CHAPTER 3

METHOD

In the preceding chapters, the problem, of the related literature and the tools were discussed. The present chapter deals with the method of study which covers the sample, design of the study, procedure and statistical techniques used for the data analysis.

3.1. SAMPLE

The present research investigation was carried out on the teachers and students of class IX taken from some Government and public schools of Chandigarh representing both Hindi and English medium of instruction. The investigation was confined only to Bio-Science students.

3.1.1. SAMPLE OF TEACHERS

The teachers, invited the biology teachers to participate in the investigation. The selection of teachers was made on the basis of their teacher effectiveness scores as well as, their personality-type. Selected teachers were interviewed personally, for knowing their teaching experience. The final sample comprised 30 teachers. The distribution of teachers, with respect to teacher-effectiveness, personality types and teaching experience has been given below in the Fig.3.1
FIG. NO. 3.1 Sample of Teachers

TEACHERS (30)

TEACHER EFFECTIVENESS

HIGH (15)  LOW (15)

PERSONALITY TYPES

EXTROVERT (7)  INTROVERT (8)  UNSTABLE (8)  STABLE (7)

TEACHING EXPERIENCE

LOW (8)  MODERATE (16)  HIGH (6)
ble and low neurotic scores as stable personality types. Categorisation for teaching-experience was based on frequency distribution of the years of experience. A brief description of the experience categories are given below in the table 3.1.

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Yrs. OF TEACHING EXPERIENCE</th>
<th>EXPERIENCE CATEGORIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>9 Yrs. and Below</td>
<td>Low Experience</td>
</tr>
<tr>
<td>2.</td>
<td>10 to 19 Yrs.</td>
<td>Moderate Experience</td>
</tr>
<tr>
<td>3.</td>
<td>20 Yrs. and Above</td>
<td>High Experience</td>
</tr>
</tbody>
</table>

Each teacher was coded three times with the help of RCS and three times with the help of ETC observation system in a natural classroom setting. Thus, in all, 180 lessons of 30 teachers were observed and coded.

3.1.2. SAMPLE OF STUDENTS

The students sample of the present investigation consisted of class IX, boys and girls, studying biology, taken both from Hindi and English medium schools. The age of the students ranged between 13 to 15 years. The selection of the students was done randomly from the classes of selected sample of teachers. The final sample comprised of 600 students. The distribution of students with respect to teacher
effectiveness, personality types and teaching experience has been given below in the Fig.3.2

**FIG. NO. 3.2 Sample of Students**

The number of students for each teacher were twenty. All students were observed along with their teachers in the classroom interactions. Later, the randomly selected sample of students was administered on tests for assessing their academic performance, attitude and initiative level.

**3.2. DESIGN OF THE STUDY**

In the present study an ex-post-facto design was employed. It is a design with the help of which events that have already occurred in the hope that they will reveal significant generalities are examined. It is extensively used,
where controlled experimental analysis was not possible.

In order to attain clearly distinguished exclusive effects of experimental variable, the controls by way of schematic selection of one level of concomitant variables or the other were introduced. These experimental controls in form of a schematic lay-out of the design have been presented in Fig. 3.3.
FIG. NO. 3.3 Schematic layout of the Design
In the present study personality traits, teacher effectiveness and experience of teaching were the organismic/independent variables.

Classroom interaction ensured the stimulus variable. The observation of classroom interactions was done by reciprocal category system and equivalent talk category.

In the present study, learners performance at cognitive and effective level were taken as main dependent variables. To study such variables Criterion reference test (Achievement test), Scales of Attitude and Initiative were administered on students.

3.3. TOOLS

The following tools were used for the purpose of data collection:

3.3.1. Standardized Tools
i) Scale of initiative
ii) Eysenck Personality Inventory
iii) Scale of Teacher Effectiveness (Teacher Form)
iv) Observation System of ETC and RCS (for classroom interactions)

3.3.2. Tools Developed Specially for the Study
i) Scale of attitude towards Biology
ii) Criterion reference test for Biology
The detailed description of each tool was reported in Chapter 2.

3.4. PROCEDURE

Procedure of the investigation was comprised of two main stages. They are:

(a) - Selecting the sample of the study.
   - Conducting the study.
(b) - Observation of the classroom interactions.
   - Administration of scales.

3.4.1. SELECTING THE SAMPLE

This stage involved the identification of schools in Union-territory of Chandigarh, on the basis of their use of NCERT syllabus for Biology in Class IX.

After selecting schools, class IX Biology teachers were contacted and explained the two self reporting scales i.e., Teacher effectiveness scale and Eysenck Personality Inventory. They were administered the tests and requisite instructions were given to them. They were given an assurance that, their responses were kept strictly confidential, so they can react frankly, freely without fear. For collecting the requisite information from teachers, the investigator took about 9 weeks commencing from mid of Aug.1987 to first week of Oct.1987.
In each of 28 schools of Chandigarh 5 were Govt. Model Schools, 5 Govt. high schools, 5 Govt. Senior Sec. Schools, 4 D.A.V. Public schools, 6 Public schools and 2 were Kendriya Vidyalaya. The male and female biology teachers of class IX were invited to participate in the study. The tools properly completed as directed, were scored for all the participants, and were processed for the selection of the required sample. The criteria of selection was as follows:

**TABLE NO. 3.2 Criteria for selection of teachers**

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Variables</th>
<th>Criteria of Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>Teacher Effectiveness</td>
<td>* 27% Top &amp; 27% Bottom scales (According to Kelley 1939)</td>
</tr>
<tr>
<td>2)</td>
<td>Personality Type</td>
<td>* High and Low extroversion and neurotic scores (According to the manual)</td>
</tr>
<tr>
<td>3)</td>
<td>Teaching Experience</td>
<td>Frequency Distribution System.</td>
</tr>
</tbody>
</table>

* Middle Groups were dropped.

**TABLE NO. 3.3 Scores indicating cut-off points for selection.**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Variables</th>
<th>Criteria (Cut-off Point)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>Teacher effectiveness</td>
<td>/ High -- Above 321&lt;br&gt;Low -- Below 300</td>
</tr>
<tr>
<td>2)</td>
<td>Personality Types</td>
<td>/ High E+ -- Above 27&lt;br&gt;Low E- -- Below 11&lt;br&gt;High N+ -- Above 28&lt;br&gt;Low N- -- Below 10</td>
</tr>
<tr>
<td>3)</td>
<td>Teaching Experience</td>
<td>Low -- Below 10 Years&lt;br&gt; Moderate -- 10 to 19 Years&lt;br&gt; High -- 20 Years &amp; above</td>
</tr>
</tbody>
</table>

* E+ = EXTROVERT  N+ = UNSTABLE  
E- = INTROVERT  N- = STABLE  
/ Middle Groups were dropped
After applying the above mentioned criterion of selection upon the scores of the teachers thirty (30) teachers were finally chosen for the sample. A detailed list of teachers, schools and the sectors where the schools are situated, time of data collection, scores of selected teachers, their categories and types along with the criteria of selection is given in the Appendix No. 1.

The final sample selected for different presage variables is conceived by the table 3.4.

TABLE NO. 3.4 Selected sample of teachers

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Experience Cat.</th>
<th>Teacher Effec.</th>
<th></th>
<th>Personality</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No.of Trs.</td>
<td>High</td>
<td>Low</td>
<td>Extrovert</td>
<td>Introvert</td>
<td>Unstable</td>
</tr>
<tr>
<td>1) 9 Yrs. and below</td>
<td>8</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>2) 10 to 19 Yrs.</td>
<td>16</td>
<td>8</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>3) 20 Yrs. &amp; above</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>15</td>
<td>15</td>
<td>7</td>
<td>8</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

3.4.2. CONDUCTING THE STUDY

3.4.2. a) Observation of Classroom Interactions.

(i) Encoding the classroom interactions
(ii) Matrix-plotting
(iii) Tabulation

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3.4.2. b) Administration of Scales.

3.4.2. a) Observation of Classroom Interaction

(i) Encoding the classroom interactions

The investigator herself observed the classes of selected teachers, using ETC and RCS systems of classroom observations. Each of the 30 teachers, was observed thrice individually for about 20 minutes, for this purpose, with the help of RCS. The lessons were also recorded with the help of cassette recorder and just after the class, the lesson was encoded using ETC system of classroom observation. Three months from Jan.1988 to Mar.1988 were utilized to complete this work.

Following collection of data, the coding systems such as Reciprocal category system and Equivalent talk category provide useful modes of observation, that made it possible to gain information from recorded data. Processing data for interpretation includes four stages:

(i) Bracketing the data into pairs of observation
(ii) Tally marking the observations in a 361 cell Matrix.
(iii) Totalling the tallies by rows and columns.
(iv) Computing category percentages and ratios or proportions.

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Matrix - Plotting

After coding the lessons, according to the RCS and ETC observation systems the code numbers are paired in a way, that each recorded code number is used twice, first, as a second member of a pair, and then, as the first member of the following pair. The code 10 is added in the beginning and the end of the group of codes. The data, are then transferred to a 361 cell observation matrix, by inserting each code-pair into its corresponding cell. The cells are identified by row and column numbers. Thus, to plot a code pair in a matrix cell, the first code of a pair was used to locate the row and the second to locate the column. The procedure was followed until each pair was entered into the Matrix.

Tabulation

After the plotting of matrix, counting the number of tallies for each category provides a way of summing and thus, viewing relative distribution of verbal behaviours among the categories. The useful approach is simple counting and recording in the suggested format, which makes comparisons of gross raw data totals possible. It is possible to see by the 'eye-ballring' technique that which categories tend to contain the largest numbers of incidence, and in spotting types of interchange occurring between teacher-student and student-teacher. After summing up the tallies for each category, the
tallies across each rows and down each column are added. The total number of tallies for rows and columns should be the same.

(iv) Millage Matrix Formation

In the present study the patterns of teachers were compared with each other. For comparison, the row matrixes had to be converted into millage-matrix. The most elegant method, and one which is generally used in research projects, that have access to a computer, is to convert all matrices, usually these are composite matrices involving thousands of tallies, to a common base of 1000. This is called a millage-matrix. The one advantage of millage-matrix is that the infrequently appearing teaching acts are eliminated by approximating integers and leaving the fractions in the millage-matrix. In actual data only prominent teaching acts appear, so that any overlapping or contamination could be avoided.

(v) Computations

Percentages and ratios are found useful in determining the relative concentration of activity in any classroom episode or strategy sequence. Category percentages of record functions of individual categories and of record deviations such as non-related materials are computed by dividing the total number of incidents recorded into the individual to-
Percentages and ratios were calculated in the present study for the purpose of concluding some results, recording the classroom behaviour of students and teachers by the formula suggested by Ober, Bentley And Miller (1971). Flow diagrams of all the sequences of verbal interchange were made and interpreted to get model patterns.

3.4.2 b) Administration of tests

The heads of the institutions were requested to help in the present research project by sparing teachers and students for 2-3 periods. After the observation of classes two tests were distributed to randomly selected sample of students numbering 20.

The test administered was, scale of attitude towards Biology and Criterion-reference test. A rapport was built by the investigator, with the students through a small introduction to ensure their cooperation. Then the students were given instructions to make their responses on the scale. The respondents were given sufficient time to respond on each item before passing on to the next item. It was observed that on an average, the students took 45 to 50 minutes for (C.R.T.) Criterion Reference Test and 20 to 25 minutes for attitude scale. Rating Scale for initiative was given to the respec-
tive teachers of the students, so as to test their initiative level. Teachers were requested to fill the rating scale in their vacant periods during their school hours only. The average time taken by the teacher to complete the test was about 5 minutes.

3.5. DATE - SCHEDULE OF THE STUDY

The present study commences with selection of teachers and then accomplished by the observation of their classroom interactions. The administration of tests marked the end of the study. Date schedule of the study has been given in the table 3.5.

TABLE NO. 3.5 Date schedule of the study.

<table>
<thead>
<tr>
<th>Sl.no.</th>
<th>TESTS</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Selection of Teachers' Sample</td>
<td>18th Aug. to 10th Oct. 1987.</td>
</tr>
<tr>
<td>2</td>
<td>Classroom Observation And Administration of Scales and Tests</td>
<td>2nd Jan. to 28th Mar. 1988</td>
</tr>
</tbody>
</table>

The data, thus, obtained was subjected to statistical analysis discussed in the following section.

3.6. STATISTICAL TECHNIQUES

The following statistical techniques were employed to
analyse the data obtained from the study in order to test the hypothesis.

(1) Aggregates of rows and columns of millage matrix were converted into percentages for further computation of the data.

(2) Ratios of different comparative categories were computed.

(3) Descriptive statistics like Means and SD's of achievement scores, attitudes scores and initiative scores, were computed and later initiated.

(4) The t-test for difference in between the two percentages was applied.

(5) Test of significance (Chi-square test) for the comparative category ratios was applied to seek the equality between the two ratios.

(6) Analysis of variance was applied and F-ratios was calculated.

The analysis of data through the application of above mentioned statistical techniques have been reported in the following chapter.