all the students gained mastery. This procedure was adopted uniformly for implementing all the three Mastery Learning Strategies to the three groups.
- Each unit (Total eleven) took about 4-5 days to complete. The maximum number of trials any unit required was four. No student on any of the eleven units and any of the Mastery Learning Strategy needed trials beyond four.
- The second unit was introduced and the cycle was repeated for all the units.
- Corrective feedback and confirmations were provided whenever needed.
- A final summative test was administered at the end of all the eleven units.

Implementing Keller's Personalized System of Instruction

- Programmed texts were provided to each student for their initial instruction.
- Students were instructed to follow the slide rule for reading these texts.
- A thorough supervision, was done by the investigator herself.
- No time limit was imposed on the students, still all of them completed the unit within the scheduled period.
- Unit Formative Test was administered at the end of each unit.
The diagnosis through formative tests helped the investigator to identify masters and non-masters. For this the students who had achieved the performance standard of hundred percent were termed as masters and given praise and encouragement and others were termed as non-masters.

The masters were provided with enrichment. Some of these students were told to prepare charts on the lesson they had just finished with. The enrichment material was also drawn from English Grammar and Composition by Wren & Martin, (1999), S.Chand & Company Ltd.; Collins Cobuild : Student's Grammar: Practice Material by Dave Willis, (1999), Harper Collins Publishers and Intermediate English Grammar: Reference and Practice for South Asian Students by Raymond Murphy, (1999) Cambridge University Press, to go to the library and fetch parallel materials or work on second unit test as an additional exercise.

Difficulties of non-masters were identified from the responses on formative unit tests. The objectives and instructional sequences corresponding to them were identified for each individual student. This mapping helped the investigator to prepare a list of suggestive remediation through relevant sequences in the Keller plans.

Corresponding feedback was given on the next day. The remediations mainly included self-repetition as first mode of corrective remediation. The students once again studied the suggested programmed sequence. During the process of mapping the investigator had prepared a list of suggested sequences of Keller programmes for each individual non-master. The second instruction in Keller’s Personalized System of instruction was done with the help of masters.

A second formative test was administered and the left out non-masters were administered second remediation.

The second remediation was imparted by the teacher.

The sequence was repeated till achievement of mastery.

The second unit was introduced and the cycle was repeated for all the units.

A final summative test was administered at the end of all the eleven units.

Implementing Eclectic Mastery Learning Strategy

Investigator used the lessons developed in advance for Bloom’s Mastery Learning Strategy for the initial instruction of this group.

The concepts were explained by the teacher using instructional plans based on Blooms Mastery Learning Strategy.

Visual Aids and coloured chalks were also used.

Students were provided with the programmed texts prepared for KPSI.
Method of Study

- Investigators explained the concepts herself and then told the students to go through the practice frames and summary frames of programmed texts. Students were told to give their responses in writing.
- Recapitulation and summarization was done at the end of each sub unit.
- Corrective feedback or confirmation was provided whenever needed.
- The presentation of instructional material was followed by administration of formative tests.
- Scores on unit formative tests helped in the identification of masters and non-masters. This was same for the three Mastery Learning Strategies.
- Those students who attained mastery (100 percent) were identified and enrichment material was suggested to them. Some of these students were told to prepare charts on the unit’s material mastered by them. The enrichment material was also drawn from English Grammar and Composition by Wren & Martin, (1999), S.Chand & Company Ltd.; Collins Cobuild : Student's Grammar: Practice Material by Dave Willis, (1999), Harper Collins Publishers and Intermediate English Grammar: Reference and Practice for South Asian Students by Raymond Murphy, (1999) Cambridge University Press, to go to the library and fetch parallel materials or work on second unit test as an additional exercise.
- Some of these masters were requested for peer tutoring to non-masters as remedial instruction.
- The investigators approached each pair while the second tutoring was on. She guided and helped wherever it was required.
- The second set of formative test was used after monitors reported to have finished remediation.
- These tests were scored and on the third day feedback was provided. Some more students had qualified for the mastery attainment. They were routed to enrichment whereas; the students who had still not been able to attain mastery were given third trial. The group of second trial non-masters were then given corrective instruction by the investigator herself. The cycle of remediation-diagnosis-remediation continued till all the students gained mastery. This procedure was adopted uniformly for implementing all the three Mastery Learning Strategy to the three groups.
- Each unit (Total eleven) took about 2-3 days to complete. The maximum number of trials any unit required was three. No student on any of the eleven units and any of the Mastery Learning Strategy needed trials beyond three.
- The second unit was introduced and the cycle was repeated for all the units.
- Corrective feedback and confirmations were provided whenever needed.
- A final summative test was administered at the end of all the eleven units.
Method of Study

For Control Group

• This group was taught by the regular English teacher in the Conventional Group Learning situation. It generally refers to reading out the chapter by the teacher. Solving exercise and providing notes for certain important questions.
• Lessons were provided to the regular English teacher by the investigator, so that there is no difference among groups on the amount of content taught to them (a copy of each lesson has been appended).
• No unit criterion tests were conducted after the completion of different units.
• The time schedule followed for this group was similar to that of the other three groups.
• After having completed content, a summative test was administered to this group also.

Phase IV: Administration of Post-test on English Self-efficacy Scale & Criterion Test

English Self-efficacy Scale

English Self-efficacy Scale was administered to all the students of selected groups, after they had completed eleven units instructional programme. Separate answer sheet were provided. Students were given thirty minutes to mark their responses. Scoring was done to obtain the information regarding English Self-efficacy Scale of the students after completing the instructional programme.

Criterion Test

Criterion Test as Post-instructional Test was administered to all the students of selected groups. Space for answers was provided with the questions. Three hours time was given to complete the test. Scoring was done to obtain the information regarding knowledge of the students on the criterion test after completion of the instructional programme. Students were thanked for their full Co-operation.

The data schedule followed for the experiment has been given in the Table 3.5.

Table 3.5

School-wise Date Schedule Followed for the Conduction of the Experiment

<table>
<thead>
<tr>
<th>Phase of the Experiment</th>
<th>D.C. Model School</th>
<th>Guru Nanak Public School</th>
<th>Shishu Niketan Sr. Sec. School</th>
<th>D.A.V. Sr. Sec. School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase III</td>
<td>29 Oct. to</td>
<td>29 Oct. to</td>
<td>6 Jan. to</td>
<td>6 Jan. to</td>
</tr>
</tbody>
</table>
THE STATISTICAL TECHNIQUES

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

- Means and Standard Deviations were used wherever required.
- Graphical Analysis: presentations were done through Bar Graphs, Frequency Polygons & Pie diagrams.
- One way Analysis of Variance was used for analysis of cumulative scores on Entry Behaviour, its components, pretest scores on criterion test and English Self-efficacy scale.
- Two way analysis of variance was used for analysis of data pertaining to effect of Mastery Learning strategies on achievement and Self-efficacy gain scores in relation to Entry Behaviour.
- Each significant F-ratio was followed by t-test.
- Effect sizes were calculated according to Glass’s technique of d-values (meta analysis technique) separately, to study the impact of instructional strategies on achievement and Self-efficacy scores.