CHAPTER – III

METHODOLOGY

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3.1.0 Introduction

The previous two chapters have described the overall approach to the problem. This chapter is concerned with the details of the techniques adopted in this study. The sample, its selection, tools their description, data collection and statistical techniques used for analyzing the data.

3.2.0 Sample

A sample is a small proportion of a population selected for observation and analysis. By observing the characteristics of the sample, one can make certain inference about the characteristics of the population from which it is drawn. As the time was short at the disposal of the experimenter, so incidental sampling method was adopted. It included two government high secondary schools of Indore city. The control and experimental groups in teaching was taken from the school. The de scription of the sample for the study is given in the Table-3.1.

Table : 3.1: Distribution of Sample

School	Govt. High Sec. School	Bal Vinay Mandir School
Group	Control	Experimental
Enrolment	57	45
Pre test	47	40
Post test	30	30
N	30	30
Boys	15	15
Girls	15	15

3.3.0 Variables

The study was based on following variables :

Variables

Independent Variables

Teaching method

1. Traditional teaching method
2. Concept attainment model based teaching.

Dependent variables

1. Achievement in science
2. General mental ability :

3.4.0 Design of the Study

3.4.1 Need of the design

No planning of educational research can be completed without a detailed design of investigation. Design is considered as the heart and soul of the investigation. A dear visualization of the methodological step is an imperative need for the successful completion of the researcher project.

According to Tuchaman (1978) "A researcher design as a specification of operation for the testing of hypothesis under a given set of conditions".

3.4.2 Design

The present study was experimental in nature. Pre-test, post-test control group design was employed.

Table-3.2 : Characteristics of Researcher Design

Group	Control	Experimental
Early Status	Pre-test	Pre-test
Treatment	Traditional Method	Concept attainment model based teaching
Terminal status	Post-test	Post-test

Table-3.3 : Schematic Representation of the Study

Activity	Experimental Group	Control Group	Time
Group Formation	Students were randomly selected and school were selected and designated as experimental group	Standard were randomly selected and school were selected and designated as control group	
Pre-testing	Criterion test	Criterion test	60 Minutes
Treatment	Ten concepts were taught through concept attainment model	Ten concepts were taught through traditional model	40 minutes each = 400 minute
Post Testing of the variable	Criterion test	Criterion test	60 Minutes
Administration	General mental ability test	General mental ability test	20 minutes

3.5.0 Tools

For various purposes of the study , following tools were used.

3.5.1 Test of General Mental Ability

To determine the intellectual capacity of learner's a test of general mental ability was administered on the student, which was given by J.C. Raven - Standard progressive Matrices (non-verbal test) for 11 years and above.

The test consist of 60 items divided into five sets provide five opportunities for grasping the method and five sets of progressive assessment of a person.

The aggregate of five scores, provides an index f "Intellectual capacity" classified as below :

Grade-I = "Intellectually superior"
(scores at or above the 95th percentiles)

Grade-II = "Above the average"
(Scores between 75 and 95 percentiles)

Grade-III = "Intellectually average"
(Scores between 25-75 percentiles)

Grade-IV = "Definitely below average"
(Scores between 5 and 25 percentiles)

Grave-v = "Intellectually defective"
(Scores at or below 5 percentiles)

3.5.1a Validity : The concurrent and predictive validities of SPM vary with age, possibly sex and homogeneity of the sample.

3.5.1b Reliability : Slimissen used the retest method of the test with the interval of one week, one month and three months. The realiability of the test was measured .89, .81, .78 Zhang and wang got the .79 realibility with the margin of 15 days and 30 days.

3.5.2 Achievement Test

For constructing the test of achievement, the items were framed on the basis of selected concepts :-

(i) Metal

(ii) Micro-organism

(iii) Man made things

(iv) Fuel

(v0 Minerals

(vi) Alloy

(vii) Renewable resources

(viii) Vestigial organs

(ix) Useful animals for human beings

(x0 Crop plants.

The test consisted of ten multiple choice questions, five match the columns type questions, ten short answer type questions, five fill in the blanks, four right or wrong type questions and two long answer type questions, that covered above topics.

The number type weight-age of the test item are shown in the table below: -

Table- 3.4: Item details of the Achievement Test

S.N.	Type of items	No. of items	Weightage
1.	Multiple choice	10	10
2.	Match the columns	5	5
3.	Short answer recall	10	20
4.	Fill in the blanks	5	5
5.	Right or wrong	4	4
6.	Long answer recall	2	6
	Total	**36**	**50**

3.6.0 Procedure of Data Collection

Data were collected with the help of tools described in the preceding captions. For measuring general mental ability the standardized test developed by Raveen was used. Details of the tool were described in the caption under tools. Achievement test was developed by the investigator and was standardized for the purpose of the study.

For standardization of the achievement test 10 teachers different government schools were consulted by the researcher. The suggested different measures for the standardization and their valuable recommendations were incorporated.

Data collection included the test before and after the treatment which were conducted as detailed and presented in the in table 3.5.

Table-3.5 : Study Schedule

School	Govt, High Sec School	Bal Vinay Mandir School
Group	Control	Experimental
Pre-test	8th Feb. 2006	8th Feb. 2006
Treatment	9th Feb. to 18th Feb.	9th Feb. to 18th Feb.
Post-test	20th Feb. 2006	20th Feb. 2006

3.7.0 Statistical Techniques used

The statistical technique used in the present study for anlaysing the data are given objective-wise as under:

1. For Studding the effectiveness of concept attainment model Percentile,

Mean and Standard deviation were used.

2 For comparison of achievement of experimental and control group Two way ANOVA was employed.

3. For comparison of general mental ability Two way ANOVA was used.
4. For studying the effect of treatment and sex on achievement in Science 2x2 Factorial design, ANOVA of equal cell size was used.
5. For studying the effect of treatment and sex on general mental ability 2x2 Factorial design, ANOVA of equal cell size was used.