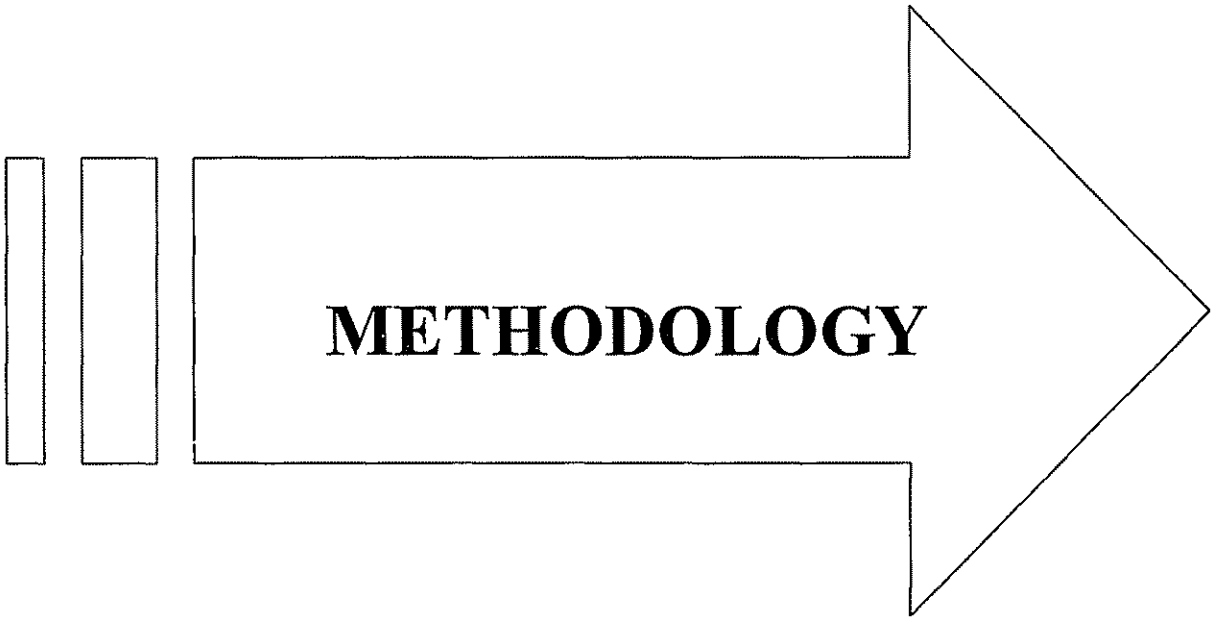
CHAPTER - III



CHAPTER - III

METHODOLOGY

3.1 Introduction

This chapter deals with the methodology employed to achieve the objectives of the study mentioned in chapter one. Keeping in view the nature and objectives of the study appropriate sample was selected and tools were developed. This chapter deals with the research design, sample, tools used, data collected and statistics used.

3.2 Research design

The research design is the detailed plan of an investigation. In fact, it is due print of the detailed procedure of testing the hypothesis and analyzing obtained data. The research design may be defined as a sequence of those steps taken ahead of the time to ensure that the relevant data permits objectives analysis of the different hypothesis formulated with respect to the research problems.

Research design refers to the systematic scheduling of the time at which observations are made on the performance of the subjects. This careful scheduling of the treatment and observations can be very helpful in reducing the threats to the internal validity of research.

3.2.1 Design of the study

In educational research it is not possible to control the situations in an adequate manner. No school will allow its class sections to be disturbed or reorganized on a random basis. The practical reality therefore warrants the use of an experimental design with the least interference of the on going arrangements. Such designs are known as "quasi experimental designs". In

these designs researcher is able to control only some of the sources of internal validity. These provide control of when and to whom the measurement is applied, but because random assignment to experimental and control a treatment has not been applied, the equivance of the group is not assured.

Compbell and Stanley(1963)suggested many quasi-experimental designs. On-equivalent Control Group Design is one of the experimental designs. This design is often used in classroom experiments when experimental and control groups are such naturally assembled groups. The difference between the mean of the O1 and O2 scores and the difference between the mean of the O3 and O4 scores are tested for statistical significance.

For the present study Non-equivalent Control group design was employed. This can be presented as follows:

O X O

O X O

O= Observation

X= Treatment

3.3 Sample

Most of the educational phenomena consist of large number of units. It would be impractical to observe each unit of the population under controlled conditions is in order to arrive at the principle having universal validity. Some populations are so large that their study would be expensive in terms of time, money, effect and manpower. Sampling is a process by which a relatively small numbers of individual objects of events are selected in order to find out something about the entire population from which it was selected.

An appropriate chosen sample size enhances the reliability and validity of research findings. Commonly used sampling techniques are random

sampling, stratified sampling, quota sampling, purpose sampling and incidental sampling. For conducting the present study, keeping in view the limitations and resources available with, the method of random sampling has been used. The researcher which collects information from all the students that are conveniently available and willing to cooperate for providing information, the sample is called incidental sample.

Bal Bhawan School, Shyamla Hills, Bhopal was selected randomly. Two sections of the Class IX was selected randomly from the five sections. From these two sections, one section was designated as experimental group and other was designated as control group. Experimental group was taught through the CAI Package and the control group was taught through the traditional approach. Each group was having 36 students. The distribution sample (boys and girls) are presented in Table 3.1.

Table: 3.1: Group-wise and Gender-wise Distribution of Sample

Group	Boys	Girls	Total
Experimental	22	14	36
Control	22	14	36
Total	44	28	72

3.4 Data Gathering Tools

To select or construct appropriate tools for the study is an important aspect of any research study. In the present study the researcher has used two standardized tools and constructed one tool keeping in view the objectives of the study. For the present study, the variables like Attitude towards Science and Achievement in chemistry taken as dependent variables. Study Habits and

Teaching strategies are Independent variables. For measuring these dependent variables the tools used were presented under different captions.

3.4.1 Science Attitude Tool-Science Attitude Scale

This tool developed by Mrs.Avinash Grewal.It consists of 10 positive items and 10 negative items. The SAS is a self reporting inventory consisting of 20 items desired to assess the attitude of individuals towards science. There is no time limit but normally it takes about 15 minutes for giving responses to the items of the scale.

3.4.2 Study Habits Inventory

This tool was developed by Dr.B.V.Patel.It consist of 45 items desired to find out the good study habits among the students. Some items are marked from 5-1 and some other are marked from 1-5.Marking is done according to the responses given by the students. There is no time limit but normally it takes about 15 minutes for giving responses to the items of the inventory.

3.4.3 Constructing Achievement Test

Achievement test is used to measure the achievement of the learners after duration of teaching learning process. Achievement test in Chemistry. The syllabus of chemistry for class IX from science book was analyzed keeping in view objectives of teaching chemistry and competencies of the student. The items were framed on the basis of selected content of chemistry of class IX.The topics of the content included in the test are given below:

- Matter in our Surroundings
- Is matter around us Pure
- Atoms and Molecules
- Structure of The Atom

The test consists of two types of questions like Multiple Choice and Question/Answer. These test items covered the above content. The number, type and marks of the table below:

Table 3.2: Details of the Items in Achievement Test

S.N.	Types of questions	No. of questions	Total Marks
1	Multiple Choice	40	40
2	Question/Answer	10	10
Total		50	50

3.5 Development of Computer Assisted Instruction(CAI) package

For developing Computer Assisted Instruction (CAI) package the investigator considered the four Chapters of Chemistry from the Science Text Book of Class IX Students. The software used for the development of CAI was VB(Visual basic). The investigator kept in mind the following objectives during the development of CAI.

1. The students will be able to learn chemistry with interest.
2. The student will be able to understand the nature of Chemistry.
3. The students will be able to develop confidence in Chemistry.

3.6 Data Gathering Procedure

Data were collected with the help of tools described in the preceding captions. The treatment i.e., teaching through CAI package and the teaching through Traditional approach was given to both the groups, respectively. The experimental group was taught through the CAI package and the control group was taught through the Traditional approach. In total, ten lessons were taught to both the groups following the different approach as mentioned. An Achievement test was developed by the investigator and was

administered to the students of both the groups after teaching of ten lessons. Attitude towards science and study habits test was administered to both groups before the start of the treatment and, again, after the end of the treatment. The Science Achievement score of Class VIII was collected from the school register. The Reaction Scale developed by the Investigator was administered only to the experimental group, who was taught through the CAI package, after the completion of ten lessons. The schematic representation of the experiment is presented in the table-3.3.

(a) Achievement in Chemistry, Percentile Mean, C.V. and Standard deviation were used; and

(b) Reaction of the students towards the CAI Package Percentage was used.

3.7 Statistical Techniques Used

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

1. For studying the effectiveness of the CAI Package in terms of Achieveme
2. For studying the effect of treatment and Gender on achievement in 2X2 factorial design ANCOVA of unequal call size was used.
3. For studying the effect of treatment and Gender on Attitude towards Science 2X2 factorial design, ANCOVA of equal cell size was used.
4. For studying the effect of treatment and Gender on Study habits 2X2 factorial design, ANCOVA of equal cell size was used.

Table 3.3: Schematic Representation of the study

Activity	Experimental group	Control group	Time
Group formation	Section A was designated as experimental group and taught through the CAI Package	Section B was designated as Control group and taught through the Traditional Method	
Pre-testing	1.Attitude towards Science 2. Study habits	Attitude towards Science 2. Study habits	45 minutes
Treatment	Ten lessons were taught through the CAI Package	Ten lessons were taught through the Traditional Method	40 minutes each – 60 minutes
Post testing of the variables	Criterion test (Achievement test in Chemistry).	Criterion test (Achievement test in Chemistry)	50 minutes
Administration of Reaction Scale	Administration of Reaction Scale	----	30 minutes