CHAPTER V

DESIGN AND PROCEDURE OF STUDY

Variables and their concepts

Design of the study

Procedure of the study

Selection of Sample

Selection of Tools.

Construction of Achievement Test

Administration of Tests.

Scoring of Tests.

Procedure of the Experiment

Methods followed for the Analysis of data
CHAPTER V

DESIGN AND PROCEDURE OF THE STUDY

Research activity is a planned activity and is carried out according to some conceptual framework. This conceptual scheme is the basis of the design of a study. In this chapter the conceptual framework, the method of work and the procedure carried out to achieve the goals is presented.

Conceptual framework is a statement of the concepts of the major variable involved in the study and the relationship in which they have been visualized.

Variables and their concepts:

Generally the variables are categorized into three classes.
1. Criterion variables or Dependent variables.
2. Experimental variables or Independent variables.
3. Extraneous or controlled variables.

Where does a particular variable fall in a study is determined by its purpose. The main aims of this study were:

i. To study the impact of perceptual, Symbolic and Audio Modelling in Microteaching upon General Teaching Competence of pupil-teachers.

ii. To study the impact of General Teaching competence developed through different types of modelling upon the Academic-Achievement of the students. Here the
different classes of variables were as follows:

1. **Criterion variables or dependent variable:**

   According to Townsend "A dependent variable is that factor which appears, disappears, or varies as the experimenter introduces, removes or varies the independent variables."

   The dependent variable is a response variable or output. It is an observed aspect of the behaviour of an organism that has been stimulated. The dependent variable is that factor which is observed and measured to determine the effect of the independent variable, that is, that factor that appears, disappears or varies as the experimenter introduces, removes or varies the independent variable. It is the variable that will change as a result of variations in the independent variable. It is considered dependent because its value depends upon the value of the independent variable. It represents the consequence of a change in the person or situation studied.

   In this study dependent variables were:

   i. General Teaching competence of the pupil teachers.
   ii. Academic achievement of students.

   **Concepts:** The operational definitions of the concepts of the variables are stated in chapter I on pages
18 and 20 respectively.

**Experimental or Independent variable:**

According to Townsend "An independent variable is that factor manipulated by the relationship to an observed phenomenon."

The independent variable, which is a stimulus variable or input, operates either within a person or within her environment to affect behaviour. It is that factor which is measured, manipulated, or selected by the experimenter to determine its relationship to an observed phenomenon. If an experimenter studying the relationship between two variables $x$ and $y$, she wants to know "what will happen to $y$ if she makes $x$ greater or smaller?" She is thinking of variable $x$ as her independent variable. It is the variable that she will manipulate or change to cause a change in some other variable. She considers it independent because she is interested only in how it affects another variable, not in what affects it.

In this study independent variables were:

1. **Perceptual Modelling**: (SMT) perceptual modelling is assumed standard microteaching. This is control group.
Symbolic Modelling: (MMT₁) Here in this study symbolic modelling refers to the handbook "Becoming Better Teacher" A microteaching approach edited by Dr. B.K. Passi.

Audio Modelling: (MMT₂) Here in this study audio modelling refers to present desired behaviour through audio tape. Here modelling is through tape recorder.

Extraneous or Controlled Variables:

All of the variables in a situation or in a person cannot be studied at the same time; some must be neutralized to guarantee that they will not have a differential or moderating effect on the relationship between the independent variable and the dependent variable. These variables whose effects must be neutralized or controlled are called control variables. They are defined as those factors which are controlled by the experimenter to cancel out or neutralized any effect they might otherwise have the observed phenomenon. While the effects of control variables are neutralized, the effect of moderator variables are studied.

Certain variables appear repeatedly as control variables, although they occasionally serve as moderator variables sex, intelligence and socio-economic status
are three subject variables that are commonly controlled; noise, task order, and task content are common control variables in the situation. In constructing an experiment, the researcher must always decide which variables will be studied and which will be controlled.

In present study controlled variables were as follows:

1. Intelligence.
2. Socio-Economic status.
3. Age.
4. Academic level.
5. No teaching experience.
6. No teaching experience.

Design: An experimental study having pre-test and post test parallel group design was undertaken to test the hypotheses laid down for the study.

Three groups, consisting 10 students each formed one controlled group and two experimental groups in each subject. Controlled group A was taken under standard Microteaching procedure and group B and C were taken under Modified Microteaching procedures. The treatments were standardized and kept uniform for the control group which was termed as the Standard Microteaching Technique Group. Deliberate variations in the components of Microteaching Technique were brought about in experimental
groups which were termed as Modified Microteaching Technique (MMT₁ and MMT₂) groups. The treatments of MMT₁ and MMT₂ were exactly the same as SMT except for Modelling. Students of S.M.T. group was exposed to perceptual modelling when the students of MMT₁ and MMT₂ were exposed to symbolic and Audio Modelling respectively.

Procedure of the study: The procedure of the study is presented in this chapter under the following heads:

A. Sample:
   1. Selection of town for the sample.
   2. Selection of colleges for the sample
   3. Selection of sample.

B. Tools:
   1. Their selection.
   2. Administration.

C. Procedure of the Experiment:

D. Analysis of data.

A. 1. Selection of town for the sample: Kanpur city was selected for conducting this experimental study for the following reasons:

   1. Kanpur city is the main city of Uttar Pradesh with population 22 lakhs. /

   2. The researcher is registered for Ph.D. in Kanpur
University.

3. The researcher and her guide belong to Kanpur City, therefore, it was convenient for her to conduct her experimental work in the training colleges of affiliated to Kanpur city.

Keeping all these in mind the researcher selected Kanpur City for this study.

A. 2. Selection of colleges: Only two prominent training colleges of Kanpur were selected in the sample for the following reasons:

Selection of Acharya Narendra Deo College:
1. Acharya Narendra Deo Mahapalika Mahila Mahavidyalaya is a women's college.
2. It is prominent college of Kanpur in the centre of the city.
3. Researcher's guide is the Head of Training Deptt. of Acharya Narendra Deo College. The guidance and co-operation of her staff members of training Department was possible.
4. It was convenient for the researcher to conduct her experiment in this college as she was fully acquainted with the training Deptt. as she did her M.Ed. from this college.

Selection of Vikramjeet Singh Sanatan Dharma College:
1. Vikramjeet Singh Sanatan Dharma College is co-educational college.
2. It is prominent college of Kanpur.
3. Its training Deptt. is famous for its results and discipline and co-operation of the staff was also possible.

A 3. Selection of Sample:

In the beginning one hundred sixty eight teacher trainees, eighty four from Acharya Narendra Deo college, Kanpur and eighty four from Vikramjeet Singh Sanatan Dharm College Kanpur formed the sample. The pupil-teachers offering only Social-studies, Hindi and Science methods of teaching were included in the sample. In each subjects three groups i.e. S.M.T. M.M.T._1 and M.M.T._2 on the basis of Intelligence, Socio-economic status, Age, Sex, Academic level, with no teaching experience were formed. The control and experimental groups were equated on the basis of Mean and Standard Deviation. The Means, S.D's and t's showing difference between the groups are given in table No. 2.
**TABELE 2.1**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>S.M.T.</th>
<th>M.M.T. 1</th>
<th>M.M.T. 2</th>
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<tbody>
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**Socio-Economic Status Scale**

| 't' between S.M.T. and M.M.T. 1 = 0.03 |
| 't' between S.M.T. and M.M.T. 2 = 0.03 |
| 't' between M.M.T. 1 and M.M.T. 2 = 0.05 |

**Intelligence Test**

| 't' between S.M.T. and M.M.T. 1 = 0.03 |
| 't' between S.M.T. and M.M.T. 2 = 0.03 |
| 't' between M.M.T. 1 and M.M.T. 2 = 0.03 |

**Socio-Economic Status Scale**

| 't' between S.M.T. and M.M.T. 1 = 0.03 |
| 't' between S.M.T. and M.M.T. 2 = 0.03 |
| 't' between M.M.T. 1 and M.M.T. 2 = 0.03 |
TABLE 2.2

Y.S. S. D. COLLEGE
HINDI METHOD

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<th>Sl No.</th>
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<td>86</td>
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Mean: 57.8 103.4 19 25 5 25 25 5 25 25 5 25 25 5 25 25

σ = 22.5 21.21 Years. σ = 21.04 20.59 Yrs. σ = 20.6 20.73 Yrs.

**Hindi Method**

**Intelligence Test**

't' between S.M.T. and M.M.T. = 0.05

't' between S.M.T. and M.M.T. = 0.05

't' between M.M.T. and M.M.T. = 0.01

**Socio-Economic Status Scale**

't' between S.M.T. and M.M.T. = 0.20

't' between S.M.T. and M.M.T. = 0.10

't' between M.M.T. and M.M.T. = 0.10
**TABLE 2.3**

**SCIENCE METHOD**

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<th>Sl. No.</th>
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<td>Intellig-</td>
<td>Socio-</td>
<td>Age</td>
</tr>
</tbody>
</table>

**Intelligence Test.**

't' between S.M.T. and M.M.T. 1 = 0.00
't' between S.M.T. and M.M.T. 2 = 0.03
't' between M.M.T. 1 and M.M.T. 2 = 0.04

**Socio-Economic Status Scale**

't' between S.M.T. and M.M.T. 1 = 0.17
't' between S.M.T. and M.M.T. 2 = 0.04
't' between M.M.T. 1 and M.M.T. 2 = 0.21
### Table 2.1

**A. N. D. MAHAFALEKA MAHILA MAHAVIDYALAYA**  
**SOCIAL STUDIES**

<table>
<thead>
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<th>Sl. No.</th>
<th>S.M.T.</th>
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<th>M.M.T.</th>
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<td>F</td>
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<td>7.</td>
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<td>F</td>
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**Intelligence Test**

- 't' between S.M.T. and M.M.T. = 0.08
- 't' between S.M.T. and M.M.T. = 0.25
- 't' between M.M.T. and M.M.T. = 0.15

**Socio-Economic Status Scale**

- 't' between M.M.T. and M.M.T. = 0.06
- 't' between M.M.T. and M.M.T. = 0.02
- 't' between M.M.T. and M.M.T. = 0.04
### TABLE 2.5

#### A. N. D. MAHAPALIKA MAHILA MAHAVIDYALAYA

**METHOD**

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<td>64.0</td>
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</table>

Intelligence Test:
- t' between S.M.T. and M.M.T.₁ = 0.05
- t' between S.M.T. and M.M.T.₂ = 0.06
- t' between M.M.T.₁ and M.M.T.₂ = 0.01

Socio-economic Status Scale:
- t' between S.M.T. and M.M.T.₁ = 0.06
- t' between S.M.T. and M.M.T.₂ = 0.11
- t' between M.M.T.₁ and M.M.T.₂ = 0.03
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<th>Socio-Age Status</th>
<th>Academic Qualification Test</th>
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<td>Academic Qualification</td>
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</table>


Intelligence Test

't' between M.M.T. 1 and M.M.T. 2 = 0.17
't' between S.M.T. and M.M.T. 1 = 0.215
't' between M.M.T. 1 and M.M.T. 2 = 0.04

Socio-Economic Status Scale

't' between S.M.T. and M.M.T. 1 = 0.12
't' between S.M.T. and M.M.T. 2 = 0.23
't' between M.M.T. 1 and M.M.T. 2 = 0.12
"If sample data are to be used as the basis for generalization to a population it is essential that the sample be representative of the population and it must be adequate" (Good and Matt 1972)

Keeping in mind the representativeness and adequacy of the sample, in the beginning all students offering social-studies Hindi and Science were included in the sample. Random technique was used only in Hindi method for selecting the sample. All students in social-studies and science were included in the sample as the number of students was limited.

The experiment was conducted on the 168 pupil-teachers (84 male and 84 Female). In each cell the number of pupil-teachers was not equal. Due to statistical problem the number of Pupil-teachers was lessened and each cell was made equal. In the final sample for statistical computation the size of each cell was made of eight and the total sample was of 144 pupil-teachers.
Tools: To equate the groups and to collect the data for the study following measures were used.

2. Socio-Economic status Scale by Kulshrestha (1980).
3. Observationschedules as given in Handbook "Becoming Better Teacher" by B.K. Passi.
4. General Teaching Competence scale prepared by the researcher on the basis of B.K. Passi's G.T.C. Scale.
5. Achievement tests in social-studies Hindi and science were used.

The tools used for this study were selected on the basis of the following criteria.

1. Reliability and validity of the tools.
2. Suitability of the tools in the Indian conditions for Hindi speaking students in the age group 16-22 years (Adolescent)
3. Time needed for the test.
4. Availability and cost of the tests.

Selection of Intelligence Test: A review of Intelligence tests (Louis L and Mehta P.H. 1966) given in table 3 revealed that many verbal group tests of Intelligence were being used in the Hindi speaking areas of the country. Reliability, validity and other details of the tests are reported in the table No. 3.
### TRAVEL NO. 3

**Reliability, validity and other details of various Intelligence Test:**

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Name of the test</th>
<th>Reliability</th>
<th>Validity</th>
<th>Age Group (Time) (Mts)</th>
<th>Time</th>
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<td>C.I.E. verbal group test of intelligence T_3, T_4, CIE, Delhi</td>
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<td>0.33-0.56</td>
<td>13-14</td>
<td>35</td>
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<tr>
<td>3.</td>
<td>N.G.E.S Intelligence Test Manovigyan Shala, Uttar Pradesh</td>
<td>Not known</td>
<td>Not known</td>
<td>Class X-XII</td>
<td>60</td>
</tr>
<tr>
<td>4.</td>
<td>Test of General Intelligence (V.I.T.)</td>
<td>0.93</td>
<td>0.55</td>
<td>10-16</td>
<td>25</td>
</tr>
<tr>
<td>5.</td>
<td>Samanya Mansik Yogyata Pariksha (Test of General mental Ability)</td>
<td>0.86</td>
<td>0.47-0.75</td>
<td>12-19</td>
<td>20</td>
</tr>
<tr>
<td>6.</td>
<td>Sadarshan Mansik Yogyata Pariksha (Group general mental Ability) S. Jalota.</td>
<td>0.94</td>
<td>0.50-0.78</td>
<td>12-16</td>
<td>20</td>
</tr>
<tr>
<td>7.</td>
<td>Verbal Intelligence Test by Rai Chaudhary Ojha.</td>
<td>0.64-0.91</td>
<td>0.35-0.51</td>
<td>13-22</td>
<td>40</td>
</tr>
</tbody>
</table>

To equate the groups Rai Chaudhary Ojha's (1958)

*Verbal Intelligence Test was selected for the following reasons...*
1. It could be easily administered because the instructions were clear and could be completed in 40 mts. time only.

2. It was highly reliable and comprehensive test of Verbal Intelligence.

3. This test was for 13-22 years age group.

4. It was standardized on 15 hundred students of 13-20 years age group. It could be easily used in the Hindi speaking areas of different states. The author found many facts with the help of this sample.

5. The reliability of the test was known with the help of split-half method and Kuder-Richardson formula. Validity of this test was known calculating the correlation between the eight parts of the verbal Intelligence Test.

2. Selection of Socio-Economic Status Scale: A careful search for a suitable tool for assessing socio-economic status of boys and girls was made. Socio-Economic Status scale available in Hindi, their reliability, validity and other relevant particulars are presented in the table 4.
TABLE NO. 4

Reliability, Validity and other details of Socio-Economic Status Scale

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the test</th>
<th>Reliability</th>
<th>Validity</th>
<th>Age group (Yrs.)</th>
<th>Time (Min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Socio-Economic Status Scale by B.K. Kuppa-swami.</td>
<td>Not known</td>
<td>Not known</td>
<td>Form A (Adults)</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Socio-Economic Status Scale by S. D. Kapoor</td>
<td>0.89</td>
<td>0.92</td>
<td>College Students</td>
<td>No time</td>
</tr>
<tr>
<td>3</td>
<td>Socio-Economic Status Scale by S. F. Kulshrestha</td>
<td>0.70-0.90</td>
<td>0.52-0.62</td>
<td>College Adult Population</td>
<td>10</td>
</tr>
</tbody>
</table>

From amongst the scales reviewed, Socio-Economic Status Scale (SESS Form A) developed by Kulshrestha (1980) was selected for the following reasons:

1. It was easily available and widely used scale in U.P.
2. It could be administered easily as it took less than half an hour.
3. Scale has a very high reliability and validity, the reliability of the scale was calculated by the test-retest method. The scale was administered on Bikaner City at two different times with an interval of
10 days. The co-efficient of correlation was found .87.

4. The validity of the scale was also calculated by comparing the scale with Dr. Kuppa's and Pandey's Socio-Economic Status questionnaire. The Co-efficient of correlations were calculated. They were found to be 0.57 and .89 respectively. The scale possesses content and construct validity also.

5. The norms of the scale are given in table for scoring. The grand total of the testee can be composed with this table and can be classified accordingly for the status.

### TABLE No. 5

**Showing Norms: N= 100 Male students**

<table>
<thead>
<tr>
<th>Raw Score Distribution</th>
<th>Cutting points in sigma units</th>
<th>Status category (SESS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 223 and above</td>
<td>+1.26 +</td>
<td>High</td>
</tr>
<tr>
<td>2. 108 to 223</td>
<td>-.56 to +1.5</td>
<td>Average</td>
</tr>
<tr>
<td>3. below 108</td>
<td>-.5 Σ</td>
<td>Low</td>
</tr>
</tbody>
</table>

3. **Selection of B.K. Passi's General Teaching Competence Scale as a basis for G.T.C. Scale**

To measure the General Teaching Competence of
pupil teachers, a General Teaching Competence scale based on B.K. Passi's G.T.C. scale was prepared by the researcher. Out of 21 items of G.T.C. scale the researcher selected only 9 items related to six teaching skills for her study. The items were such that they were centre around teacher classroom behaviour in relation to pupil behaviours. It was a seven point rating scale measuring the use of the skill by the teacher in the classroom corresponding to each item ranging from '1' for 'not at all' to '7' for 'very much'. Selected 9 items are related to three major aspects of classroom teaching namely planning, presentation and closing.

Reliability of the Scale: This scale has been used for doctoral research (Joshi, 1977; Passi, 1977) and reported inter-observer reliability Co-efficients range from 0.85 to 0.91. Inter-observer reliability can be better established when the observers train themselves for using the G.T.C. scale.

Validity of the Scale: The scale has content validity and factorial validity.

There were some reasons that the researcher chose the B.K. Passi's G.T.C. scale as a basis making her scale.  
1. The researcher used Passi's handbook "Becoming Better
Teacher" so she used the Passi's scale as a pattern.

2. This is the only standardized scale for measuring G.T.C.

4. Observation Schedules: For the supervision of practising the six skills observation schedules as given in handbook "Becoming Better Teacher" by B.K.Passi were used.

This proforma was meant to ascertain the extent to which the student teacher exhibited or used the skill. Judgements were given on a seven point scale for various aspects of the skill. The extent of acquisition of the various aspects of the skill was indicated by (x). The scale value '0' indicated that the student teacher did not use the concerned aspect(s) of the skill at all, which as the scale value '6' was meant that the student teacher used/practised the skill aspect(s) very much. Keeping these two extremes in view, the teacher behaviour related to the various given aspects of the skill were examined carefully and crossed (x). The appropriate scale value ranging from 0 to 6.

The same procedure was adopted for all the six selected skills for every student teacher.

5. Achievement Tests: To measure the academic achievement of pupils Achievement Tests in Social Studies, Hindi and Science were prepared by the researcher herself for class VIII.
Construction of Achievement Tests: The researcher followed the following steps in test construction procedure.

A. Planning the Test: In the planning of test construction, aims, content, nature, medium, administration procedure, level were considered.

The main aim of the test construction was to measure the academic achievement in social-studies, Hindi and Science of students of standard VIII.

The content of the test was selected from the books of class VII, question papers and on the experience of researcher.

The nature of the test was verbal. Medium of the test was Hindi. It was grouped test. Time for the test was forty minutes.

B. Preparing the first draft: After planning, the researcher selected the items. Eight types of items were included in the test. Which were as follows:

1. Recall type
2. Sentence completion type
3. Classified type.
4. True – false type.
5. Matching type.
6. Multiple choice and completion type.
7. Analogy type.
8. Multiple choice type.
In the beginning 150 items were selected and they were arranged in the serial of simple to complex.

C. Pilot study of blue-print

The main aims of pilot study were:

1. To remove the weak and defective items.
   (Unclear items, inadequate items, too much difficult and too much easy items.).

2. To decide the time limit for the final test.

3. To arrange all items in the sub-part of the test.

4. To decide the scoring method of the test.

5. To decide the instruction and administration procedure for the test.

For the above said purpose the test was administered on the group of 60 students.

Final Test Construction:

The researchers constructed the test on the basis of Pilot study or Blue-print. Only those items were selected which were correctly solved by 60% of the students.
There were eighty items in the final test divided into eight sub-parts of ten each. Instructions of each sub-test were given. General Instructions of the test were decided.

"This was an achievement test of social studies by which your knowledge about social-studies was measured. Forty minutes were fixed for completion the test. Eight types of items were in the test. Instructions for each type were given separately".

In the final test—eight types of items were as follows:

1. Recall type.
2. Sentence completion type.
3. Classified type.
4. True-false type.
5. Matching type.
6. Multiple choice and completion type.
7. Analogy type.
8. Multiple choice type.

Scoring:

For this purpose according key was prepared one mark for each correct answer was decided.
Maximum marks for the test were 80.

Reliability:

Reliability means Consistency of scores of an individual obtained by the individual on different occasions According to Stodala and Stordahl—

"The reliability of a test can be defined as the co-relation between two or more sets of scores on equivalent tests from the same group of individual".

There are three methods of reliability—

1. Test-Retest Method.
2. Equivalent-Retest Method.

To find out the reliability of the test Test-Retest method on the gap of 15 days was followed +0.73 reliability of the tests was found.

Validity:

The validity is a main criteria of a good test construction. The validity of an evaluation device is the degree to which it measures what it is intended to measure.
According to Mahesh Bhargava -

"A index of test validity shows the degree to which a test actually measures what it purports to measure, when compared with accepted criteria."

Four types of validity have been accepted by the American Psychological Association, the National Council on Measurement used in Education. These four types are called (1) Content validity (2) Concurrent validity (3) Predictive validity and (4) Construct validity.

In present study the Achievement Tests were constructed by the researcher have content validity, Concurrent validity and construct validity.

To find out the validity of the test, the test was checked by subject teacher of different schools. Their consultations were also taken in test construction.

The same procedure was followed for the test construction in Hindi and Science test.

Administration of verbal Intelligence test:

For the formation of controlled and experimental groups Verbal Intelligence Test by Roy Chaudhary Ojha was administered. The students were instructed to sit apart from one another. The research worker gave introductory talk in Hindi while administrating the
intelligence test. After this, Instructions, given on the first page of the test were read out.

Instructions: "First of all fill these entries given in the booklet's first page."

"This is a general intelligence test by which mental abilities are known. 40 minutes will be given to complete the test. This test consists of eight parts. Time limit and instructions for each subpart are given on each subpart. Don't write anything without permission. Don't waste your time on that question which you think difficult. You will have to give answers of sub-parts in fixed time. Don't ask any question from another."

The students were given answer sheets and booklets and were instructed. The answers of the questions of the booklets would be written in the columns of answersheet. There were 112 questions in eight parts.

Two examples were given to them for introducing the test. After forty minutes, booklets and answersheets of students were collected.

Administration of Socio-Economic Status Scale

To equate the groups Socio-Economic Status Scale was also administered. First of all the researcher instructed the students to fill all the entries given on the first page of booklet. After this the researcher
read out instructions given on the first page of booklet.

Instructions: "The aim of this schedule is to decide the socio-economic status of your family. So fill correct informations about your mother/father, brother, and sister. Informations given by you will be kept confidential. In this schedule every question have so many tentative answers. But you will select those answer which will apply on you and you will mark right(√) in the square against that question."

Two examples were given to them for introducing the test. After some minutes the booklets were collected.

Administration of General Teaching Competence:

The General Teaching Competence Scale was used for measuring teaching competence of a teacher individually by observer making direct observations of her classroom behaviour for the entire teaching period.

As the teacher taught, the observer sat at the back for observation. At the end of the teaching period she gave her rating on the G.T.C. Scale against all the items.

Administration of Observation Schedules: The researcher used observation proformas as given in Handbook "Becoming Better Teacher" for the supervision of six teaching skills. As the student teacher taught, the observer sat at the back for observation. The observer gave her ratings on
seven point scale according to the components of the skill by marking right mark (✓), with the help of observation schedules. The researcher gave the appropriate feedback to the student teacher and trained for reteach session.

Administration of Achievement Test: Achievement test in Social-Studies, Hindi and Science were administered two times.

Pre-test: Before introducing the variable or conducting the experiment the academic achievement of pupils were measured by achievement tests by the researcher for pre-test indifferent three subjects.

Instructions: Instructions given on the first page of the test were read out. The researcher gave an introductory talk in Hindi while administrating the test. The tests were administered on three groups i.e. Social-studies Hindi and Science group. Two examples in each group were given for introducing the test. After forty minutes booklets were collected.

Post-test: After introducing the variable to find out difference in gain in achievement of pupils in three groups the tests were readministered. The same procedure was adopted in post-test as in pre-test.
Scoring of Intelligence Test: A uniform plan of scoring was adopted. Correct responses were scored with a right mark (✓) and incorrect with a wrong (✗) mark was assigned for each correct answer. The total marks for the test were 112. The marking and totaling were done correctly.

In this way, the selected sample of 168 students were examined carefully. The uniform plan for administration and scoring was adopted for each group and for both the colleges.

Scoring of Socio-Economic Status Scale: The scale has transparent scoring key for easy and simple scoring. The scoring key summarises the informations recorded on the scale. The weightage of each item has been written on the transparent key. Which may be used in most convenient manner.

For the scoring of Socio-Economic Status scale the researcher kept the key on the scale and added the scores mentioned above the each box on the key for each ticked (✓) answer. The same process was adopted for page No. 3, 4 and 5. By adding all the scores of all the pages of the scale formed the grand total. This grand total of all the scores was taken into consideration for determining the Socio-Economics Status of urban testee.
In this way, the selected sample of 168 students were examined carefully. On the basis of SESS scores the groups were equated.

**Scoring of General Teaching Competence Scale:** The sum of the ratings against all the nine items constituted the score on General Teaching Competence (G.T.C. Score) of the teacher being observed. The maximum score possible was 63 and the minimum was 9.

In this way the G.T.C. scale was used for 168 pupil teachers for pre-test and post-test.

**Scoring for observation Schedules:** For the supervision of practicing the six skills observation schedules as given in handbook "Becoming Better Teacher" by B.K. Passi were used. Judgements were given on a seven point scale for various aspects of the skill. The extent of acquisition of the various aspects of the skill was indicated by (x). The scale value '0' indicated that the student teacher did not use the concerned aspect(s) of the skill at all, whereas the scale value '6' meant that the student teacher used the skill aspect(s) very much. Keeping these two extremes in view, the teacher behaviours related to the various given aspects of the skill were examined carefully and crossed (x) the appropriate scale value ranging from 0 to 6.
The same procedure was adopted for all the six selected skills for every student teacher.

Scoring of Achievement Test: All the answer-sheets were scored with the help of the scoring key prepared by the researcher herself. All the correct answers were ticked (✓) and incorrect answers were ticked (✗). Right ticks were counted and one mark for each correct answer was given. The maximum marks for the test were 80 and scoring was done carefully.

The same procedure was adopted for all the pupils of three groups—Social-studies, Hindi and Science for pre-test and post-test.

Procedure of the Experiment:

After the sample for each group was selected and equated one of the group was trained through Standard Micro-Teaching Technique and the others through Modified Micro-Teaching Technique. The experiment was conducted in two phases as given below:

**PHASE I**

Procedure for Standard Microteaching

**Step 1: Pre-test**

*Administration of General Teaching Competence Scale:*

For the purpose of pre-testing General Teaching Competence scale was administered on two traditional type lesson in real classroom situation
The mean performance of pupil teachers on these two lessons formed the pre-test score.

Step 2. **Orientation about Microteaching**

Theoretical discussion about the concept of Microteaching was conducted. The merits and demerits of Microteaching were explained.

Step 3. **Discussion of Teaching skills**

The concept of teaching skills was clarified first. Only six teaching skills as developed by Centre of Advanced Study of Education Baroda as given in Handbook "Becoming Better Teacher" were explained. One skill at a time was discussed before practice. The pupil teachers were trained in observing corresponding teaching skills.

Step 4. **Presentation of Model Lesson**

This group was exposed to Perceptual Modelling. The Model lessons of the corresponding teaching skill were demonstrated by the investigator in Social Studies, Hindi and Science.

Step 5. **Preparation of Microlesson Plans.**

Micro lesson plans were prepared on the basis of standard lesson format as given in the Handbook. One unit concept was selected for Micro-lesson.

Step 6. **Microteaching setting**

The following was the Micro-teaching setting under
<table>
<thead>
<tr>
<th>Time in mins.</th>
<th>Teach A</th>
<th>Reteach B</th>
<th>Feedback</th>
<th>Planning</th>
<th>Planning</th>
<th>Teach B</th>
<th>Reteach A</th>
<th>Feedback</th>
<th>Planning</th>
<th>Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>A</td>
<td>Sup. I</td>
<td>B</td>
<td>Sup. I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>A</td>
<td>Sup. I</td>
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<td>Sup. I</td>
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</tr>
<tr>
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<td>Sup. I</td>
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<td>B</td>
<td>Sup. I</td>
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<td></td>
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<tr>
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<td></td>
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<td>Sup. I</td>
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<td>Sup. I</td>
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<td></td>
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<tr>
<td>36</td>
<td>B</td>
<td>Sup. I</td>
<td>A</td>
<td>B</td>
<td>Sup. I</td>
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<td></td>
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<td>42</td>
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<td>A</td>
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<tr>
<td>48</td>
<td>B</td>
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<td>A</td>
<td>Sup. I</td>
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</tr>
<tr>
<td>54</td>
<td>A</td>
<td>Sup. I</td>
<td>B</td>
<td>Sup. I</td>
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</tr>
<tr>
<td>60</td>
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<td>Sup. I</td>
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<tr>
<td>66</td>
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<tr>
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<td>A</td>
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<td>Sup. I</td>
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<td>90</td>
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<td>Sup. I</td>
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<td>Sup. I</td>
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<td>Sup. I</td>
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<td>108</td>
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<td>Sup. I</td>
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<td>Sup. I</td>
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<td>114</td>
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<td>Sup. I</td>
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<td>Sup. I</td>
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<td>120</td>
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<td>Sup. I</td>
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<td>126</td>
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<td>Sup. I</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Where, A, B denotes group one and group two respectively.
$S1$ $S2$ $S3$ are the student teachers.
Sup. I A - Supervisor of A group.
Sup. I B - Supervisor of B group.
10 students in 132 minutes.
2 supervisors - and in group A and one in group B.
5 students were in group A and 5 were in group B.
the standard procedure.

(a) Time:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
</tr>
</thead>
</table>
| Teach        | 6 Mts.
| Feedback     | 6 Mts.|
| Replan       | 12 Mts|
| Reteach      | 6 Mts.|
| Refeedback   | 6 Mts.|

Time table plan is presented in Table No. 6 (page 137)

(b) Number of pupil-teachers

1. 10 Pupil-teacher in Social Studies
    10 Pupil-teacher in Hindi
    8 Pupil-teacher in Science
    28 V.S.S.D. College Kanpur.

2. 10 Pupil-teacher in Social Studies
    10 Pupil-teacher in Hindi
    8 Pupil-teacher in Science
    28 A.M.D. College Kanpur.

(c) Supervisors

(d) Feedback by the Supervisors

Step 7. Treatment was under simulated conditions

Step 8. Sequence of skills

The six teaching skills were developed in the following order.

1. Skill of writing Instructional objectives.
2. Skill of Introducing a lesson.
3. Skill of Probing questioning.
4. Skill of Reinforcement.
5. Skill of using Black-board.

The details of skills is given in chapter V

Step 9 Observation of Teaching skills

The teaching skills developed through Micro-lessons were observed by the supervisors on rating type scale as given in the handbook "Becoming Better Teacher". Ratings were given after the lesson on a rating type schedule.

Step 10. Feedback

Immediate feedback was given to the pupil-teachers individually. The feedback was based on the rating on the observation schedules and the interpretation in the light of model lesson.

Step 11. Teaching time

Two complete cycles of Micro-lessons for each of the six skills were given by the trainees. Teaching time devoted to each 12 Microteaching lesson were the same.

Integration of Skills

After completing practice in all the six skills the trainees of all three groups in each subject were given two lessons each 15 minutes under simulated conditions. The purpose of these lessons was to give
the pupil teachers a chance to integrate the use of six skills in their classroom teaching before they start actual classroom teaching.

Procedure for Modified Microteaching group I (M.M.T₁)

The treatment of M.M.T₁ was exactly the same as group S.M.T. except for the modelling. This/ was exposed to Symbolic Modelling by the use of Model lessons.

Procedure for Modified Microteaching group 2 (M.M.T₂)

The treatment of M.M.T₂ was exactly the same as S.M.T. except for Modelling. This group was exposed to Audio Modelling.

After integration of skills all the three groups were given two lessons in real classroom situation. These lessons were evaluated by the researcher on General Teaching Competence scale. The mean performance of these two lessons of the pupil teacher formed the post-test scores.

PHASE - 2

To find out the difference in impact of G.T.C. developed through different types of Modellings upon Academic Achievement of students of class VIII Achievement tests in Social-studies, Hindi and Science were administered for pre-test purpose. After that
pupil-teachers of each group taught 13 lessons more to their students. After completing these lessons Achievement tests in Social-studies, Hindi and Science were administered and difference in gain in Achievement were found out.

Table-8
The approximate duration of the experiment was 135 days. The detailed time schedule was follows:

**PHASE-1**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Activity</th>
<th>Approximate duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Administration of Verbal Intelligence Test, Socio-Economic Status Scale in all three subjects (S.M.T., M.M.T.₁ and M.M.T.₂ groups)</td>
<td>3 days</td>
</tr>
<tr>
<td>2</td>
<td>Orientation and lesson planning (S.M.T., M.M.T.₁ and M.M.T.₂ groups)</td>
<td>9 days</td>
</tr>
<tr>
<td>3</td>
<td>Pre-test on G.I.C. Scale</td>
<td>6 days</td>
</tr>
<tr>
<td></td>
<td>i. Real classroom situation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ii. Three supervisors.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Orientation in Micro-teaching</td>
<td>3 days</td>
</tr>
<tr>
<td>5</td>
<td>Discussion of teaching skills</td>
<td>3 days</td>
</tr>
<tr>
<td>6</td>
<td>Perceptual, Symbolic and Audio Modelling in first skill</td>
<td>3 days</td>
</tr>
</tbody>
</table>
7. Practice teaching of first skill
   i. Microteaching cycle
   ii. Simulated condition
   6 days

8. Practice teaching of other 5 skills in sequence.
   (simulated condition)
   45 days

9. Integration of skills
   i. Two lesson of 15-15 minutes
   ii. Three supervisors
   iii. Simulated condition.
   6 days.

10. Post test on G.T.C. Scale
    i. Real classroom situation
    ii. Three supervisors
    6 days.

Total 90 days.

PHASE - 2

1. Pre-test on achievement test on standard VIII 3 days.

2. Practice teaching of thirteen lesson
   i. SMT, MMT1, and MMT2 (Social-studies, Hindi
      and Science).
   ii. Three supervisors.
   iii. Real classroom situation

3. Post Test on achievement test on standard VIII 3 days.

Total 45 days.

G. Total 135 days.

From December mid 1982 to May 15th 1983

The same procedure was adopted for in V.S.S.D. College, Kanpur.
Methods followed for the analysis of data:

The following statistical devices were used for analysing the data of this study. The reasons for using them are also given.

Mean: Mean rather than median or mode was used as a measure of central tendency of the scores of pre-test and post-test on General Teaching Competence Scale. Because mean is sensitive measure of central tendency. Mean is suitable measure to compare the groups. Mean was calculated of S.M.T. 1, M.M T.1 & MMT 1 groups for having an idea of the central tendency. The equation of the mean is \( \frac{\sum X}{N} \). Hence \( \sum \) denotes the sum total, \( X \) denotes scores and \( N \) denotes the total number of cases.

Standard Deviation: S.D. as a measure of variability was used because it goes hand in hand with mean as a measure of central tendency. It may be stated that mean and S.D. were suitable for the kind of data obtained in the present study. S.D. was calculated to know the extent of heterogeneity. The equation of S.D. is:

\[
\sigma = \sqrt{\frac{\sum d^2}{N}}
\]

where,

\( \sigma \) = Standard Deviation.

\( \sum \) = The sun off.

\( d \) = Deviation from mean.

\( d^2 \) = Squares of deviation.

\( N \) = Total no. of cases.
"F" Ratio: For the testing of experimental hypothesis F ratio was calculated. F ratio is variance ratio. In F ratio we divide the "among means" variance by the "within groups" variance and compare the resulting variance ratio, called F with the F values in table F.

F furnishes a comprehensive or over-all test of the significance of the difference among means. A significant F does not tell us which means differ significantly, but that at least one is reliably different from some others. If F is not significant, there is no reason for further testing. But if F is significant, we may proceed to test the separate differences by the 't' test.

't' test: Being the F ratio significant for the further testing of hypothesis 't' test was used.

't' test was used to find out the significance of difference. 't' scores were calculated for the verification of hypothesis at 0.05 level and 0.01 level of significance.

Levels of significance: Two levels of significance for any statistics were considered in this study. Firstly 0.05 level (F < 0.05) denotes that the statistics was
significant and the null hypothesis was highly suspected. Secondly 0.01 level ( \( P < 0.01 \) ) denotes that the statistics was highly significant and there was very little risk of the type I error in rejecting the null hypothesis. It may be said her that the decision of rejecting the null hypothesis is two and the same (that is, it is being rejected) whether \( P < 0.05 \) or \( P < 0.01 \). But the greatest impact of the level of significance is on the faith of the researcher with which he takes up the action as a result of the rejection of the null hypothesis. Hence, the level of significance was reported carefully.

The data so analysed is discussed and interpreted in the following Sixth chapter.