CHAPTER III

DESIGN AND PROCEDURE
3.0.0. **Introduction**

The present study aimed at the comparative effectiveness of Concept Attainment Model and Advance Organizer Model with Traditional Method for teaching selected concepts of 'Educational Administration and School Organization' to student-teachers. Both these models were compared with Traditional Method in terms of attitude towards teaching profession, the immediate impact of teaching in terms of achievement and the participation level in developing lesson taught through these models. All these were stated in the form of objectives in chapter I. In the same chapter theoretical aspects of the study along with objectives, the corresponding hypotheses were also stated. Empirical evidences were presented in the second chapter. In the present chapter, the methodology followed in carrying out the study has been presented in detail under various headings like sample, design, tools, procedure for data collection, scoring, and statistical techniques used for analysing the data. The details of each one of them are discussed below:
3.1.0. **Sample**: The sample consisted of 75 student-teachers of B.Ed. class of the Department of Education, Aligarh Muslim University, Aligarh (U.P.). The researcher selected 'Educational Administration and School Organization' course for the purpose of this study.

The researcher selected 75 students-teachers on the basis of non-equivalent three static groups of tutorial classes. Each group namely A, B and C consisted of 25 students. Groups A and C were experimental groups and group B was control group.

3.2.0. **Design**: Kerlinger (1973) defined research design as "the plan, structure and strategy of investigation conceived so as to obtain answers to research questions and control variance". The plan includes an outline of what the investigator will do from writing the hypothesis to the final analysis of the data. The structure refers to scheme of the operation of variables. The strategy implies how the research objectives will be reached. Shulman (1970) suggested a scheme for examining the variables which should be considered in formulating propositions about the best form of instruction, particularly when the practitioner
is confronted with a contrasting array of positions. The scheme is depicted in the following figure:

Since Concept Attainment Model (CAM) and Advance Organizer Model (AOM) of teaching involved in the present study took contrasting position with respect to attainment of educational objectives, the choice of variables for this study was done according to the Shulman scheme. The type of subject matter was the selected concepts of Educational Administration and School Organization. Type of instructions were Bruner's Concept Attainment Model and Ausubel's Advance Organizer Model. These two strategies included deductive-expository and inductive-discovery type of sequences respectively. Each type of
instruction was imparted for fifteen class-periods of 55 minutes each. Each objective of instruction was product-centered, that is, acquisition of selected concepts. Entering characteristics of the learners were previous knowledge and intelligence.

The independent variables in the present study were Bruner's Concept Attainment Model and Ausubel's Advance Organizer Model and Traditional Method in the form of control treatment.

The dependent variables in the study were scores on achievement test developed by the researcher attitude towards teaching profession and scores obtained from observation matrix through Flander's interaction Analysis Categories System.

The Previous Knowledge and intelligence were treated as control variables in this study.

3.3.0. Selection of Experimental Design

Selection of experimental design is naturally based upon the purposes of the experiment, the type of variables to be manipulated and the conditions or limiting factors under which it may be conducted. Since application of the results of this study to
classroom teaching of selected concepts of Education Administration and School Organization was one of the prime concerns to the researcher, the experiment was conducted in the natural classroom setting. The essential condition of a true experimental design, that of random selection of subjects to form equivalent treatment-groups, was difficult to be met in the classroom experiment. Like any head of the Unit/Institution the Chairman of the Department of Education would not allow his class to be reshuffled. Hence, "The Non-equivalent Control Group Design" (Campbell and Stanley, 1963) was chosen for the study. The design is diagramatically presented in the following figure:

\[
\begin{array}{cccc}
0_1 & \ldots & X_1 & 0_2 \\
0_3 & X_2 & 0_4 \\
0_5 & \ldots & \ldots & 0_6
\end{array}
\]

Dashed line between the rows indicates non-equivalence of the groups. A blank in the third row represents control group receiving no experimental treatment but a place in the form of traditional treatment. Both
the control groups A and C are taught by AOM and CAM respectively and control group B is taught by TM. The procedure for design is the same as for pre-test—post-test control group design except that intact groups rather than randomly assigned ones are used. This problem mandates the use of pretest measures to demonstrate initial equivalence of the intact groups on the dependent variable.

In respect of "Non-equivalent Control Group Design" Kerlinger (1973) stated that the fact must be faced that frequently in research it is extremely difficult or impossible to equate groups by random selection or random assignment or by matching. Researchers commonly take pains to establish equivalence by other means and to the extent they are successful in doing so, to this extent the design is valid.

3.4.0. **Content to Be Taught**

The fifteen concepts selected from 'Educational Administration and School Organization' in B.Ed. Course were taught through CAM, AOM and TM. The list of concepts is given in Appendix A.
3.5.0. **Lesson Plans**

Each lesson plan was prepared by the researcher on fifteen concepts taught through Concept Attainment Model and Advance Organizer Model and Traditional Method respectively. The prepared lesson plans on both the models are given in Appendix C and D. The researcher taught both the experimental groups A and C through CAM and AOM. However the researcher taught the control group B through Traditional Method which is based on Herbartion teaching steps - Preparation, Presentation, Association, Assimilation and Application. The format of these two models and Traditional Method are given in Appendix B.

3.6.0. **Tools of the Study**

In order to draw any valid conclusion from an experimental research, tools used for the measurement of variables should be reliable and valid. This requirement is usually met by employing standardized tests. Since no research has been done in the area selected for the research the researcher constructed his own test for the purpose. The present study required the following tools and measures:
(1) a test for measuring intelligence,
(2) a test of measuring attitude towards teaching profession,
(3) achievement scores of the student teachers in the subject area involved in the study,
(4) an interaction analysis system for measuring participation/interaction level.

3.6.1. Measure of Intelligence

For measuring Intelligence of the subjects, 'The Group Test of General Mental Ability (20/52), A Point Scale For Adults, constructed by Jalota and Tandon (1971) was employed. This test is a spiral omnibus type of group verbal test of general mental ability in English. It is a point scale for adults and can be used on educated individuals of the ages 15 years and above.

The test contains 100 questions. Besides it employs 10 items for practice in beginning. Each item has been framed in a selective form providing mostly five alternatives to each question. This has been done with a view to make scoring more rigid and objective. The test consists of 9 subtests, namely, Number Series, Mathematical Instructions, Following
Reliability of Intelligence Measure

The reliability coefficients of the test have been determined by three methods. The value and the names of each method are given against it.

(1) Split - half method .... 91 (corrected value)
(2) Kuder-Richardson formula No. 20 ,..... 901
(3) Item reliability index and the item variance ... 906.

Validity of Intelligence Measure

Several studies have been done in order to find out validity of the test. In one of its studies, the present form (20/52) correlates 28 with the Rev. Minnesota Paper Form Board Test Series AA (Tandon, 1964). Further it correlates 35 with the academic examination marks and 67 with the Samahik Mansik Pariksha (A test of General Mental Ability in Hindi by Dr. S. Jalota). It also correlates 80 with the Samahik Mansik Yogyata Pariksha (1/61), the Hindi adoption of 20/52 scale. The intelligence test of Jalota is given in Appendix E.
3.6.2. Measure of Attitude Towards Teaching Profession

"Teacher Attitude Inventory" developed by Dr. S.P. Ahluwalia (1978) was selected for the present study to measure Attitude Towards Teaching Profession. The attitude scale was developed on the lines of Likert type summated ratings procedure. The scale was developed for the secondary school teachers. It consisted of 90 items with five point-scale. The subjects were to read the statement and select one out of the five options given against each statement. The five choices were: Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D), and Strongly Disagree (SD). The reliability coefficient of the scale are as follows:

<table>
<thead>
<tr>
<th>Method</th>
<th>Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Split half method (odd-even)</td>
<td>.88</td>
</tr>
<tr>
<td>Test method (9 months)</td>
<td>.75</td>
</tr>
<tr>
<td>KR 21</td>
<td>.70</td>
</tr>
</tbody>
</table>

3.6.3. Measure of Achievement

The achievement of student-teachers was measured with the help of achievement test developed by the researcher. The achievement test consisted of 10 questions of short answer type. Each question was to be answered in five points. The test was evaluated
by 100 marks. Each question was of 10 marks and the 10 marks were also distributed in 5 alternative points. Each point was of 2 marks. The same achievement test was administered in pre-testing and post-testing. The achievement test is given in Appendix G. The following steps were followed while developing the test:

Step I: The first step of the test construction was the preparation of blue print of the test. While making blue print all the cognitive aspects of the educational objectives (Bloom 1956) were taken into consideration.

Step II: According to the blue print 20 items of short-answer type were framed. These items were taken from the content of the course "Educational Administration and School Organization" of B.Ed. Course. Only English version of the items was made. The language of the items was kept very easy so that there should not be any difference in the understanding of the examiner, the teacher and the students.

Step III: Now this list of items was given to the teachers of the Department to know their reactions against the format of questions and their distractors.
On the basis of their opinion and suggestions five test items were eliminated as they were somewhat vague in nature.

Step IV: (Try Out): A booklet containing the list of 15 items was made. Each question was provided some space to give short-answer. These were distributed to the student-teachers in the Department of Education, AMU Aligarh (UP) for the try-out. Introduction for answering the questions and the approximate time-limit were given in the booklet. Booklets were distributed in the class and instruction were read and explained. Each correct answer was awarded ten marks and all the wrong answers were given zero mark.

Step V: Item Analysis: Item analysis was done by taking 27 percent of the students who scored the highest and 27 percent of students who scored the lowest scores. This was done to select the items which discriminates the best among the low and high achievers.

Step VI: Final Forms of the Test: Out of the twelve items only ten items were selected for the final form of the test. Scoring was done by the researcher himself very carefully.
Reliability: The reliability of test was calculated by split-half method (formula K-R 20) and was found to be 0.84.

Validity: The test showed high content validity because it was done on the basis of spelling out the course content with proper specification.

3.6.4. Measurement of Participation Level

Flander's Interaction Analysis Category System was used to measure the participation/interaction level of student-teachers in the development of lessons. Flanders and his associates developed a classroom observational system at the University of Minnesota between 1955 and 1960.

Flander's system investigates the verbal behaviour of a teacher and students in a classroom setting in order to enhance understanding and thus improve teaching behaviour (Amidon and Flanders, 1971). The Flander's Interaction Analysis System provided in Appendix H. consists of ten categories of verbal behaviour. These are divided into three major sections: Teacher Talk, Pupil Talk, and Silence and confusion.
Observation Procedure

Flander's system of interaction analysis was employed by a trained observer in the present study. The observer in the present study was Miss Nasreen, research scholar, Department of Education, Aligarh Muslim University, Aligarh (UP). She was trained in this interaction analysis system regarding encoding of observations before conducting the experiment. She used a live classroom of observations. It was desirable to take about five minutes to get acclimatized to the classroom situation and started recording. This recording is called encoding process. It was done by noting down every three seconds the category number of the interaction, she had then observed. She recorded these numbers in a sequence in a column.

Preparation of Observation Matrix

Constructing an interaction matrix from raw data from the recorded sequence of events is relatively simple and straightforward. The method consists of entering the sequence of numbers into ten matrix (10 row by 10 column table). Each number was entered in the form of sequence pairs, being used twice, firstly as the first number and secondly as second number. The rows of the matrix represent the first number in the pair and the columns represent the
second. In this way overlapping pairs of observations were entered in appropriate cells of the matrix. The data were begin and ended in silence ie category 10. The following example will clarify the procedure of matrix preparation.

**Recorded Sequence of Class Room Interaction**

<table>
<thead>
<tr>
<th>Pair</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>5</td>
</tr>
<tr>
<td>II</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>4</td>
</tr>
<tr>
<td>IV</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>5</td>
</tr>
<tr>
<td>VI</td>
<td></td>
</tr>
<tr>
<td>VII</td>
<td>6</td>
</tr>
<tr>
<td>VIII</td>
<td></td>
</tr>
<tr>
<td>IX</td>
<td>5</td>
</tr>
<tr>
<td>X</td>
<td></td>
</tr>
<tr>
<td>XI</td>
<td>5</td>
</tr>
<tr>
<td>XII</td>
<td></td>
</tr>
<tr>
<td>XIII</td>
<td>6</td>
</tr>
<tr>
<td>XIV</td>
<td></td>
</tr>
<tr>
<td>XV</td>
<td>7</td>
</tr>
<tr>
<td>XVI</td>
<td></td>
</tr>
<tr>
<td>XVII</td>
<td>8</td>
</tr>
<tr>
<td>XVIII</td>
<td></td>
</tr>
</tbody>
</table>

The Observation Matrix Table is given in Appendix I.
Interpretation of Interaction Analysis Data

Amidon and Flanders (1971) have suggested that the investigator should avoid reference to matrix until he/she had formulated a question about the interaction data. Some probable questions are mentioned below:

(i) What is the relationship of teacher talk to pupil talk?
(ii) Is the teacher typically direct or indirect?
(iii) How much class time was spent on lecturing?
(iv) Does the teacher generally ask narrow or broad questions?
(v) How does the teacher typically communicate the subject matter?

In order to answer certain questions about classroom communication decoding may be done at the following levels.

(A) Quantitative Analysis of Teacher Behaviour

(i) Interaction Categories
(ii) Areas of Interaction.
(iii) Behaviour Ratios.
(iv) Interaction Variables.
(B) **Qualitative Analysis of Teacher Behaviour**

(i) Clock-wise flow diagrams.

(ii) Box flow diagrams.

(iii) Locating the interaction models of critical teaching behaviours.

The researcher interpreted his results on the basis of 'Interpretation Based on Interaction Categories'. The column total represents the use of various categories. It was converted into percentage. Computation formula of behaviour ratio from observation Matrix is given in Appendix J.

**Data Collection**

Pretest and posttest scores on attitude towards teaching profession and on an achievement test in educational administration and school organization were collected for testing of the hypotheses of the present study. The scores for knowing participation level were collected through Flander's Interaction Analysis Categories System.

**Scoring**

Scoring was done according to the scoring procedure for a particular test given in the test
booklet. Gain score of achievement and attitude test was obtained by subtracting the pre-test scores from the corresponding post-test scores.

**Statistical Analysis Used**

Analysis of variance was applied to see the significance of difference among the mean gain scores of achievement and attitude towards teaching profession. For significant 'F' ratio t test was applied for each pair of groups to test the hypothesis of the present study. For participation level FIACS was interpreted on the basis of percentage. However \( \chi^2 \) - Chi square technique was used to test the significance of the hypothesis.