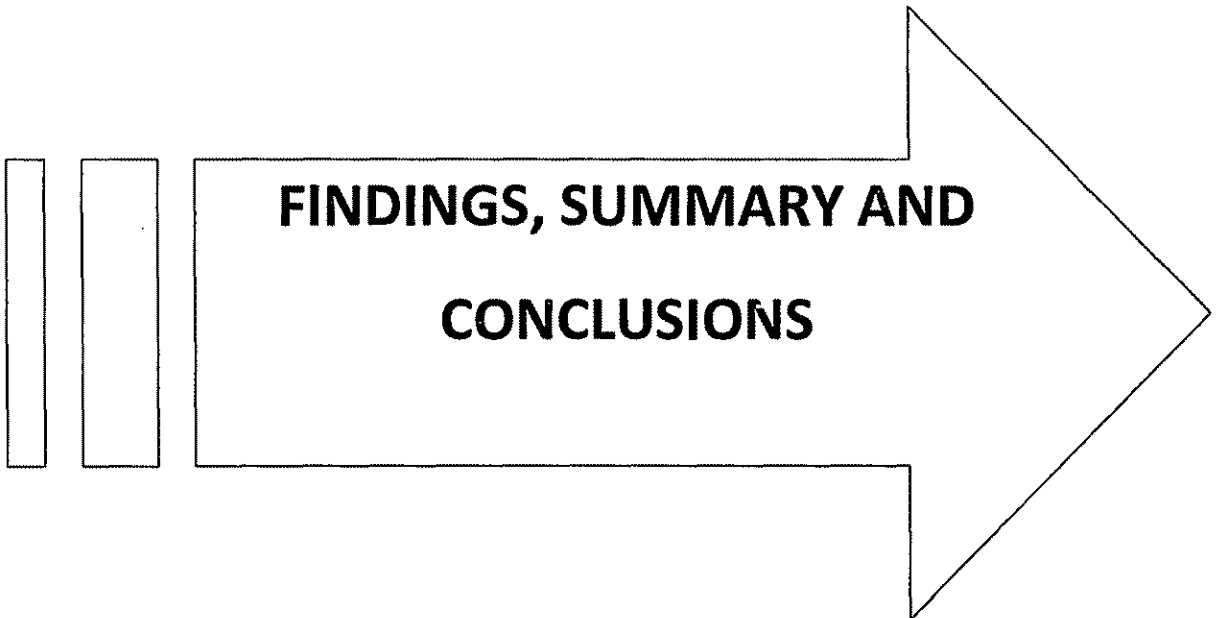
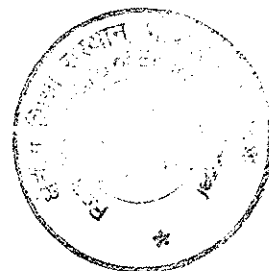


# **CHAPTER - V**





## CHAPTER - V

### SUMMARY AND CONCLUSIONS

#### 5.1 Introduction

Introduction and the review of researches are presented in the chapter I and chapter II, respectively. The methodology employed for the study along with the techniques of sample selection, design of the study, tools, procedure of data collection and the statistical techniques for the analysis of data are presented in the chapter III. The results and interpretations are presented in the chapter IV. In the present chapter summary and conclusions are presented in the following captions.

#### 5.2 Findings

Largely significant difference has been found between mean Achievement scores of Control group and Experimental group in favor of Experimental group. So the Computer Assisted Instruction (CAI) was found effective for teaching Chemistry.

Following are the findings of the study:

1. Computer Assisted Instruction (CAI) package was effective in terms of students' Achievement in Chemistry.
2. Computer Assisted Instruction (CAI) package was effective in terms of students' Reaction towards the Approach.
3. Treatment (Computer Assisted Instruction) produced a significant differential effect on the students' Achievement in Chemistry.
4. Gender did not produce any differential effect on the students' Achievement in Chemistry.

5. The interaction of Treatment and Gender did not produce any differential effect on the students' Achievement in Chemistry.
6. Treatment (Computer Assisted Instruction) produced a significant differential effect on the students' Attitude towards Science.
7. Gender did not produce any differential effect on the students' Attitude towards Science.
8. The interaction of Treatment and Gender did not produce any differential effect on the students' Attitude towards Science.
9. Treatment (Computer Assisted Instruction) produced a significant differential effect on the students' Study Habits.
10. Gender did not produce any differential effect on the students' Study Habits .
11. The interaction of Treatment and Gender did not produce any differential effect on the students' Study Habits .

### **5.2.1 Effectiveness of the Computer Assisted Instruction(CAI)**

Effectiveness of the Computer Assisted Instruction (CAI) package was studied in terms of the students' Achievement in Chemistry and the students' Reaction towards the Approach. The findings are as follows:

- (a) Computer Assisted Instruction (CAI) package was effective in terms of students' Achievement in Chemistry
- (b) Computer Assisted Instruction (CAI) package was effective in terms of students' Reaction towards the Approach.

These are discussed in the captions 5.2.1 and 5.2.2.

### **5.2.2 Effectiveness of the Computer Assisted Instruction (CAI) package in terms of Achievement in Chemistry**

Computer Assisted Instruction (CAI) package was found to be effective in terms of students' Achievement in Chemistry. This finding was supported by Mahapatra(1991). During teaching through the developed material, teacher guided the students from one phase of activity to the other. In all these teaching strategies, the climate of the classroom was open, co-operative and-encouraging with a scope for good deal of students' activity. The approach, thus, provided wide opportunity to students for acquiring concepts, interpreting the data and applies the principles in new and differential situations. All the students were found active in the class. The results of the present investigation are an outcome of this student-centered approach. The nature of the approach demands greater involvement of pupils in the teaching learning situation. So, the students were motivated and stimulated to retain and improvement in their achievement. The elements of novelty (new and different approach) or 'orienting effect' might have also contributed towards the present result. Different examples, which were presented in the package, might have aroused interest and motivation among the students to study Chemistry. Thus, interest and motivation might have contributed towards the present result. Due to the multiple choice objective type test items, pupils achievement might have been higher. Generally, that kind of achievement of the students, is not achieved either through conventional made of teaching, or through the instructional material that are used by the teachers in the class room. Thus, the teaching through CAI was found to be effective in terms of students Achievement in Chemistry.

### **5.2.3 Effectiveness of the Computer Assisted Instruction (CAI) package in terms of Reaction of the students towards the Package**

Computer Assisted Instruction (CAI) package was found to be effective in terms of students' Reaction towards the package. The various aspects of the teaching/ CAI were taken in to consideration. Majority of students had expressed favourable reactions towards these above said aspects. Thus, it can be concluded that the favourable reactions of majority of students towards the above mentioned aspects indicated that they found these aspects to be of important. Normally, people express their favourable reactions towards an object whenever they feel that object is of some use to them; it is of some interest to them; it helps to them in attaining the goals; it provides challenge to the individual. The present finding in respect to the CAI can be viewed in the content of the above mentioned reason and it may, therefore, be said that the favourable reactions of students towards the teaching.

## **5.3 Effect and Interaction of Treatment and Gender on Achievement in Chemistry**

The discussions related to the effect and interaction of Treatment and Gender on Achievement in Chemistry are presented in the captions 5.3.1, 5.3.2 and 5.3.3.

### **5.3.1 Effect of Treatment on Achievement in Chemistry**

Treatment (Computer Assisted Instruction (CAI) package) produced a significant differential effect on the students' Achievement in Chemistry. The adjusted mean scores of Achievement of students in Chemistry, taught

through the Computer Assisted Instruction (CAI) package were found to be significantly higher than that of their counterparts taught through Traditional Method. This finding is supported by Rabindranath,(1982), Paul (1985), Henry (1986), Mahapatra (1991), Desai( 1996), Dubey and Adhikari(1999). In this study, the reason for CAI's superiority to Traditional Method might be due to the teacher's domination in the traditional mode of teaching.

- In CAI, students get opportunity to think openly and freely as visuals along with the textual description. The nature of the CAI demands greater involvement of pupils in the teaching learning. Because of these factors inherent in the CAI, the students might have been enabled to retain and reproduce larger amount of information than those who studied through the Traditional Method of teaching.

Students do not study and acquire knowledge just for the sake of knowledge but, they acquire the knowledge so that they can apply it in their day to day life. Students get an opportunity to identify additional examples. They generate examples and teacher confirms their hypotheses. Students apply those principles, which they have learned. Thus, the strategy provides a chance to draw generalisations by applying principles. It is possible that the different components of the approach might have developed in the students, the ability to apply principles. This might be the reason for the improvement of Achievement of the students in Chemistry taught through CAI.

### **5.3.2 Effect Gender on Achievement in Chemistry**

Gender did not produce any differential effect on the students' Achievement in Chemistry, significantly. Therefore, it may be said that there

is no significant difference in the performance of boys and girls on the measure of Achievement in Economics. Mevareach (1985), Chaudhari and Vaidya (1992) and Singh (1994) support this finding.

In contrast, Abraham (1969), Beedwati (1986), Mathew (1976) and Riley (1985) found, in their studies, that males were significantly superior to females in academic Achievement in general. These studies were conducted 25 years ago. There is a lot of difference in the attitude of parents, now. At present, through all media, attempts are being made to promote a feeling of equality among boys and girls. There has been a noticeable change in the attitude of parent towards girls and boys. Parents are now almost equally and increasingly investing time, energy and money to both the girls and boys. This change in educational climate and particularly, in the attitudes of parents and teachers might be the cause of lack of Sex difference in the achievement in the present study.

### **5.3.3 Interaction of Treatment, Gender on Achievement in Chemistry**

The interaction of Treatment and Gender did not produce any differential effect on the students' Achievement in Chemistry. The interaction of Treatment and Gender did not produce any differential effect on the students' Achievement in Chemistry. The effect of interaction between Treatment and Sex on the measure of Achievement in Chemistry was not found significant. The result indicates that the male and female students were benefited to the same extent in both the modes of teaching. Thus, Sex differential was not noticed in the said interaction on Achievement. But the mean achievement scores of male and female students of experimental group were higher than that of the male and female students

of control group. Further, achievement of female students of experimental group was found higher than their male counterparts of the same group. Similarly, female students in the control group achieved higher than the male students of the same group. It may, therefore, be said that Sex of the pupils affected their Achievement in Chemistry in both experimental and control group to the same degree. This result shows that the effect of Treatment on Achievement in Chemistry is independent of the Sex of the students. Achievement, generally, depends on the cognitive development of the students. It is not dependent on Sex. Perhaps, therefore, no significant interactional effect was found in this study.

#### **5.4 Effect and Interaction of Treatment, Gender on Attitude towards Science**

The discussions related to the effect and interaction of Treatment and Gender on Attitude towards Science are presented in the captions 5.4.1, 5.4.2 and 5.4.3.

##### **5.4.1 Effect of Treatment on Attitude towards Science**

Treatment (Computer Assisted Instruction (CAI) package) produced a significant differential effect on the students' Attitude towards Science. This finding is supported by the earlier findings of Mandila(1988), Shrivastava (1995), Reddy, Reddy and Manchala(1996), Ojha(2004). Attitudes are positive or negative feelings that an individual holds about objects, persons, ideas. If a student develops a negative or positive attitude towards his school, it may include the subject, the teachers and staff, and even the whole idea of schooling. Employing the right type of instructional strategy along with other environmental contextual components can eliminate negative attitude towards a subject (Ojha, 2004). If the treatments would have been



given for a long period, the change in the students' Attitude towards Science would have been experienced.

#### **5.4.2 Effect of Gender on Attitude towards Science**

Gender did not produce any differential effect on the students' Attitude towards Science. This finding is supported by Chunawala and Pradhan(1993), Singh(1994) and Ojha(2004). At present steps are taken in various ways to promote the feeling of equality among boys and girls. Parents are, also, now almost equally and increasingly investing time, energy and money to both the girls and boys. The change in educational climate particularly, in attitudes of parents and teachers might be the cause of lack of Sex difference in the Attitude towards the subject in the present study.

#### **5.4.3 Interaction of Treatment and Gender on Attitude towards Science**

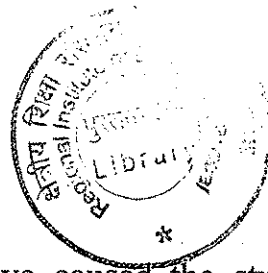
The interaction of Treatment and Gender did not produce any differential effect on the students' Attitude towards Science.

### **5.5 Effect and Interaction of Treatment, Gender on Study habits**

The discussions related to the effect and interaction of Treatment and Gender on study habits are presented in the captions 5.5.1, 5.5.2 and 5.5.3.

#### **5.5.1 Effect of Treatment on Study habits**

Treatment (Computer Assisted Instruction (CAI) package) produced a significant differential effect on the students' Study habits. This finding is supported by Reddy, Reddy and Manchala(1996) and Dey(1997). CAI package might have aroused interest among the students to study the subject i.e., Chemistry. Chemistry when taught through the CAI package, the investigator presented the content with the visuals/ animation with the sound



effect and also the 3-D effect. These might have caused the students to change their habits of study.

### **5.5.2 Effect of Gender on Study Habits**

Gender did not produce any differential effect on the students' Study habits. Now a day's both boys and girls are keen to build their careers. They give much emphasis on their study and their future. Parents are also so conscious about their children's education that they provide all kinds of educational facilities to the children. This might be the cause of this kind of result in the present study. Therefore, gender did not produce significant differential effect on the Study habits.

### **5.5.3 Interaction of Treatment and Gender on Study habits**

The interaction of Treatment and Gender did not produce any differential effect on the students' Study habits.

## **5.6 Summary**

The summary of the present study is presented in the following captions.

### **5.6.1 Rational of the study**

The main function of educational research is to improve the educational procedures, existing process of teaching and system through the refinement and extension of knowledge. The researcher in this study wants to see the effectiveness of computer in science teaching. It is well accepted fact that today a single teacher is not capable of giving up-to-date and complete information in his own subject. Computers provides better technology to present content, which helps learner in concentrate and better understanding and long retention of information, which is not possible otherwise.

### 5.6.2 Statement of the problem

The researcher in this study aspires to measure the effectiveness of the Computer Assisted Instruction in terms of student's achievement in Chemistry, Attitude towards Science and Study Habits.

Title of the study is :

**“Effectiveness of Computer Assisted Instruction (CAI) Package for Teaching Chemistry to Class IX in terms of Achievement in Chemistry.”**

### 5.6.3 Defining the Key terms

- **Achievement**
- **Attitude**
- **Study Habits**
- **CAI Package**
- **Traditional Approach**

### 5.6.4 Objectives of the study

1. To study the effectiveness of CAI package in terms of :
  - (a) Achievement in chemistry of class IX students, and
  - (b) Reaction of the students towards the package.
2. To study the effect and interaction of treatment and gender on the Achievement in chemistry of class IX students by taking their scores of Achievement in Science scores of class VIII as covariate.
3. To study the effect and interaction of treatment and gender on Attitude towards Science of class IX students by taking their pretest scores of Attitude towards Science as covariate.

4. To study the effect and interaction of treatment and Gender on Study habits of class IX student.

#### 5.6.5 Hypotheses

1. There is no significant effect of treatment on the Achievement in chemistry of class IX students when their scores of Achievement in Science of class VIII were taken as covariate.
2. There is no significant effect of Gender on the Achievement in chemistry of class IX students when their scores of Achievement in Science of class VIII were taken as covariate.
3. There is no significant effect of treatment and Gender on the Achievement in chemistry of class IX students when their scores of Achievement in Science of class VIII were taken as covariate.
4. There is no significant effect of treatment on Attitude towards Science of class IX students when their pretest scores of Attitude towards Science were taken as covariate.
5. There is no significant effect of Gender on Attitude towards Science of class IX students when their pretest scores of Attitude towards Science were taken as covariate.
6. There is no significant effect and interaction of treatment and Gender on Attitude towards Science of class IX students when their pretest scores of Attitude towards Science were taken as covariate.
7. There is no significant effect of treatment and gender on Study habits of class IX students when their pretest scores of Study habits were taken as covariate.
8. There is no significant effect of Gender on Study habits of class IX students when their pretest scores of Study habits were taken as covariate.

9. There is no significant effect and interaction of treatment and Gender on Study habits of class IX students when their pretest scores of Study habits were taken as covariate.

#### **5.6.6 Methodology**

Experimental Method was employed for the study.

#### **5.6.7 Sample**

Random Sampling technique was employed for the study.

#### **5.6.8 Design of the study**

Non –Equivalent Control group design was employed for the study.

#### **5.6.9 Tools**

- Achievement in Chemistry
- Science Attitude Scale
- Study Habits Inventory
- Reaction Scale

#### **5.6.10 Data Gathering Procedure**

Data were collected with the help of tools described in the preceding captions. The treatment i.e., teaching through CAI package Approach 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.

#### 5.6.11 Statistics 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  
(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.
2. For studying the effect of treatment and Gender on achievement in 2X2 factorial design ANCOVA of unequal cell 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.

### 5.6.12 Findings

Following are the findings of the study:

1. Computer Assisted Instruction (CAI) package was effective in terms of students' Achievement in Chemistry.
2. Computer Assisted Instruction (CAI) package was effective in terms of students' Reaction towards the Approach.
3. Treatment (Computer Assisted Instruction) produced a significant differential effect on the students' Achievement in Chemistry.
4. Gender did not produce any differential effect on the students' Achievement in Chemistry.
5. The interaction of Treatment and Gender did not produce any differential effect on the students' Achievement in Chemistry.
6. Treatment (Computer Assisted Instruction) produced a significant differential effect on the students' Attitude towards Science.
7. Gender did not produce any differential effect on the students' Attitude towards Science.
8. The interaction of Treatment and Gender did not produce any differential effect on the students' Attitude towards Science.
9. Treatment (Computer Assisted Instruction) produced a significant differential effect on the students' Study Habits.
10. Gender did not produce any differential effect on the students' Study Habits .
11. The interaction of Treatment and Gender did not produce any differential effect on the students' Study Habits .

### 5.6.13 Delimitations

Depending upon the focus of the study the present study was conducted under the following constraints:

1. The study was conducted only in schools of the Bhopal city.
2. The study was conducted in the private school of Bhopal.
3. The study was conducted in the to the class IX student of specified school of Bhopal.
4. The treatment was given for only ten days.
5. The Achievement comparison was confined to Achievement in Chemistry only.

### 5.6.14 Educational Implications

1. The teacher should be trained in developing and utilizing Computer Assisted Instruction (CAI) package on Chemistry.
2. The various Text-Book Boards can attach CDs of such Computer Software with the Text-Book.
3. Allocation of learning materials according to individual needs and interest.
4. CAI packages provide direct interaction between pupil and subject matter.
5. After knowing the Attitude towards science and Study habits of the students, teacher learning process can be made more effective.
6. CAI packages provide immediate feed back to students for better interaction and motivation.



### 5.6.15 Conclusion

By analyzing the hypothesis it was found that Teaching with CAI package is better than that of Traditional Approach so far as Achievement in Chemistry is concerned. So, CAI package are beneficial and it should be adopted by the teachers so as to increase the achievement in chemistry among the students.

### 5.6.16 Suggestions for further study

There are some suggestions for further studies as follows:

1. Computer Assisted Instruction (CAI) may be developed by using other Computer Software.
2. Software packages need to be developed for training of teachers to teach Chemistry.
3. Opinion of parents and teachers towards Computer Assisted Instruction (CAI) package can be analyzed.
4. Role of Computer Assisted Instruction (CAI) package in enhancing the personality of the students can be studied.
5. Effectiveness of Computer Assisted Instruction (CAI) package on students differing in terms of Achievements, Socio-economic status and intelligence.
6. Study can be undertaken to measure Computer literacy of the students studying through Computer Assisted Instruction (CAI) package .
7. The study can be undertaken in other schools of M.P. & other states.
8. Replication of study may be done with different samples and at a different grade level.
9. The effectiveness of CAI package on Achievement in Chemistry at other level of higher secondary can also be studied.