CHAPTER III
METHODOLOGY

The purpose of the present study was to look into the effect of micro teaching and use of multimedia on teaching competence of prospective teachers. For this purpose experimental method of research was used in the conduct of the present study. The experimental method of the conduct of study is explained as under. In order to achieve this objective, it was required to select a representative sample of prospective teachers and the necessary tools for collecting the data. The relevant details regarding these aspects of the study are given as under:-

3.1 RESEARCH METHOD

The study was conducted through experimental method of research. An experiment is the process in which the experimenter manipulate one variable to study the effect of the manipulation on another variable. The experimental method test the hypothesis concerning cause and effect relationship.

The method requires sample for conduct of study with certain research tools for conduct of the study. The description of tools and sampling is given hereunder:-
3.2 RESEARCH TOOLS

For collecting new unknown data required for any research problem, one may use various devices. For each and every type of research we need certain tools together facts or to explore new fields, which act to as means are called research tools. Different tools are suitable for collecting various finds of information for various purposes. The selection of suitable tools is of vital importance for successful research. The success of any research endeavour is largely dependent upon the tools which are used for the data collection. The following tools were selected and used by the investigator in the study.

In this study following tools were used by the investigator.

- Ravan’ Standard Progressive Matrices (Intelligence test for making the three equal matched groups (A1, A2, A3).
- General Teaching Competence Scale (GTCS) of Dr. B.K. Passi and Dr. Mrs. Lalita (1977) (Appendix-I).
- Micro lesson plans for microteaching and lesson plans for use of multimedia were prepared by the investigator herself (Appendix-II).
- Observation schedule for selected skills were used (Appendix-II).
• Transparencies and slides were prepared by the investigator overhead projector and slide projector were used for this purpose (Appendix-III).

3.2.1 Ravan' Standard Progressive Matrices

The Standard Progressive Matrices Sets A, B, C, D and E:

As one of the objectives of the study was to equate the group on the intelligence variable so Standard Progressive Matrices, Sets, A, B, C, D and E prepared by J.C. Ravan M.Sc. was administered to measure the intellectual level of the prospective teachers. This test used in the study is designed to measure the level of observation, abstract and clear thinking and reasoning.

The scale consists of 60 problems divided into five sets of 12. A person’s total score provides an index of his intellectual capacity, whatever his nationality or education. The test was administered according to the instructions given in the Progressive Matrices, Sets A, B, C, D & E. One hour was given to the prospective teachers to fill the forms of the test. The first problem i.e. A 1. was solved by the supervisor and then the prospective teachers were asked to turn over the next page of the test books and do the rest of the problems.
3.2.2 B.K. Passi’s General Teaching Competence Scale

The General Teaching Competence Scale is generally used by measuring teaching competency of a teacher individually by a reliable observer or a group of reliable observers making direct observations of his classroom behaviour for the entire teaching period.

As the teacher teaches, the observer sits at the back for observation. At the end of the teaching period, she gives her ratings on the General Teaching Competence Scale against all the items.

To facilitate this process she may either mark frequencies or write verbal descriptions against each item which would help her in giving rating more objectively.

- **Planning (Pre-instructional).** Objectives of the lesson were appropriate: clearly stated relevant to the content, adequate and attainable.
- Content selected was appropriate: relevant and adequate with respect to the objectives of the lesson, and accurate.
- Content selected was properly organized: Logical continuity and psychological organization.
- Audio-visual material chosen were appropriate: suited to the pupils and content, adequate and necessary for attaining the objectives.
• **Presentation (Instructional)** Lesson was introduced effectively and pupils were made ready emotionally and from knowledge point of view to receive the new lesson: continuity in statements or questions, relevance, use of previous knowledge and use of appropriate device/technique.

• Questions were appropriate: well structured, properly put, adequate in number and made pupils participate.

• Critical awareness was brought about in pupils with the help of probing questions: prompting, seeking further information, refocusing, redirection and increasing critical awareness.

• Concepts and principles were explained (understanding brought about) with the help of clean, interrelated and meaningful statements: statements to create set, to conclude, statements which had relevancy, continuity appropriate vocabulary explaining links, fluency and had no vague words and phrases.

• The concepts and principles were illustrated with the help of appropriate examples though appropriate media (verbal and non verbal): simple, relevant to content and interest level of pupils.
• Pupils’ attention was secured and maintained by varying stimuli like movements, gestures, changing speech pattern, focusing, changing interaction styles, pausing, and oral-visual switching: Pupils’ postures, and listening, observing and responding behaviour of pupils.

• Deliberate silence and nonverbal cues were used to increase pupil participation.

• Pupils’ participation (responding and initiating) was encouraged using verbal and nonverbal reinforces.

• Speed of presentation of ideas was appropriate: matched with the rate of pupils’ understanding and there was proper budgeting of time.

• Pupils’ participated in the classroom and responded to the teacher and initiated by giving their own idea and reacting to others’ ideas.

• The blackboard work was good: legible, neat, appropriateness of the content written and adequate.

• **Closing.** The closure was achieved appropriately: main points of the lesson were consolidated, present knowledge was linked with the past knowledge, opportunities were provided for applying present
knowledge, and present knowledge was linked with future learning (assignment).

- The assignment given to the pupils was appropriate: suited to individual differences, relevant to the content taught, and adequate.

- **Evaluation.** Pupils’ progress towards the objectives of the lesson was checked and the procedures of evaluation were appropriate: relevant to the objectives, valid, reliable and objective.

- Pupils’ difficulties in understanding a concept or principle were diagnosed by step-by-step questioning and suitable remedial measures were undertaken.

- **Managerial.** Both attending and non-attending behaviours of the pupils were recognized: attending behaviour was rewarded, directions were given to eliminate non-attending behaviours, questions were asked to check pupils’ attending behaviour, pupils’ feelings and ideas were accepted, and nonverbal cues were used to recognize pupils’ attending and non-attending behaviours.
Classroom discipline was maintained in the class: pupils’ followed teacher’s instructions that were not related to the content. Comments (if any):

3.2.2.1 Scoring Procedure. The sum of the ratings against at the 21 items constitutes the score on General Teaching Competency (GTC Scale) of the teacher being observed. The maximum score possible is 147 and the minimum is 21.

- **Reliability of the Scale.** The inter-observer reliability coefficients range from 0.85 to 0.91.

- **Validity of the Scale.** The scale has factorial validity. Scott’s coefficient of inter-observer ranging from 0.78 to 0.82.

3.2.3 Observation schedule for selected skills were used

The first part records the bio-data about the prospective teachers who is to be tested on this schedule.

- Name of the prospective teachers.
- Roll No.
- Topic
- Class
- Name of the Supervisor
- Date
• Time duration
• Teach/Re-teach

The scale value 0 indicates that the prospective teachers did not use the component at all. The scale value six indicates that the prospective teachers used the component very much.

3.2.3.1 Observation Schedule for the Skill of Probing Questioning:

As one of the objectives of the study is to develop teaching competence through the skill of probing questioning. The observation schedule for probing questioning prepared at CASE, Baroda, was used to observe and measure the skill. This schedule is of two types. These to types are identical in content but differ in the mode of responding. These modes of responding are based upon (i) frequency system, for marking tallies, and (ii) numerical weight age system to ascertain the extent to which the prospective teachers uses the skill of probing questioning.

The list of the components is given as under:-

• Prompting questioning
• Seeking further information questions.
• Refocusing questions
• Redirected questions
• Increasing critical awareness questions
3.2.3.2 Observation Schedule for the Skill of Increasing Pupils’ Participation

As one of the objectives of the study is to develop teaching competence through the skill of increasing pupils’ participation. The observation schedule for increasing pupils’ participation prepared at CASE, Baroda, was used to observe and measure the skill.

The list of the components is given as under:-

- Creating set:
- Questioning:
- Encouraging pupils’ participation
- Pausing

3.2.3.3 Observation Schedule for the Skill of Reinforcement

As one of the objectives of the study is to develop teaching competence through the skill of reinforcement. The observation schedule for reinforcement prepared at CASE, Baroda, was used to observe and measure the skill.

The list of the components is given as under:-

- Desirable Behaviours
  - Use of Positive Verbal Reinforcer
  - Use of Positive Non-verbal reinforcer
  - Use of Extra-Verbal reinforcement
• Undesirable Behaviours
  • Use of Negative Verbal Reinforcer
  • Use of Negative Non-verbal reinforcer
  • Wrong Use of Reinforcement

3.2.3.4 Observation Schedule for the Skill of Recognizing Attending Behaviour

As one of the objectives of the study is to develop teaching competence through the skill of Recognizing Attending Behaviour. The observation schedule for Recognizing Attending Behaviour prepared at CASE, Baroda, was used to observe and measure the skill.

The list of the components is given as under:-

• Rewarding the Attending Behaviour of the Pupils
• Giving Directions
• Asking Questions
• Accepting Feelings and for Ideas of Pupils
• Using silence and Non-verbal Cues

3.2.3.5 Observation Schedule for the Skill of Achieving Closure

As one of the objectives of the study is to develop teaching competence through the skill of Achieving Closure. The observation schedule for Achieving Closure prepared at CASE, Baroda, was used to observe and measure the skill.
The components of this skill are given below:

- Consolidation of the major points by the teacher the pupils.
- Providing opportunities for the pupils to apply the new knowledge to various situations.
- Linking the pupil’s new knowledge gained during the lesson (present knowledge) with their previous knowledge.
- Linking present knowledge with future learning.

### 3.3 Universe of the Study and Sample

Sampling is the essential feature in any research endeavours. Since it is not possible to cover the whole population in experimental studies, the researcher is to resort to sampling.

#### 3.3.1 Universe

The universe of the study is prospective teachers studying in education colleges situated in 21 districts in State of Haryana. Further the focus of the study was on prospective teachers studying in B.Ed. out of 21 districts one district namely Sirsa was selected on random basis.

The table 3.1 the list of education colleges district Sirsa alongwith the number of seats.
### Table 3.1

**The List of Education Colleges District Sirsa alongwith the Number of Seats**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the College</th>
<th>No. of Seats</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bhagwan Shri Krishan College of Education (W) Mandi Dabwali.</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Mata Harki Devi College of Education (W) Odhan, Sirsa.</td>
<td>200</td>
</tr>
<tr>
<td>3</td>
<td>Rashobha College of Education, Moriwala, Sirsa</td>
<td>200</td>
</tr>
<tr>
<td>4</td>
<td>Lala Dheeramal Arora National College of Education, Sirsa</td>
<td>200</td>
</tr>
<tr>
<td>5</td>
<td>Jan Nayak Ch. Devi Lal College of Education, Sirsa</td>
<td>200</td>
</tr>
<tr>
<td>6</td>
<td>Ch. R.R. Memorial College of Education, Ellenabad, Sirsa</td>
<td>200</td>
</tr>
<tr>
<td>7</td>
<td>Triveni College of Education (W) Sirsa</td>
<td>100</td>
</tr>
<tr>
<td>8</td>
<td>Shah Satnam Ji College of Education, Sirsa</td>
<td>100</td>
</tr>
<tr>
<td>9</td>
<td>Haryana College of Education, Ellenabad, Sirsa</td>
<td>100</td>
</tr>
<tr>
<td>10</td>
<td>Hakeem Harbans Singh New Era College of Education, Sant Nagar, Sirsa</td>
<td>100</td>
</tr>
<tr>
<td>11</td>
<td>Sir Chhotu Ram Jat College of Education, Ellenabad, Sirsa</td>
<td>100</td>
</tr>
<tr>
<td>12</td>
<td>Shaheed Bhagat Singh College of Education, Kalanwali, Sirsa</td>
<td>100</td>
</tr>
<tr>
<td>13</td>
<td>J.G. College of Education, Sirsa</td>
<td>100</td>
</tr>
</tbody>
</table>
3.3.2 The College Sample

The college sample was drawn from the representative education colleges. A list of affiliated colleges with Kurukshetra University, Kurukshetra was procured from B.Ed. prospectus and website of K.U.K. In order to get relevant information from colleges, the investigator researched website. Random sampling technique was used in choosing Sirsa District from Haryana. Random sampling technique was used for choosing three education colleges namely, Mata Harki Devi College of Education, Odhan, Sirsa, J.C.D. College of Education, Sirsa, Lala Dheeramal Arora National College of Education, Sirsa and again random sampling technique was used for distribution of groups.

3.4 FORMATION OF DESIGN

Stage I

First of all prospective teachers were selected on the basis of teaching subjects they have offered at their B.Ed. level. It was found 522 prospective teachers opted for teaching of social studies. The table 3.2 given below indicated the number of 270 prospective teachers selected as sample at this stage.
Table 3.2

the Number of Prospective Teachers who have offered Teaching of Social Studies as one of the Teaching Subjects.

<table>
<thead>
<tr>
<th>Name of the college</th>
<th>No. of prospective teachers admitted</th>
<th>No. of prospective teachers offering teaching of social studies</th>
<th>No. of prospective teachers included in the sample at this stage</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mata Harki Devi College of Education, Odhan (District Sirsa)</td>
<td>200</td>
<td>170</td>
<td>90</td>
<td>52.94</td>
</tr>
<tr>
<td>J.C.D. College of Education, Sirsa</td>
<td>200</td>
<td>172</td>
<td>90</td>
<td>52.33</td>
</tr>
<tr>
<td>Lala Dheeramal Arora National College of Education, Sirsa</td>
<td>200</td>
<td>180</td>
<td>90</td>
<td>50</td>
</tr>
</tbody>
</table>

Stage II

To achieve further homogeneity in the group efforts were made to equate the ninety prospective teachers referred to above, on the basis of intelligence. The table 3.3 given below show the composition sample at second stage.
Table 3.3  
the Composition of Sample at Second Stage.

<table>
<thead>
<tr>
<th>Name of the college</th>
<th>No. of prospective teachers subjected to test</th>
<th>No. of prospective teachers who completed the test</th>
<th>Percentage who completed the test</th>
<th>No. of prospective teachers identified as homogenous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mata Harki Devi College of Education, Odhan (District Sirsa)</td>
<td>90</td>
<td>50</td>
<td>55.56</td>
<td>40</td>
</tr>
<tr>
<td>J.C.D. College of Education, Sirsa</td>
<td>90</td>
<td>52</td>
<td>57.78</td>
<td>40</td>
</tr>
<tr>
<td>Lala Dheeramal Arora National College of Education, Sirsa</td>
<td>90</td>
<td>55</td>
<td>61.11</td>
<td>40</td>
</tr>
</tbody>
</table>

In the present study pre-test, post-test, control group design was employed. The study involved two independent variables, namely, microteaching skill, use of multimedia. The dependent variable studied was teaching competence of prospective teachers in Social Studies. The table 3.4 given below show the design of the study.
### Table 3.4
**the Design of the Study**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Groups</th>
</tr>
</thead>
</table>
|                  | Experimental
|                  | Group A1                    |
|                  | Experimental
|                  | Group A2                    |
|                  | Control                      |
|                  | Group A3                    |
| Equating        | Equating the groups on the factors of intelligence and subject opted as teaching subject in B.Ed. |
| Pre-Test         | Administration of Baroda General Teaching Competence Scale |
| Training         | Orientation and training in Micro Teaching skills |
|                  | Training to use Multimedia |
|                  | Training through traditional method |
| Post-Test        | Administration of Baroda General Teaching Competence Scale |

The above table shows the design of the study in which the different steps of the process of treatments are presented. There are three treatment groups – Experimental Group A1 – through micro teaching, Experimental Group A2 – through multimedia and Control group A3 – through conventional method. In the first step, Baroda General Teaching Competence Scale was administrative on 120 prospective teachers who constitute the sample of the study. In a micro lesson the number of the prospective teachers should be between 5 to 10. The experimental group A1 – through micro teaching in the case of the present
constitute of 40 prospective teachers hence it was divided into four groups. In order to develop teaching competence.

The experimental group A2 – through multimedia was exposed to use of Multimedia through Overhead Projector, Slide Project and Compact Disk. The control group A3 – through conventional method was exposed to conventional method of preparing of prospective teachers for classroom teachers. Distribution of total sample may also be seen from Fig. 3.1.

![Figure 3.1](image)

**Figure 3.1**

*Distribution of Total Sample*
3.5 CONTROL OF VARIABLES

The study involved two independent variables, namely, microteaching skill, use of multimedia. The dependent variable studied was teaching competence of prospective teachers in Social Studies.

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

- **Organismic Variables:** In research, frequent use is made of response-inferred organismic variables which means a classification based upon prior observation of responses. Teaching competence was organismic was variable in the present study. All the three groups were matched on basis of subject and score of intelligence.

- **Stimulus Variables:** The general class of things related to an environment situation or conditions of stimulation are referred to as stimulus variables. Control on this experimental variable was exercised by the investigators herself administrated the treatment. The activities involved in treatment were exactly similar for each group.

- **Response/Behavioural Variables:** It refers to any variables which involves some action or response of an
organism. To control such variables criterion/achievement test was administrated for a pre-test as well as post-test measurement. Every effort was made to administer the pre-test and post-test under the similar conditions of room and instructions.

3.6 CONDUCTING THE EXPERIMENT

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

Phase I – Administration of the Pre-test

After selecting the colleges for experiment the investigator fixed appointments and discussed the proposed instructional programme with the principals of colleges. Availability and favourable climate for research was the criteria for final selection of colleges. A meeting with principal and teacher educators helped in chalking out the date and time schedules for the implementation of the programme. The investigator visited the selected prospective teachers and established a rapport with respective teachers. Before starting the treatment all the prospective teachers selected in sample were given pre-test. This was the initial stage in which the General Teaching Competence Scale (GTCS) was administered on group A1, group A2 and group A3 before introducing any treatment.
**Phase-II Treatment.** In the treatment stage all the three groups were treated as given below.

**Group A1** was oriented through Microteaching skills.

**Group A2** Lesson plans delivered with the help of multimedia (O.H.P. & Slide Projector.

**Group A3** Unlike the other two groups, this was the control group. The treatment was given to this group as per the lesson plans prepared by using conventional method of teaching simultaneously with the other groups.

This treatment was maintained for thirty working days for one period of 36 minutes for each working day in each institution for each of the groups.

**Phase III Terminal Stage.** At this stage post-test was administered on group A1, group A2 and group A3 on the completion of the treatment. In this way the terminal behaviour of the sample was evaluated.

**3.7 FORMATION OF FACTORIAL DESIGN**

The major objective of the study was to explore relationship of micro teaching, multimedia and conventional method. In order to study the effect of micro teaching on teaching competence, use of multimedia on teaching competence and conventional method on teaching competence of prospective
teachers. 3x2 factorial design was formed and depicted in the table 3.5 and fig. 3.2

**Table 3.5**

**Formation of Factorial Design**

<table>
<thead>
<tr>
<th>Teaching Competence (B)</th>
<th>Treatment A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levels</td>
<td>A1 40</td>
</tr>
<tr>
<td></td>
<td>A2 40</td>
</tr>
<tr>
<td></td>
<td>A3 40</td>
</tr>
<tr>
<td>Teaching Competence</td>
<td>A₁B₁</td>
</tr>
<tr>
<td>High Level=B₁</td>
<td>A₂B₁</td>
</tr>
<tr>
<td></td>
<td>A₃B₁</td>
</tr>
<tr>
<td>Teaching Competence</td>
<td>A₁B₂</td>
</tr>
<tr>
<td>Low Level=B₂</td>
<td>A₂B₂</td>
</tr>
<tr>
<td></td>
<td>A₃B₂</td>
</tr>
</tbody>
</table>

Treatment was considered as factor A. It included three groups of prospective teachers two experimental and one control group.


A2 – Experimental Group A2 through Multimedia.

A3 – Control Group A3 through Conventional Method.

Teaching competence was considered as Factor B. It included two levels of teaching competence high and low.

A2 – Experimental Group A2 through Multimedia.

A3 – Control Group A3 through Conventional Method.

**Figure 3.2**

**The 3x2 Factorial Design Layout**

**Treatment A**
3.8 STATISTICAL ANALYSIS

Statistical procedures have been developed to simplify the large quantities of numerical data and thus to assist in the task of obtaining meaning from them. In this study the undermentioned statistical treatments were applied to give numerical description and meaningful shape to the obtained data:

For analysis of data in the present study following statistical techniques were used:

- Mean
- Measure of variability
- Significance of difference between two means
- Analysis of variance (ANOVA)
- t-test & F-test
- Factorial design 3x2