CHAPTER - III

METHOD AND PROCEDURE OF THE STUDY
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Methodology of research depicts the general pattern for organizing the procedure for gathering data for the investigation. Methodology can be defined as:

1. "the analysis of the principles of methods, rules and postulates employed by a discipline".
2. "the systematic study of methods, that are, can be or have been applied with in a discipline".
3. "a particular procedure or set of procedure".

Methodology includes a collection of theories, concepts or ideas as they relate to a particular discipline or field of inquiry. (Wikipedia.com)

The present chapter would imply sub – heads like:

3.1 Design of the study
3.2 Sample
3.3 Procedure Followed
3.4 Statistical Analysis
3.5 Precautions observed
3.6 Constraints and Difficulties Faced during experiment

3.1 DESIGN OF THE STUDY

Research Design can be thought of as the structure of research. It is the 'glue' that holds all of the elements in a research project together. Research Design is an overall plan for organizing a scientific investigation (Polit and Beck 2004).

According to Best (2003), the Experimental design is the blue print of the procedures that enable the researcher to test hypotheses by reaching valid conclusions about relationships between independent and dependent variables. Selection of a particular design is based on the purposes of the experiment, the type of variables to be manipulated and the conditions or limiting factors under which it is conducted. The design deals with such practical problems as how subjects are to be assigned to experimental and control groups, the way variables are to be controlled, how observations are to be made, and the type of statistical analysis to be employed in interpreting data relationship.
In the present study, a pre-test, post-test control group experimental design was employed with a random sampling in the form of two sections of B.Ed. class of the same college of Education. It involved two groups of students Experimental group and Control group; the experimental group was taught through MML Package and control group taught through conventional method.

**TABLE 3.1**

**DESIGN OF THE STUDY**

<table>
<thead>
<tr>
<th>Group</th>
<th>Before Intervention outcomes</th>
<th>Independent Variables</th>
<th>After Intervention Outcomes</th>
<th>Difference Outcomes</th>
<th>Net Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>$E_1$</td>
<td>Multimedia Approach</td>
<td>$E_2$</td>
<td>$E = E_2 - E_1$</td>
<td>E-C</td>
</tr>
<tr>
<td>Control</td>
<td>$C_1$</td>
<td>Conventional Approach</td>
<td>$C_2$</td>
<td>$C = C_2 - C_1$</td>
<td></td>
</tr>
</tbody>
</table>

$E = \text{Gross outcomes measure for experimental group.}$

$C = \text{Gross outcomes measure for control group}$

Net effect of intervention of $E-C$ where

$E_1C_1 \text{ measure of outcomes before the intervention}$

$E_2C_2 \text{ measure of outcomes after the intervention.}$
Fig. 3.1 Graphical Description of the study

The design comprised of three stages. The first stage involved pre-testing of all the students of the two groups on achievement in 'Educational Technology'. The second stage involved the experimental treatment, which consisted of teaching all the five units of Paper IV: 'Educational Technology' of B.Ed. through Multimedia learning package to experimental group and through conventional method to control group. In the third stage, the students were post-tested on achievement in 'Educational Technology'. The phases of experiment are presented in Fig. 3.1.
Study Variables

In an experimental research, the relationship between two types of the variables namely independent and dependent variables are studied. Independent variables are the causes while dependent ones are effects. Another category of variables which is equally important is of the intervening variables. All these three kinds of variables identified for the study are:

Independent Variables

As the impact of Multimedia Learning Package was to be studied, the multimedia approach was used as independent variables. MML package was used to see its effect on the achievement of B.Ed. learners. The experimented group was taught through MML package and control group was taught through traditional method. So the multimedia approach and the conventional approach were the two independence variables for the study.

Dependent Variables

Achievement in 'Educational Technology' was taken as Dependent Variables. This variable was measured twice during the course of the study- first before beginning the experimental treatment i.e. at the pre test stage and then after completing the experimental treatment i.e. at the post test stage.

Intervening Variables

There are certain variables known as intervening variables which have their effect on the learning outcomes and can influences both independent, dependent and intervening variables such as Nature of Institution, Subject to be taught, Teacher, Class and Intelligence of pupils etc. were controlled experimentally.

Control Employed

It is necessary to control all these variables that may significantly affect the dependent variables. Hence such intervening variables were controlled by employing suitable controls.
1. **Nature of Institution**
   The sample was selected from a single college of education (Advance Institution of Education, Palwal)

2. **Class**
   B.Ed. students were selected for the study and were kept constant during the study.

3. **Teacher**
   Both the experimental group and the control group were taught by the investigator herself to avoid any variation.

4. **Subject**
   The two groups were taught the same content of paper: 'Educational Technology'.

5. **Intelligence**
   Since the students of both the groups got admission into B.Ed. after clearing the Entrance Examination, they didn't differ on General mental ability.

The independent variables, dependent variables and control variables with the kind of control employed in the study are summarized in table – 3.2.

Specific events and factors like anxiety, home environment, adjustment, social maturity and the like would have only a marginal effect upon the experiment so these factors were not taken into account.
TABLE 3.2
INDEPENDENT, DEPENDENT AND CONTROL VARIABLES

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variables</th>
<th>Control Variables</th>
<th>Control Employed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2. Class</td>
<td>2 Only B.Ed. students were taught.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Subject to be taught</td>
<td>3. Paper IV : Educational Technology was taken</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Duration of the instructional Phase</td>
<td>4. Throughout the session one group was taught with Multimedia Learning package and the other group was taught with traditional method</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Teacher</td>
<td>5. The two groups were taught by the same teacher</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Pupils Intelligence</td>
<td>6. Came from the same entrance Examination</td>
</tr>
</tbody>
</table>

3.2 SAMPLE

Sampling is a technique by which a relatively small number of individuals or measures of individuals, objects or events is selected and analyzed in order to find out something about the entire population from which it is selected. Sampling technique reduces the expenditure, saves time and energy, permits measurement of greater scope produces greater precision and accuracy.

In all types of researches, there are some inferences regarding a well specified and identifiable group known as population and the selected number of person known as sample is the representative proportion of the population.

The present study will be focused on the population of student teacher pursuing B.Ed. Random Sampling Method was used to form two groups i.e. experimental group and control group. Each group consists of 50 students.
3.3 **PROCEDURE FOLLOWED**

Procedure of the experiment comprised of three phases as given below:

**Phase I:** Pre-Testing Stage

**Phase II:** Treatment Stage

**Phase III:** Post-Testing Stage

**Phase I: Pre-Testing Stage**

The stage involved the administration of an achievement test to both the groups: Experimental as well as control group. Scoring was done with the help of scoring keys.

**Phase II: Treatment Stage**

In the Second Stage the experimental group was exposed to instructional MML package whereas the control group was taught by conventional method. Same content was taught to both the groups. Students were encouraged to participate and learn through the novel method of instruction i.e. through multimedia on computer with the combination of text, animation, graphics, pictures, video, audio etc.

**Phase III: Post-Testing Stage**

After completion of the experimental treatment, the achievement test was administered to both the groups i.e. Experimental and Control group.
3.4 STATISTICAL ANALYSIS

To achieve objectives of the study, the data collected was statistically analyzed using the following techniques:

1. Descriptive statistics such as Means and SDs were worked out of the score of the achievement.

2. 'T' value was employed for testing the significance of difference between the means of pupils' achievement in 'Educational Technology' on pre test post test and gain scores. The value to 't' was computed with the help of the following formula:

\[ t = \frac{M_1 - M_2}{\sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}}} \]

Where  
- \( M_1 \) = Mean of first group;
- \( M_2 \) = Mean of second group;
- \( \sigma_1 \) = Variance of first group;
- \( \sigma_2 \) = Variance of second group;
- \( N_1 \) = Number of cases of first group;
- \( N_2 \) = Number of cases of second group;

Mean scores in respect of achievement in 'Educational Technology' was pictorially presented in the form of bar graph. Bar graphs were drawn in respect of pre test and gain scores of experimental group and control group.

3.5 PRECAUTIONS OBSERVED

Following precautions were observed during the course of experiment (pre-test –Treatment – Post test) for ensuring effectiveness and high precision in experimental condition which may have contributed to the results.

- No undue stress or control of any kind was imposed on the subjects at any time during the study and the experiment was conducted in a relaxed natural settings.
• Both the experimental and control groups were taught by the researcher herself to avoid any variation.

• The effectiveness of the experimental treatment was ensured by maintaining natural setting, harmonious atmosphere, providing sufficient time for various activities in the experimentation.

• It was ensured that the topics chosen as contents of treatment had not been previously taught to the students in both the experimental and control groups.

• During instructional treatment attempt was made to stick to limits of the specific teacher directed instructions in both groups and not to deviate from the steps made in lesson plans of the treatment during execution.

• Care was taken to keep the importance of content matter during the course of treatment and it was not underplayed while fitting into the instructional treatment.

• Separate material for achievement tests was provided to every student during experiment so as to avoid any indiscipline or chances of unfair observations.

• Teaching periods of 50 minutes duration were utilized fully for treatment and time was not wasted during treatment.

3.6 CONSTRAINTS AND DIFFICULTIES FACED DURING EXPERIMENT

It may be improper to mention some of the difficulties faced or constraints for the experiment that need to be taken note of. These were sorted out by the researcher.

• Power failure
• Lack of proper infrastructure
• Time table related difficulties

Efforts were needed to convince other teachers and principal about importance of the experiment to make them agree to cooperate in the experiment. The researcher contacted the authority and briefed about the programme and its usefulness. It is an essential requisite for every experiment that the treatment
should be fully provided to every student. It was ensured that the sample groups regularly attended the college. The experiment had to be adjusted as per the time table as the students were purposing in a regular course of studies. Even the time table in charge was contacted for making some changes in the regular time table. The method of MML package takes more time in setting up and winding up. So some students were involved in setting the equipment in the class. Such students repeatedly needed encouragement, so it was made sure to encourage them from time to time. The students were motivated to take interest in teaching learning activities. Despite these constraints the researcher carried out the experiment very smoothly to study the effectiveness of MML package for B.Ed. students.