CHAPTER II

THE EXPERIMENT
CHAPTER-II

2.0 THE EXPERIMENT

The present study is an investigation into the area of micro-teaching. It purports to find out the effect of different models of integration exercises of teaching skills learned through micro-teaching upon teaching effectiveness and teachers attitude. This chapter is devoted to explain the method and procedure followed to carryout the investigation. The sequence of the description is as follows.

2.1. Design of the study.
2.2. Sampling.
2.3. Tools used in the study.
2.4. Procedure for the experiment.
2.5. Administration of tools and collection of data.
2.6. Experimental variation for experimental and control group.

2.1. DESIGN OF THE STUDY:

The parallel group pretest-post test design (Experimental and control group) was followed for the present study. The samples understudy were matched on the basis of age, intelligence level, academic achievement and teaching experience. The samples were divided into four groups of six each i.e. Group I, Group II, Group III and Group IV. The subjects of G I, G II and G III were regarded as experimental groups and underwent integration exercise through Diode, Summative and Additive model respectively. G IV remained to
be the control group and did not undergo any treatment for integration of skills. The tools used to realise the objectives are Teaching Assessment Battery form 0 and S, Indore Teaching Competence Scale (ITCS), Ahluwalia Teacher Attitude Inventory (ATAI) of which TAB-0 and ITCS are observational schedules used by the supervisors while delivering the lesson by the student teachers whereas ATAI and TAB-S can be directly administered to the student teachers.

Before undergoing any experimental treatment pretest scores were obtained by observing the practising lesson delivered by all the student teachers in the general class room situation with the help of TAB-0 and ITCS and by administering TAB-S and ATAI later on.

Then all the student teachers underwent micro-teaching practice for two cycles for each skill to gain mastery over five skills. (The detailed procedure was discussed in the preceding pages). When the micro-teaching session was over, post test I scores were obtained where each of the subjects delivered a lesson each and the performance was observed on the basis of TAB-0 and ITCS. Later on TAB-S and ATAI were administered.

When micro-teaching practice was over the experimental groups underwent experimental variation basing on the integration of skills by Diode, Summative and Additive model respectively and the control group underwent vicarious integration.
where the time for experimental and control group was the same.

After the experimental variation the student teacher of all the groups delivered a lesson each in general class room situation and their performance was observed with the help of TAB-0 and ITCB. As soon as the lesson was over, ATAI and TAB-5 were administered. These are called the post test II scores.

The scores obtained were analysed with the help of co-related 't' test followed by 'z' test to get end results. Post test I and pretest results of each group were analysed to find out the effect of micro-teaching practice upon teaching efficiency, teaching competence and attitude of the student teachers. Likewise, post test II and post test I results were analysed to find out the effect of integration exercises upon teaching efficiency, teaching competence and attitude of the experimental group over control group. To see the variation within and among the groups mean gain (1), gain (2) and gain (3) results were analysed.

2.2. SAMPLING:

John W. Best is of the opinion that "Sampling is both necessary and advantageous. Taking a complete census is generally both costly and difficult; in many cases it is completely impossible". The sample for the present study
consisted of 24 Bachelor of Education students, who were randomly selected out of 115 students (student teacher) of the training college, Sundargarh during the session 1983-84. The subjects were matched on the basis of intelligence, academic achievement, age and teaching experience. To assess their level of intelligence Cattell's Culture Fair Intelligence Test (Scale 3 Form A) was administered. With the help of Personal Information Blank, data concerning age, educational qualification and teaching experience regarding the subjects were collected. The data collected through Personal Information Blank were validated against the documents which were submitted during admission. As no body had got teaching experience equating on this variable became automatic. The age of the subjects was expressed in months for easy manipulation. The intelligence score, academic achievement (in terms of percentage of marks) and age (in terms of month) of 115 student teachers are given in appendix A-1.

The co-relation coefficients of the three variables i.e. age and intelligence and academic achievement were found out. The respective r's are given in Table No. 1(A)

<table>
<thead>
<tr>
<th>Table No. 1 (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Showing co-relation between age and academic achievement, age and intelligence, and intelligence and academic achievement.</td>
</tr>
</tbody>
</table>
Variables Co-rerelations
Age and Academic Achievement 0.53
Age and Intelligence 0.33
Intelligence and Academic Achievement 0.72

(The procedure of calculation of co-relation coefficient is given in Appendix A-2). The 't' ratio was found out to ascertain if the subjects were of the same population. The respective 't' ratio are given in Table No.1(B).

Table No.1 (B)

Showing 't' ratio between age and academic achievement, age and intelligence, intelligence and academic achievement.

<table>
<thead>
<tr>
<th>Variables</th>
<th>'t' ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age and Academic Achievement</td>
<td>6.63**</td>
</tr>
<tr>
<td>Age and Intelligence</td>
<td>3.71**</td>
</tr>
<tr>
<td>Intelligence and Academic Achievement</td>
<td>11.43**</td>
</tr>
</tbody>
</table>

't' ratio to be significant at .05 and .01 level with P=n-2 (115 - 2) 113 is 1.98* and 2.62** respectively.

As the table value is smaller than the calculated value hence it is significant, it shows that all the subjects were from the same population. Thus, the investigator randomly selected 24 students 6 in each group of which correlated 't' test were tried out and are given in Table No.2 (A) and 2 (B) respectively.
Table No. 2(A)

Showing mean (M), standard deviation (SD), of age, academic achievement and intelligence of 24 student teachers.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Academic achievement</th>
<th>Age</th>
<th>Intelligence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Group I</td>
<td>43.33</td>
<td>12.04</td>
<td>261.5</td>
</tr>
<tr>
<td>Group II</td>
<td>40.17</td>
<td>7.17</td>
<td>273.67</td>
</tr>
<tr>
<td>Group III</td>
<td>40.33</td>
<td>10.12</td>
<td>265.17</td>
</tr>
<tr>
<td>Group IV</td>
<td>40.17</td>
<td>6.65</td>
<td>271.33</td>
</tr>
</tbody>
</table>

Table No. 2(B)

Showing correlation and 't' ratio between and among the groups in academic achievement, age and intelligence of 24 student teachers.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Academic achievement</th>
<th>Age</th>
<th>Intelligence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r</td>
<td>t</td>
<td>r</td>
</tr>
<tr>
<td>I &amp; II</td>
<td>0.36</td>
<td>0.77</td>
<td>-0.34</td>
</tr>
<tr>
<td>I &amp; III</td>
<td>0.35</td>
<td>0.67</td>
<td>0.51</td>
</tr>
<tr>
<td>I &amp; IV</td>
<td>0.34</td>
<td>0.58</td>
<td>0.67</td>
</tr>
<tr>
<td>II &amp; III</td>
<td>0.80</td>
<td>0.06</td>
<td>-0.90</td>
</tr>
<tr>
<td>II &amp; IV</td>
<td>-0.84</td>
<td>0.00</td>
<td>-0.63</td>
</tr>
<tr>
<td>III &amp; IV</td>
<td>-0.54</td>
<td>0.52</td>
<td>0.20</td>
</tr>
</tbody>
</table>

The 't' ratio to be significant at .0.5 and .01 level of significance with df (n - 1) is 2.45* and 3.71** respectively.
As the calculated value is smaller than the table value it is not significant. Hence there are no difference among the four groups and they are treated as equal. The raw score of Group I, II, III, IV on Academic Achievement, Age and Intelligence are given in Appendix No. A-3.

2.3. TOOLS USED IN THE STUDY:

John W. Best is of the opinion that "A great variety of research tools have been developed to aid in the acquisition of data. These tools are of many kinds and employ distinctive ways of describing and quantifying the data. Each tool is particularly appropriate for certain sources of data ......

.............. like the tools in the carpenter's chest, each is appropriate in a given situation". Depending upon the objectives of the study and availability of suitable tools, the following tools have been used for this experiment for collecting the relevant data. A brief description of which is given below -

2.3.1. PERSONAL INFORMATION BLANK:

Data concerning age, educational qualification (Academic achievement), teaching experience were collected with the help of a questionnaire prepared by the investigator in order to get the identification data about the subjects. (The perform of Personal Information Blank is given in Appendix 8).
2.3.2. CATTELL'S CULTURE FAIR INTELLIGENCE TESTS:
(Scale 3 Form A)

Cattell's culture fair intelligence tests (scale 3 form A) was used to assess the level of intelligence of the subjects.

The Culture Fair Intelligence Tests measure individual intelligence in a manner designed to reduce, as much as possible, the influence of verbal fluency, cultural climate and educational level. The tests which may be administered individually or in a group, are non-verbal and enable the examinees to perceive the relationships in shapes and figures. Each scale contains four subtests, involving different perceptual tasks, so that the composite intelligence measure avoids spurious reliance on a single skill.

Scale 3 was used because greater refinement in the higher intelligence range was obtained with scale 3. This scale was also suitable for adults of superior intelligence. Form A of the tests was chosen for this study.

For the present study it seemed to be most suitable to measure intelligence of B.Ed students (who could be categorized as Adult group) so that they could be matched for age. Since the procedure for administration and scoring of the tests was very simple and printed copies of the tests along with the answer sheets were available in plenty it was possible for the investigator to administer and score the test
the same day. This test met all the characteristics of a good test as regards validity, reliability and usability. Moreover, this being a culture fair test no adoption was required.

It has been mentioned in the handbook that "the Culture Fair Tests are valuable instruments for all uses to which an intelligence test is rationally applied". According to the authors of the test "the culture free (or culture fair, as some prefer to call them). Intelligence tests aim to single out the most consistent core or basic mental capacity ....... He (Psychologist) is also looking for tests that will more clearly separate the individual's real general ability from the accidental circumstances of better or poorer local schooling, social class etc. which at present introduce a substantial error into assessments and predictions made with conventional intelligence tests". Again it has been mentioned in the handbook: "Everywhere these perceptual tests, in spite of some strangeness and lack of "face validity" as to their content, proved equal, in validity, to the traditional tests, and superior in applicability to groups of varied racial and social background or students differing in areas of academic specialization".

Review by Drake(1953) in the 4th Mental Measurement Year Book revealed - In view of the fact that (a) school training would have practically no direct influence on the cattell scores and yet the cattell correlates higher (on the average) than the Otis with school success and (b) that the...
Cattell correlates an average of 0.73 with other recognized tests of general ability, it would appear that a test which is almost culture free has many advantages over the usual culture-bound tests. Its advantage should be recognized as a possible way of equating all subjects for past subject-matter training effects to obtain a more accurate score representing each subject's innate ability.

The statement above gives a picture of the validity of the test. Besides it has a good content validity ($r = 0.85$).

As regards test reliability is concerned, it has been evaluated both in terms of Dependability Co-efficient and the Homogeneity Co-efficient which have been described in Cattell's two books (i) A Guide to Mental Testing and (ii) Personality and Motivation Structure and Measurement. The Dependability Co-efficient (agreement on test-retest without time lapse) has extended from .84 to .94 of four undergraduate groups of slightly more than 100 each with long time interval, so that it becomes a stability co-efficient in which real function fluctuation of the ability itself is involved, it may be 15 points lower. Knapp (1960) has experimented separating 'Power' from 'Speed' administration and found reliabilities ranging from .71 to .92 on the former and .71 to .94 on the latter. The Homogeneity Co-efficient (as a split-half, co-related to full length) came out on three undergraduate groups (100, 155 and 212 at .82, .91, .95).
Cattell's Culture Fair Intelligence Test scale 3
form A has 4 subtests with different numbers of items for which time allotted to each of the subtests is also different. The following table shows the number of items and time allotted to each subtests.

Table No.3
Showing items and time allotted to each subtest in scale 3 form A of the culture fair intelligence test.

<table>
<thead>
<tr>
<th>Tests</th>
<th>Type</th>
<th>Number of items</th>
<th>Time allotted in mts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test - 1</td>
<td>Series</td>
<td>13</td>
<td>3 mts</td>
</tr>
<tr>
<td>Test - 2</td>
<td>Classifications</td>
<td>14</td>
<td>4 mts</td>
</tr>
<tr>
<td>Test - 3</td>
<td>Matrices</td>
<td>13</td>
<td>3 mts</td>
</tr>
<tr>
<td>Test - 4</td>
<td>Conditions</td>
<td>10</td>
<td>2½ mts</td>
</tr>
<tr>
<td></td>
<td>(Topology)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Nos of item</td>
<td>50</td>
<td>Total time</td>
<td>12½ mts</td>
</tr>
</tbody>
</table>

In the test booklet some examples with answers have been given at the beginning to facilitate understanding and answering the items that follow. In the "Answer sheet" boxes have been provided for the corresponding options on the test booklet where the testee has to put cross mark (x) against the right response as chosen by him. Separate space has been provided for each test with item numbers and boxes. The scoring key with small holes corresponding to correct answers is available. While scoring the answer sheet the key has to be put on the answer sheet keeping in view the arrow mark given both in the key as well as answer sheet. In left hand
side the small holes come exactly above the correct answer boxes so that the scorer has to only see whether there are cross marks or not in the boxes and accordingly counting is done. As in test 2 where 2 responses are required for each item, two small holes are there in the scoring key where both answers must be given and must be correct in order to count the question right.

A copy of the test booklet, answer sheet and scoring key are given in Appendix C₁, C₂, C₃ respectively.

2.3.3. THE AHLUWALIA TEACHER ATTITUDE INVENTORY

In order to know the attitude of the student teachers an attitude inventory developed by Dr. S.P. Ahluwalia (1974) was used. This inventory is a 90 item Likert type instrument consisting of 6 sub-scales. These sub-scales were developed by the Likert summated ratings procedure. Each scale has 15 statements that pertain to a particular aspect of prospective and practising teacher's professional attitude. The six aspects dealt within the inventory are: Attitude towards (i) Teaching Profession (ii) Class room Teaching (iii) Child Centred Practices (iv) Educational Process (v) Pupils (vi) Teachers. The items for any sub-scale have not been given serially, rather those have been spread over the entire inventory. For example, item Nos. 1, 8, 13, 20, 33, 34, 41, 46, 48, 60, 66, 72, 79, 85 and 86 are for sub-scale-1 i.e. for attitude towards teaching profession similarly item Nos. 4, 7, 10, 15, 28, 32, 36, 43, 50, 55, 63, 71, 74, 76, 87 are for
sub-scale iv i.e. for attitude towards educational process.

The responses have to be given on a five point scale ranging from 'strongly agree' to 'strongly disagree'. But strongly agree and strongly disagree do not mean the same thing for all the items. It is because the inventory has got some favourable as well as some unfavourable items which are otherwise known as positive as well as negative items respectively. The weight for each item is assigned ranging from 4 (strongly agree) to 0 (strongly disagree) for favourable items and reverse in case of unfavourable items. Thus, while scoring, a credit of 4, 3, 2, 1, 0 is given for positive items for the response strongly agree, agree, undecided, disagree and strongly disagree and for negative items the credit is given as 0, 1, 2, 3, 4 for the response ranging from strongly agree and strongly disagree respectively. Again these positive and negative items have been distributed at random over the entire inventory. For example, of the items included in the sub-scale item Nos. 1, 8, 20, 33, 41, 66 and 85 are positive items while item Nos. 13, 34, 46, 48, 60, 72, 79 and 86 are negative items. Some of the positive and negative items are given below just for example:

Example of positive items

1. If I had a son entering college I would have encouraged him to become a teacher.
2. Teaching develops personality and character.
3. Everybody pays attention to what a teacher says.
41. I take pride telling that I belong to the teaching profession.

88. Teachers are the leaders of the nation.

Example of negative items

7. Individual differences among the students should not be paid much attention to.

21. Teachers are boastful.

46. There are more disadvantages than advantages in the teaching profession.

73. Class room teaching is book-centred rather than pupil centred.

90. A teachers job is primarily one of teaching and explaining the subject matter.

The ATAI has six sub-scales and each sub-scale has 15 statements. The total number of favourable and unfavourable items and their total numbers of each sub-scale are given below.

Table No. 4

Showing total number of favourable and unfavourable items and scale wise their serial number.

<table>
<thead>
<tr>
<th>Sub-scale</th>
<th>F/UF</th>
<th>Serial numbers</th>
<th>Total No. of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>F</td>
<td>1, 8, 20, 33, 41, 66, 85</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>UF</td>
<td>13, 34, 46, 48, 60, 72, 79, 86</td>
<td>8</td>
</tr>
<tr>
<td>II</td>
<td>F</td>
<td>2, 9, 14, 17, 42, 47, 53, 67</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>UF</td>
<td>35, 38, 59, 61, 65, 73, 84</td>
<td>7</td>
</tr>
</tbody>
</table>
The attitude score of a subject is the sum total of item scores of all the six sub-scales. The theoretical range of score is from 0 to 360 with the higher score indicating the more favourable attitude towards teaching and allied aspects.

The inventory has a satisfactory content validity. The split-half reliability is found to be .79 (Cor-related to .88) for a sample of 239 prospective teachers. The test-retest reliability co-efficients after the interval of 3 months and 9 months are found to be .59 (N = 102) and .64 (N = 290) respectively.

The copy of the questionnaire, answer sheet and scoring key are given in Appendix D₁, D₂ and D₃ respectively.

2.3.3.1. DEVELOPMENT DATA OF ATAI:

The ATAI was developed on a criterion sample of
2169 trainee teachers (B.Ed. and L.T courses) of Haryana, U.P, M.P, Bihar and Rajasthan. The state and area wise percentile norms were computed for male as well as female teachers. The reliability of ATAI data was established through three different techniques split-half (N = 239) test-retest time interval 3 months (N = 102) and time intervals of 9 months (N = 209) and rational equivalence using K.R.21. The validity of the ATAI responses was established through content validity. The ATAI has enjoyed fairly high reputation and has been used in various doctoral and post doctoral researches with teacher attitude as one of the variables.

2.3.4. INDORE TEACHING COMPETENCE SCALE:

This scale is used to measure the competence of the student teacher to integrate the skills or learnt skills. It was developed by the Department of Education, Indore University, Indore. This scale consists of twenty statements regarding teaching behaviours which reflect the integration of skills on the part of the teacher. Each of the statements has five possible responses such as not at all, to a little extent, to some extent, to a considerable extent, to a great extent and the weight for these items as 1, 2, 3, 4 and 5 respectively. The observer rates after careful observation of the teacher and pupils' behaviour. The sum of all the scores are the total score for a particular teacher. The theoretical range of score is from 20 to 100 with the higher
score indicating the teaching competence of the student teachers.

The inter-observer reliability found by the investigator was 0.85. The observation schedule for ITCS is given in Appendix E.

2.3.5. TEACHING ASSESSMENT BATTERY (TAB): (Form 0 and Form S)

The Teaching Assessment Battery was developed and tried out by Dr. N.K. Jangira, Department of Teacher Education, NCERT, to rate the performance of the teacher in different aspects of teaching. This battery comprises of two scales and an inventory i.e. Form 0, Form S and Form P of which Form 0 and Form S were used. Form 0 is meant for the observer and contains 20 items corresponding to 20 teaching skills to rate the performance of the teacher in the class. Form S is a self-rating scale to be used by the teacher to assess his performance just after he taught the lesson. Form S also contains 20 items on different aspects of teaching, written in non-technical language.

Each of the items (both in Form 0 and Form S) is to be rated on seven point scale i.e. Extremely Weak, Very Weak, Weak, Average, Good, Very Good, Excellent and for which the weighted scores given are 1, 2, 3, 4, 5, 6 and 7 respectively. The performance score of a teacher in teaching is the sum total of the scores in all the items. The theoretical range of score is from 20 to 140 with the higher score
indicating the more effective performance in teaching. A teacher's score on all these items indicates the level of his general teaching competence.

Out of the twenty items, seventeen items are common in both the forms. The product moment correlations between the teaching performance scores of the teachers as given by the observers were computed item wise are given in Table 5.

**Table 5**

Showing correlation between observer rating score and self-rating of teaching performance.

<table>
<thead>
<tr>
<th>No.</th>
<th>Teaching skill (Item)</th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Appropriateness of instructional objectives</td>
<td>0.72**</td>
</tr>
<tr>
<td>2.</td>
<td>Content organisation</td>
<td>0.92**</td>
</tr>
<tr>
<td>3.</td>
<td>Creating set for introducing the lesson</td>
<td>0.44**</td>
</tr>
<tr>
<td>4.</td>
<td>Introducing the lesson</td>
<td>0.60**</td>
</tr>
<tr>
<td>5.</td>
<td>Question structuring</td>
<td>0.91**</td>
</tr>
<tr>
<td>6.</td>
<td>Distribution of questions</td>
<td>0.68**</td>
</tr>
<tr>
<td>7.</td>
<td>Handling of pupil responses</td>
<td>0.39**</td>
</tr>
<tr>
<td>8.</td>
<td>Explaining</td>
<td>0.79**</td>
</tr>
<tr>
<td>9.</td>
<td>Illustrating with examples</td>
<td>0.83**</td>
</tr>
<tr>
<td>10.</td>
<td>Use of teaching aids</td>
<td>0.92**</td>
</tr>
<tr>
<td>11.</td>
<td>Stimulus variation</td>
<td>0.92**</td>
</tr>
<tr>
<td>12.</td>
<td>Use of reinforcement</td>
<td>0.50*</td>
</tr>
<tr>
<td>13.</td>
<td>Use of black-board</td>
<td>0.32*</td>
</tr>
<tr>
<td>14.</td>
<td>Closure of the lesson</td>
<td>0.75**</td>
</tr>
<tr>
<td>15.</td>
<td>Assignments</td>
<td>0.76**</td>
</tr>
<tr>
<td>16.</td>
<td>Evaluation of pupil's progress</td>
<td>0.74*</td>
</tr>
<tr>
<td>17.</td>
<td>Diagnosis of pupil learning</td>
<td>0.52*</td>
</tr>
<tr>
<td>18.</td>
<td>Class management</td>
<td>0.76**</td>
</tr>
</tbody>
</table>

* Significant at .05 level
** Significant at .01 level
It seems from the above table that the correlations between observer rating scores and self-rating scores by the teachers are fairly high on most of the items excepting items 7 and 13 which are below .4. Further most of the correlations are significant. The Teaching Assessment Battery Form 0 and Form S are given in Appendix F1 and F2 respectively.

2.3.6. EVALUATION PROFORMAS FOR TEACHING SKILLS:

For observing the five teaching skills viz. probing questioning, reinforcement, stimulus variation, explaining, illustration with examples, two types of evaluation proformas were used, one was frequency type and the other was rating type. All these proformas were first of all developed by Passi which he explained in his book "Becoming Better Teacher: A micro-teaching Approach" et al (1976). Later on, following research reports and suggestions, N.K. Jangira and Ajit Singh, Department of Teacher Education, NCERT, modified the different components of the skills and mentioned in their book "Core Teaching Skills" which is followed by the investigator for the present study.

Each of the proformas have items related to the various components of the correspondence teaching skills. The frequency proformas were used during the micro-lesson, whereas rating type proformas were used at the end of the lesson. In the present study both the types of proformas were used. Detailed description of each of the skill based
evaluation proformas are given below:

2.3.6. (a) OBSERVATION SCHEDULE FOR THE SKILLS OF PROBING QUESTIONING:

It includes four components like; Prompting, Seeking further information, Refocussing, Increasing critical awareness. The original observation schedule for the skill of probing questioning includes five components, in addition to these four components it includes redirection. This skill is explained by Jangira and Singh as follows "when a question is put in the classroom, there are a number of possible pupil response situations such as no response, wrong response, partially correct response, incomplete response or correct response. The skill of probing questioning is going deep into pupil responses through step by step questioning with a view to eliciting the criterion response". The proforma is given in Appendix G-

2.3.6. (b) OBSERVATION SCHEDULE FOR THE SKILL OF REINFORCEMENT:

It has got seven components namely: Use of praise words, Repeating and rephrasing pupil responses, Use of positive non-verbal reinforces (including extra-verbal cues) but excluding writing pupil answers on the black-board, writing pupils' answers on the black-board, Use of discouraging words, Use of negative non-verbal reinforces, Inappropriate use of reinforcement. The original observation schedule had nine components out of which two components had been omitted.
The proforma (Frequency and rating type) is given in Appendix G^2.

2.3.6. (c) OBSERVATION SCHEDULE FOR THE SKILL OF STIMULUS VARIATION:

It includes eight components of oral and visual medium of information. Such as Movement, Gestures, Change in voice, Focussing, Change in interaction pattern, Pausing, Pupil physical participation, Aural visual switching. The proforma for the skill of stimulus variation is given in Appendix G^2.

2.3.6. (d) OBSERVATION SCHEDULE FOR THE SKILL OF EXPLAINING:

It includes two types of behaviour namely: Desirable behaviours and Undesirable behaviours. The Desirable behaviours include - Using appropriate beginning and concluding statements, Using explaining links and covering essential points. Where as Undesirable behaviours imply - Using irrelevant statements, Lacking fluency, Lacking continuity in statements, Making use of inappropriate vocabulary, Vague words and phrases. This skill is explained by Jangira and Singh "as the use of interrelated statements about a concept, phenomena, generalization with a view to providing its understanding to someone else". The observation schedule for the skill of Explaining is given in Appendix G^4.

2.3.6. (e) OBSERVATION SCHEDULE FOR THE SKILL OF ILLUSTRATING WITH EXAMPLES:

The observation schedule for the skill of Illustrating
with Examples comprises six columns namely: Serial number of example, Simple, Interesting, Relevant(Examples), Approach used (Inductive/deductive, Inductive - deductive), Pupil involvement in formulating the examples. Jangira and Singh define illustrating with examples as "the selection and presentation of the example, relevant to the concept or generalization to be taught to the pupils so as to make it easier for them to understand it". The observation schedule is given in Appendix G.

In each observation schedule the first column indicates the components of the skill and the second column indicates rating which ranges from one to seven against each of the components. The points on the rating scale indicate 1. Extremely weak, 2. Very weak, 3. Weak, 4. Average, 5. Good, 6. Very good, 7. Excellent. An observer marks the tallies against the occurrence of the behavioural characteristics as he observes the skill in the teach/reteach session. Afterwards he should indicate his rating against each component by encircling the number which represents his assessment. After rating over the proforma of the respective skills the sum represents the total score or performance of a subject in a particular skill.

2.4. ARRANGEMENT FOR THE EXPERIMENT:

Being an experimental study, the sample under study was divided into 4 groups i.e. Group I or Experimental group I (underwent Diode model of integration), Group II or Experimental...
group II (underwent Summative model of integration), Group III or Experimental group III (underwent Additive model of integration), the Group IV remained as control group (Control group did not undergo any treatment for integration of skills). All the groups were treated equally in the micro-teaching session and the groups were formed after micro-teaching session was over for experimentation in different approaches of integration of skills.

2.4.1. MEASUREMENT OF CO-VARIATE/PRE-TESTING:

The subjects under study were convinced that this was an experimental study in teacher education using micro-teaching - a new technique for teacher training. They were also told that the data under study would be kept strictly confidential and would in no way be used for evaluation of their academic achievement.

Then all the student teachers delivered a regular practice lesson each in real classroom situation. The performance of the subjects was evaluated by the investigator on TAB-0 and ITCS. Later on the ATAI and TAB-S were administered to all the subjects. The pre-test score of TAB-0, TAB-S, ITCS and ATAI are given in Appendix H1.

2.4.2. EXPERIMENTAL TREATMENT (MICRO-TEACHING):

The subjects under study underwent the following steps as follows -
Step-I. Orientation to the need, concept, importance and rationale of micro-teaching.

All the student teachers were asked to assemble in the college auditorium, the investigator first of all tried to develop rapport with the student teachers and then described the need, purpose and importance of the present experiment. First of all the defects of present system of teacher training programmes were highlighted and the student teachers were made convinced about the need to bring some modification of the traditional teaching programmes. Later on the student teachers were explained how micro-teaching as a new technique of training would solve the problem. The general concepts, meanings, rationale, importance as well as merits and demerits of micro-teaching approach were explained in details. The orientation lecture was followed by supply of written materials to the students, the student teachers were made clear about their doubts if any regarding micro-teaching. They were told to go through the written materials and express their doubts and queries.

Step-II. Discussion of the teaching skills.

The student teachers were explained at length about the teaching skills and how these skills represent teaching acts/teacher behaviour. They were told about different teaching skills those were to be developed in the teaching during micro-teaching session so that the skills might be put to practice in actual class room situation as and when
required by the teacher. They were explained how to analyse
the teaching skills into specific teaching acts/behaviour
which reduces the complexities of general class room teaching.
The student teachers were provided direct practical guidance
about the behaviour desired in the general class room teaching
with the help of materials taken from "Core teaching skills"
by Jangira and Singh 1981 and "Becoming better teacher" -
a micro-teaching approach by S.K. Passi, 1976. The student
teachers were made clear about the concept and components
of each skill i.e. probing questioning, stimulus variation,
reinforcement, explaining and illustrating with examples,
one by one.

Step-III. Presentation of Model lesson/Micro-lesson.

The discussion of the skills were followed by
presentation of micro-lesson by the investigator before
the student teacher as given in "Core teaching skills" by
Jangira and Singh, 1981 in order to make them understand
fully and to get insight into it. The student teachers
were asked to go through the model lesson.

Step-IV. Demonstration and preparation of micro-lesson plans.

The investigator demonstrated before the student
teachers a standard lesson taking the unit concept. The
occurrence of the different components of the skills were
observed by the subjects (student teachers) on frequency
type observation schedule. After the demonstration lesson
was over the lesson was discussed in details with the student teachers and their doubts about the various components of the skills were clarified. During the discussion the student teachers were made clear that more attention should be given to the maximum occurrence of all the skills in the micro-lesson than the subject matter.

In the light of the discussion and on the lines of the micro-lesson provided to the student teachers the student teachers were asked to prepare micro-lesson in the skill.

Step-V. Micro-teaching session.

The experiment was conducted in simulation condition with peers acting as pupils. The procedure followed for the micro-teaching session was as follows -

(a) Time:

The total duration followed at the time of micro-teaching cycle was -

<table>
<thead>
<tr>
<th>Teach 6 mts</th>
<th>Feedback 6 mts</th>
<th>Replan 12 mts</th>
<th>Reteach 6 mts</th>
<th>Rfeedback 6 mts</th>
<th>Total 36 mts</th>
</tr>
</thead>
</table>

Thus for each micro-teaching session total time required was 36 mts.
(b) **Sequence of skills:**

Student teachers practised the skills as the sequence mentioned below.

(i) Probing questioning.
(ii) Stimulus variation.
(iii) Reinforcement.
(iv) Explaining.
(v) Illustrating with examples.

(c) **Observer/Supervisor:**

Two peers acted as supervisor for both the teach and reteach session except in some circumstances when situation compelled the investigator to act as supervisor.

In order to have an uniform rating Inter-rater reliability was calculated with the help of analysis of variance technique for mean single rater reliability $r_{ii} = \frac{v_s - v_e}{v_s + (K-1)}$ and for assessing the reliability of K rater for each skill Ebel's modified formula $r_{kk} = \frac{v_s - v_e}{v_s}$ was used. The symbols of $v_s$ & $v_e$ stand for variance of skills and variance for errors respectively.

Various methods of assessing inter-judge reliability across sets of scores using the same instrument have been proposed by Psychometricians from time to time (Ober, Bartley and Miller 1971, 80, Burrough, 1971, 72-73, Guilford, 1975, 395-398). Since Ebel's technique (Ebel, 1961, Pp 407-427)
serves the present purpose, therefore, it was used to ase­
tain inter-rater reliability.

(d) Feedback;

Immediate feedback was given to the student teachers
individually. It was based on the tallies and the ratings
on the observation schedule. The interpretation and feedback
was given to the student teachers in the light of the model
lesson presented before hand to the student teachers.

(f) Micro-teaching cycle:

The cycle followed for a micro-teaching lesson
was - Plan - Teach - Feedback - Replan - Reteach and
Refeedback. Two complete cycles of micro-lesson for each
of the five skills were given by the student teachers; in
this way each trainee gave ten micro-teaching lessons.

Step-VI. Observation of the Teaching skills.

The micro-lesson both for teach and reteach session
was observed by peer supervisor using the proforma for
coding (frequency and rating type) to observe the occurrence
of the component behaviour. The teach sessions for all the
skills were observed both by the investigator and by the
peer supervisors to facilitate the work of peer supervisor
and to make them understand the occurrence of the component
of the skills.
2.5. ADMINISTRATION OF THE TOOLS AND COLLECTION OF DATA

(POST TEST - I):

After mastering the five skills in micro-teaching session each subject delivered a lesson basing on the five skills. The lesson was observed on ITCS and TAB-0 respectively by the investigator. After administering ITCS and TAB-0 in the general class room situation ATAI and TAB-S were administered to the student teachers to get post test I score. The post test I score of TAB-0, TAB-S, ITCS and ATAI are given in Appendix H2.

2.6. TREATMENT VARIATION FOR CONTROL AND EXPERIMENTAL GROUP:

After micro-teaching practice (post test I) was over all the student teachers were dichotomised into four groups i.e. Group I, Group II, Group III and Group IV (The grouping is given in Appendix I). Where Group I, Group II and Group III were experimental group who underwent experimental variation i.e. Integration exercised on Diode, Additive and Summative models respectively. The treatment variation for the experimental groups and control group are as follows:

2.6.1. EXPERIMENTAL TREATMENT FOR DIODE MODEL:

The experimental Group I (Integration of skills on Diode model) underwent the following steps.

(i) All the student teachers of the experimental group I were oriented to the concept, need, importance and rationale of integration of skills. They were explained if a student
teacher was left after micro-teaching what were the probable difficulties he would encounter. Then the student teachers were oriented about the integration of skills through Diode model for 20 mts i.e. integrating two skills in a micro lesson. They were given the instructional materials on integration of teaching skills through Diode model for their personal study and use. As no materials were readily available on integration of skills through Diode model the investigator himself prepared the model lesson and relating material corresponding to integration of skills through Diode model. The orientation was followed by discussion with the student teachers and their doubts cleared.

(ii) The investigator demonstrated a lesson integrating two skills (Probing questioning and Stimulus variation) for 10 mts.

(iii) The demonstration lesson was followed by presentation of a model lesson on the integration of two skills (Probing questioning + Stimulus variation) prepared by the investigator is mentioned in Appendix J. The presentation of model lesson was followed by discussion for about 10 mts about the skills and how they were integrated.

(iv) The student teachers practised integration of the two skills for the teach and reteach session in the real classroom situation, where each session was of 10 mts duration. At the end of each session 5 mts feedback was provided.
(v) The investigator demonstrated the integration of two more skills (Explaining + Stimulus variation) for 10 mts before the student teachers in the real classroom situation.

(vi) The demonstration lesson was followed by presentation of a model lesson on the integration of two skills (Explaining + Stimulus variation). The model lesson prepared by the investigator is given in Appendix J$_2$. The presentation of model lesson was followed by discussion with the student teachers and their doubts cleared. The time required for explaining the two skills was 10 mts.

(vii) The student teachers practised the integration of the two skills in real classroom situation following any subject or topic of their interest. The time both for teach and reteach sessions was 10 mts each with 5 mts of feedback at the end of each session.

(viii) The investigator demonstrated before the student teachers the integration of two more skills (Explaining and Illustrating with examples) for 10 mts in the real classroom situation.

(ix) The demonstration lesson was followed by presentation of a model lesson to the student teachers for their personal use. The self-prepared model lesson of the two skills (Explaining and Illustrating with examples) is given in Appendix J$_3$. The presentation of the model lesson was followed by discussion with the student teachers and how the skills were integrated for 10 mts. The student teachers
were made their doubt clear about the integration of the two skills.

(x) The student teachers practised the integration of the two skills (Explaining + Illustrating with examples) in real classroom situation where the time for teach and reteach session was 10 mts each with 5 mts feedback at the end of each session.

(xi) The investigator demonstrated before the student teachers the integration of the five skills (Probing questioning, Stimulus variation, Reinforcement, Explaining and Illustrating with examples) for 10 mts. The lesson was observed by the student teachers on the basis of ITCS and how they were integrated.

(xii) The demonstration of the integration of the five skills (Probing questioning, Stimulus variation, Reinforcement, Explaining and Illustrating with examples) was followed by presentation of a standard micro-lesson on the integration of the five skills, prepared by the investigator which is given in Appendix J4. The presentation of model lesson was followed by discussion with the student teacher for the period of 10 mts.

(xiii) The student teachers practised the integration of the five skills namely Probing questioning, Stimulus variation, Reinforcement, Explaining and Illustrating with examples in real classroom situation where the time for teach
and reteach sessions were of 10 mts each with 5 mts of feedback at the end of each session.

2.6.2. TREATMENT VARIATION FOR CONTROL GROUP:

After micro-teaching practice was over the student teachers under control group (Group IV) did not undergo any special training or instruction. They were kept away from the experimental group and for experimental treatment/variation. The control group underwent 5 practice lessons of 44 mts each in general class room situation where they tried to integrate the skills in a global manner. No feedback was given at the end of each lesson. The total practice teaching time including feedback time for the control group and experimental groups were kept equal.

2.6.3. POST TEST II(A):

The student teachers of experimental group I (who underwent Diode model of integration of skills) and control group (Group IV) after experimental variation gave a regular lesson each in real class room situation in any method subject. The lessons were observed by the investigator with the help of TAB-O and ITCS. After the class was over the investigator administered ATAI and TAB-S to the student teachers. The score of TAB-O, ITCS, ATAI and TAB-S are given in Appendix H3.

2.6.4. EXPERIMENTAL TREATMENT FOR ADDITIVE MODEL:

Simultaneously, the experimental group II underwent the experimental treatment on Additive model using the following:
steps -

(i) All the student teachers belonging to experimental group II were oriented to the concept, need and rationale of integration of skills in general and through Additive model in particular for 25 mts. They were provided with instructional material on integration of skills through Additive model for their personal study and use. The orientation was followed by discussion with the student teachers.

(ii) The investigator demonstrated a lesson on integration of two skills (Probing questioning + Stimulus variation) in the real classroom situation for 8 mts. The student teachers observed the demonstration lesson on the basis of ITCS and how the two skills were integrated.

(iii) The demonstration lesson was followed by the presentation of a model lesson on the integration of two skills (Probing questioning + Stimulus variation). The model lesson prepared by the investigator is given in Appendix J. The presentation of model lesson was followed by discussion with the student teachers for 12 mts.

(iv) The student teachers practised the integration of two skills (Probing questioning + Stimulus variation) for teach and reteach sessions in real classroom situation where both the time for teach and reteach sessions were
of 8 mts and were followed by 5 mts of feedback respectively. The feedback was based on observation on the basis of ITCS and tallies and ratings on observation schedule.

(v) The investigator demonstrated a lesson on integration of three skills, adding one skill to the two integrated earlier (Probing questioning + Stimulus variation + Reinforcement). The demonstration lesson was observed by the student teachers on the basis of ITCS and how the skills were integrated. The demonstration lesson was followed by presentation of a model lesson which was prepared by the investigator and is given in Appendix K1. The presentation of model lesson was followed by discussion with the student teachers for 15 mts.

(vi) The student teachers practised the integration of the three skills (Probing questioning + Stimulus variation + Reinforcement) in real class room situation for 10 mts each in teach and reteach sessions which was followed by 5 mts of feedback. Immediate feedback was given to the student teachers based on the observation of the performance of the student teachers using ITCS.

(vii) The integration of the four skills, adding one more skill to the three integrated earlier (Probing questioning + Stimulus variation + Reinforcement + Explaining) was demonstrated by the investigator which was observed by the student teachers on the basis of ITCS. The demonstration lesson was followed by the presentation of a model
lesson on the integration of four skills. The model lesson prepared by the investigator is given in Appendix K2. The presentation of model lesson was followed by discussion with the student teachers for 20 mts.

(viii) The integration of the four skills was practised by the student teachers in real class-room situation where the time for teach and reteach sessions was 10 mts, followed by 5 mts of feedback respectively. Immediate and peer feedback was given to the student teachers on the basis of the performance on ITCS and observation schedule of the four skills taken for integration; which was observed by the peer supervisor.

(ix) The demonstration of the five skills, adding one more to the four integrated earlier (Probing questioning, Stimulus variation, Reinforcement, Explaining and Illustrating with examples) by the investigator was observed by the student teachers on the basis of ITCS and how the skills were integrated. The demonstration was followed by the presentation of model lesson (Prepared by the investigator is given in Appendix J4.) and discussion with the student teachers was held for 20 mts.

(x) The integration of the five skills was practised by the student teachers in real class room situation where teach and reteach sessions were of 12 mts duration. Immediate and peer feedback of 5 mts was given to the student teachers at the end of each session. On the basis of their
performance on ITCS and observation schedule of the five skills.

2.6.5. POST-TEST II (B):

The student teachers of experimental Group II (who underwent Additive model of integration) gave a lesson in real classroom situation following any method subject and there was no feedback. The lesson was observed by the investigator with the help of TAB-O and ITCS. After the lesson was delivered ATAI and TAB-S were administered to the student teachers. The score of TAB-O, ITCS, ATAI and TAB-S are given in Appendix H4.

2.6.6. EXPERIMENTAL TREATMENT FOR SUMMATIVE MODEL:

At the same time the experimental Group III (Integration of skills through Summative model) also underwent the following steps -

(i) All the student teachers of the experimental Group III were oriented to the need and rationale of integration of skills. They were supplied with instructional material on integration of teaching skills for their personal study and use. The orientation was followed by discussion and conversation with the student teachers for 30 mts.

(ii) The investigator demonstrated a lesson before the student teachers based on summative model of integration of five skills (Probing questioning + Stimulus variation + Reinforcement + Explaining + Illustrating with examples)
selected, for 20 mts which was observed by the student teachers on the basis of ITCS with respect to the integration of five skills and how they were integrated.

(iii) All the student teachers of experimental Group III were supplied with the written form of the model lesson on Summative strategy (the self prepared micro-lesson of integration of skills on Summative strategy is given in Appendix J4*). The presentation of model lesson was followed by discussion with the student teachers for 30 mts. The student teachers were also explained the affiliative characteristics of the teaching skills and how to prepare micro-lesson on integration of skills.

(iv) The student teachers practiced four micro-teaching cycles in real class-room situation following the Summative model of integration of skills. The teach and reteach sessions were each of 25 mts duration with 10 mts of feedback at the end of each session. Immediate peer feedback was provided to the student teachers based on the observation using ITCS and on observation schedule by the peer observer.

2.6.7. POST-TEST II (C):

The student teachers of experimental Group III (who followed Summative model) after experimental variation gave a lesson in real class-room situations in any method subject where there was no feedback. The lesson was observed by the investigator with the help of TAB-0 and ITCS. After
that ATAI and TAB-S were administered to the student teachers. The score of TAB-O, ITCS, ATAI and TAB-S are given in Appendix H5.