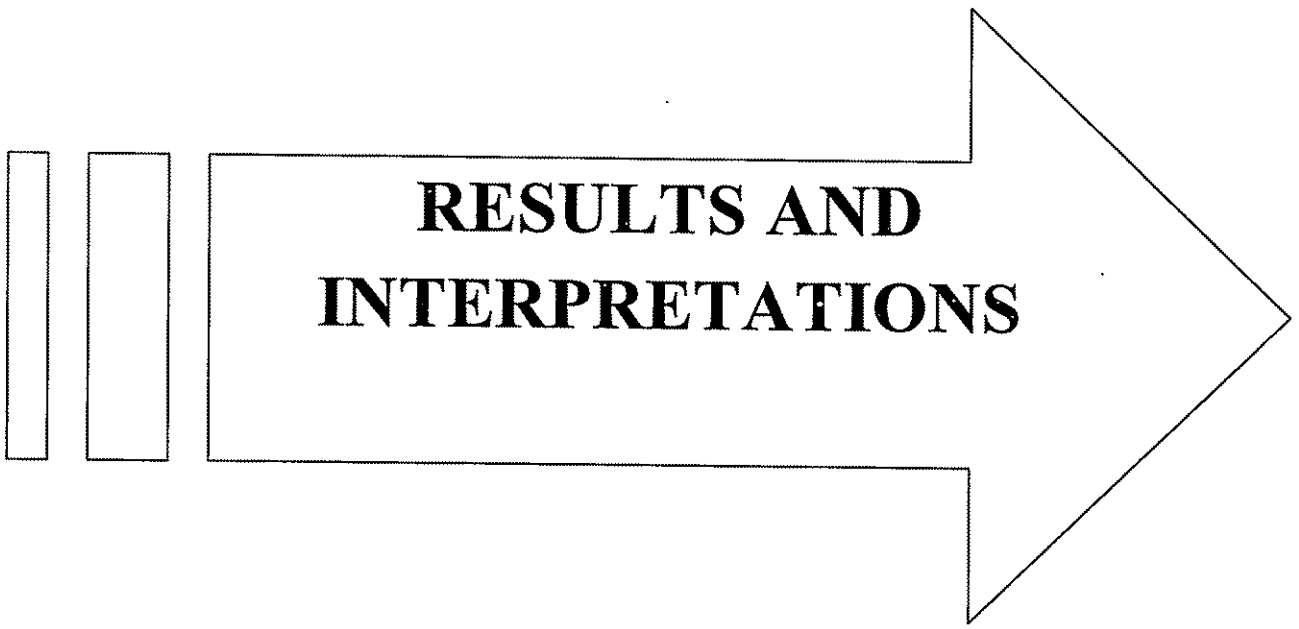
CHAPTER - IV



CHAPTER - IV

ANALYSIS OF DATA AND INTERPRETATIONS

4.1 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. In the present chapter the results and interpretations are presented in the following captions, objective-wise.

4.2 Effectiveness of the Computer Assisted Instruction (CAI) package

The first objective of the study was to study the effectiveness of the **Computer Assisted Instruction (CAI) package**. The effectiveness of the **Computer Assisted Instruction (CAI) package** was studied in terms of the Achievement in Chemistry and the reaction of the students' towards the package. The results of both the Achievement in Chemistry and the reaction of the students' towards the package were presented separately in the following captions.

4.2.1 Effectiveness of the Computer Assisted Instruction (CAI) package in terms of Achievement in Chemistry

An Achievement test was developed by the Investigator to measure the Achievement in Chemistry of the students. The test consisted of 50 items. The total marks of the Achievement test in Chemistry were fifty. The test was administered to both the groups i.e., experimental and control

group, after the completion of the teaching of ten lessons. The duration of the test was fifty minutes. For the purpose of studying the effectiveness of the **Computer Assisted Instruction (CAI) package** in terms of the Achievement in Chemistry, the scores of the Experimental group was taken, here, in to consideration. The scores were analyzed with the help of the Percentiles, Mean and Standard Deviation . The results are presented in the following table 4.1.

Table - 4.1: Percentiles, Mean, and Standard Deviation for Achievement in Chemistry

Mean	**81.6111**
Std. Deviation	**9.20645**
Minimum	**65.00**
Percentiles	
10	**68.00**
20	**73.40**
30	**77.00**
40	**78.00**
50	**82.00**
60	**86.00**
70	**87.00**
80	**89.60**
90	**93.50**

Table 4.1 reveals that the 10 percent students achieved 68 percent marks. Eighty two percent marks achieved by 50 percent students. Ninety percent students secured 93.50 marks. This kind of achievement is, generally, not found in the Traditional method of teaching. Therefore, it can be stated that teaching through the CAI package was effective in terms of Achievement of the students.

4.2.2 Effectiveness of the Computer Assisted Instruction (CAI) package in terms of Reaction of the students towards the package

The second part of the first objective was to study the effectiveness of the teaching through CAI package in terms of Reaction of the students towards the teaching approach. A Reaction Scale developed by the investigator was administered to the students of Experimental group after the completion of teaching of ten lessons. There were ten statements in the scale. There were both positive and negative statements for the approach. There were five options i.e. Strongly Agree (SA), Agree (A), Undecided (U) and Disagree (DA), Strongly Disagree (SDA). The scoring for the positive statements were 5,4,3, 2 and 1 and reverse for the negative statements. The data were analyzed with the help of the Percentages. Results are presented in table 4.2.

Seventy nine percent of the students were of the opinion that Learning through this type of material is not time consuming. Eighty percent of the students were disagree to the fact that it is boring to learn through this material. Learning through this material is an interesting experience was opined by 92% of the students. Ninety-six

Table-4.2: Statement-wise Responses of the Students (given in Percentages)

S.No.	Statements	Strongly Agree(SA)	Agree (A)	Undecided (UD)	DisAgree (DA)	Strongly DisAgree (SDA)
1	Learning through this type of material is time consuming.				21	79
2	Sometimes it is boring to learn through this material.				20	80
3	Learning through this material is an interesting experience	92	8			
4	I feel motivated while learning through this CAI package.	86	10	4		
5	I feel happy and active in the class when the teacher taught through CAI package.	90	6	3	1	
6	Provision for different examples for illustrating a concept helped me to learn with comprehension.	84	15	1		
7	Linkages of different concepts in the content were well-organized.	90	6	3	1	
8	Study through this package develops a competitive attitude.	75	20	3	2	
9	Studying through this material motivates the students to explore examples other than those given in the text-book.	89	6	3	2	
10	Material based on CAI package give chance to think independently.	92	6	2		

percent of students felt motivated while learning through this CAI package. Ninety-six percent of students felt happy and active in the class when the teacher taught through CAI package. Ninety nine percent of students opined that there was provision for different examples for illustrating a concept helped them to learn with comprehension. Ninety-six percent of students felt that linkages of different concepts in the content were well-organized. Ninety-five percent of students were of the view that study through this package develops a competitive attitude. Ninety-five percent of students viewed that studying through this material motivates the students to explore examples other than those given in the text-book. Ninety-eight percent of students viewed that Material based on CAI package give chance to think independently.

4.3 Effect and Interaction of Treatment and Gender on Achievement in Chemistry

The second objective of the investigation was to study the Effect and Interaction of Treatment and Gender on Achievement in Chemistry by taking the class VIII Science scores as covariate. The class VIII Science scores were collected from the school register. The Achievement in Chemistry was measured by administering the Achievement test developed by the investigator. The test was administered to both the experimental and control group after the end of the teaching of ten lessons through different approaches. The results are presented in table in 4.3 and interpretations are given in captions 4.3.1, 4.3.2 and 4.3.3.

Table 4.3: F-values for Effect ant Interaction of Treatment and Gender on Achievement in Chemistry

Sources of Variance	df	SS	MSS	F-Value
Treatment	1	28574.52	28574.524	299.273*
Gender	1	5.07	5.07	.053
Treat X Gender	1	123.66	123.66	1.295
Error	67	6397.15	95.48	
Total	70	35100.40	28798.73	

* significant at 0.01 level

Table 4.4: Mean and SD of the Boys and Girls of Experimental and Control Groups for Achievement in Chemistry

Treatment	Experimental Group			Control Group		
Gender	N	Mean	SD	N	Mean	SD
Boys	22	80.31	8.51	22	42.13	1.2
Girls	14	83.64	1.01	14	40.92	9.69
Total	36	81.97	9.21	36	41.52	

4.3.1 Effect of Treatment on Achievement in Chemistry

Table 4.3 reveals that the F-value for the Treatment is 299.273 significant at 0.01 level with df equal to 1/67. It indicates that the Treatment produced a significant differential effect on the Achievement in Chemistry. In other words, the adjusted mean score of the Achievement in Chemistry of the students taught through the CAI package differs significantly from that of their counterparts taught through the Traditional Method of teaching. Therefore, the null hypothesis, namely, "There is no significant effect of Treatment on adjusted mean score of Achievement in Chemistry of students taught through CAI package and Traditional Approach when previous years" Science scores is taken as covariate", rejected.

Further, Table 4.4 shows that the mean Achievement score in Chemistry of the students taught through CAI (**81.97**) is higher than those taught through the Traditional Method of teaching (**41.52**). It can therefore be said that the CAI package was found to be more effective in terms of student's Achievement in Chemistry than the Traditional Approach of teaching.

4.3.2 Effect Gender on Achievement in Chemistry

Table 4.3 reveals that the F-value for Gender is 1.69 which is not significant. It indicates that Gender did not produce any significant differential effect on student's Achievement in Chemistry. It shows that the student's Achievement in Chemistry is independent of Gender. Therefore, the null hypothesis, namely, "There is no significant effect of Gender on adjusted mean score of Achievement
in Chemistry of students taught through CAI package and Traditional Approach when previous years Science scores is taken as covariate", is not rejected.

4.3.3 Interaction of Treatment, Gender on Achievement in Chemistry

Table 4.3 reveals that the F-value of 0.08 for the interaction of Treatment and Gender is not significant at 0.05 level with df equal to 1/67. It indicates that the interaction of Treatment and Gender did not produce a significant differential effect on the Achievement in Chemistry. In other words, it can be said that there was no interactional effect of Treatment and Gender on the student's Achievement in Chemistry. Therefore, the null hypothesis, namely, "There is no significant interaction of Treatment and Gender on adjusted mean score of Achievement in Chemistry of students

taught through CAI package and Traditional Approach when previous year's Science scores is taken as covariate", is not rejected.

Fig.- 4.1 : Interaction for Treatment and Gender on Achievement in Chemistry

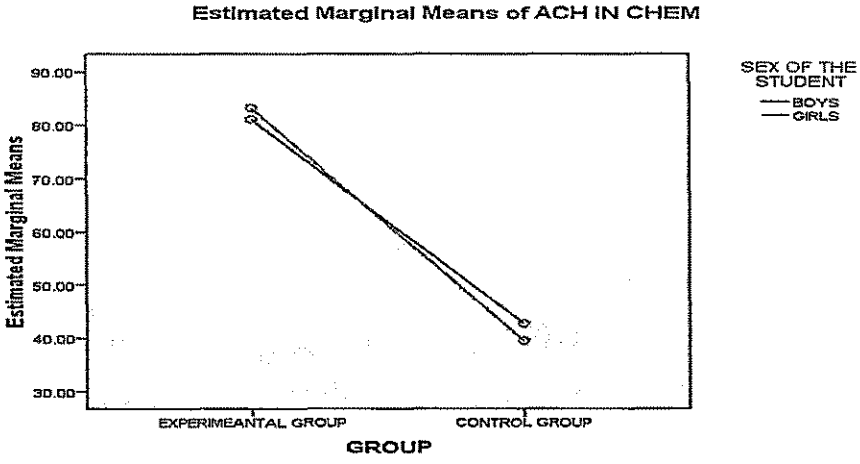


Fig. 4.2: Mean Achievement in Chemistry of Boys and Girls of Experimental Group

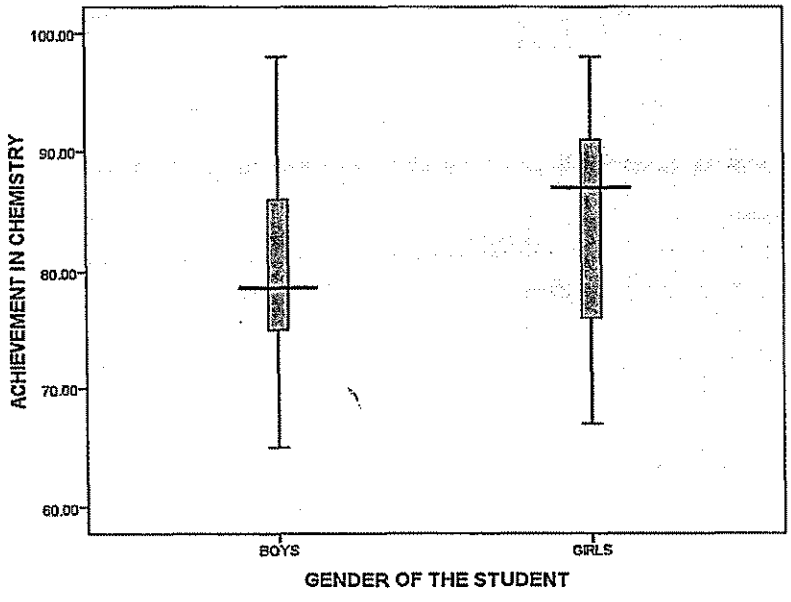
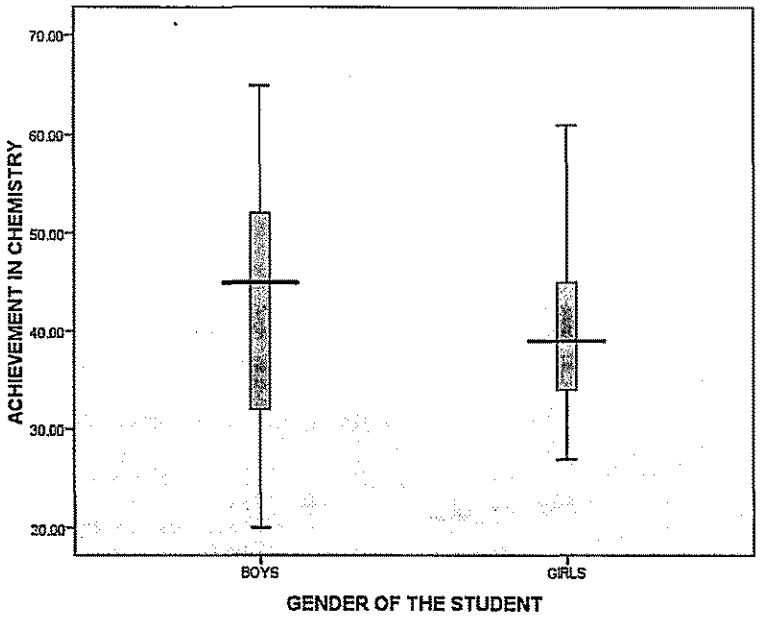


Fig. 4.3 Mean Achievement in Chemistry of Boys and Girls of Control Group



4.4 Effect and Interaction of Treatment, Gender on Attitude towards Science

The third objective of the investigation was to study the Effect and Interaction of Treatment and Gender on Attitude towards Science by taking the pre-test scores of Attitude towards Science as covariate. The test was administered to both the experimental and control group, before the start of the treatment and after the end of the teaching of ten lessons through different approaches. The results are presented in table in 4.4 and interpretations are given in captions 4.4.1, 4.4.2 and 4.4.3.

Table 4.5: F-values for Effect ant Interaction of Treatment and Gender on Attitude towards Science

Sources of Variance	df	SS	MSS	F-Value
Treatment	1	26617.06	26617.06	703.701*
Gender	1	7.85	7.85	.000
Treat X Gender	1	18.71	18.71	.496
Error	67	2534.21	37.82	
Total	72	29177.83	26681.44	

*significant at 0.01 level

Table 4.6: Mean and SD of the Boys and Girls of Experimental and Control Groups for Attitude towards Science

Treatment	Experimental Group			Control Group			Total
Gender	N	Mean	SD	N	Mean	SD	
Boys	22	76.77	7.60	22	36.45	2.64	
Girls	14	75.50	9.88	14	37.07	2.94	
Total	36	76.12		36	36.76		

4.4.1 Effect of Treatment on Attitude towards Science

Table 4.5 reveals that the F-value of **703.701** for the Treatment is significant at 0.01 level with df equal to 1/67. It indicates that the Treatment produced a significant differential effect on the Attitude towards Science. In other words, the adjusted mean score of the Attitude towards Science of the students taught through the CAI package differs significantly from that of their counterparts taught through the Traditional Method of teaching. Therefore, the null hypothesis, namely, "There is no significant effect of Treatment on adjusted mean score of Attitude towards Science of students

taught through CAI package and Traditional Approach when the student's pre-test scores of Attitude towards Science is taken as covariate", is rejected.

Further, Table 4.6 shows that the mean score of Attitude towards Science of the students taught through CAI package (**76.12**) is higher than that of those taught through the Traditional Method of teaching (**36.76**). It can therefore be said that the CAI package was found to be more effective in raising student's Attitude towards Science than the Traditional Approach of teaching.

4.4.2 Effect of Gender on Attitude towards Science

Table 4.5 reveals that the F-value for Gender is **.000** which is not significant. It indicates that Gender did not produce any significant differential effect on students' Attitude towards Science. It shows that the students' Attitude towards Science is independent of the Gender. Therefore, the null hypothesis, namely, "There is no significant effect of Gender on adjusted mean score of Attitude towards Science of students taught through CAI package and Traditional Approach then the students' pre-test scores of Attitude towards Science is taken as covariate", is not rejected.

4.4.3 Interaction of Treatment and Gender on Attitude towards Science

Table 4.5 reveals that the F-value of **.496** for the interaction of Treatment and Gender is not significant at 0.05 level with df equal to 1/67. It indicates that the interaction of Treatment and Gender did not produce a significant differential effect on the Attitude towards Science. In other words, it can be said that there was no interactional effect of Treatment and Gender on the students'. Attitude towards Science Therefore, the null hypothesis, namely, "There is no significant interaction of Treatment and Gender on adjusted mean score of Attitude towards Science students taught

through CAI package and Traditional Approach when the students' pre-test scores of Attitude towards Science is taken as covariate, is not rejected.

Fig. 4.4: Interaction for Treatment and Gender on Attitude towards Science

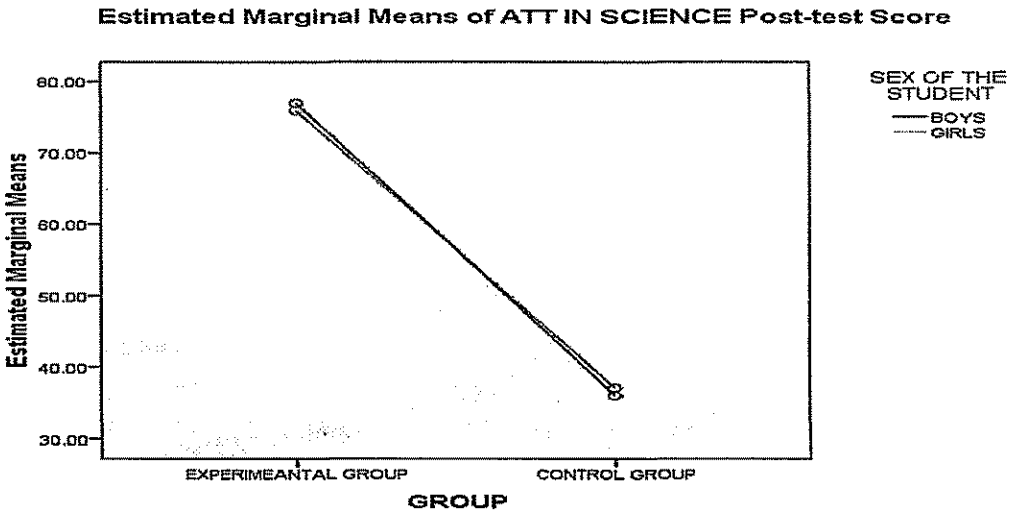


Fig. 4.5: Mean Attitude towards Science of Boys and Girls of Experimental Group

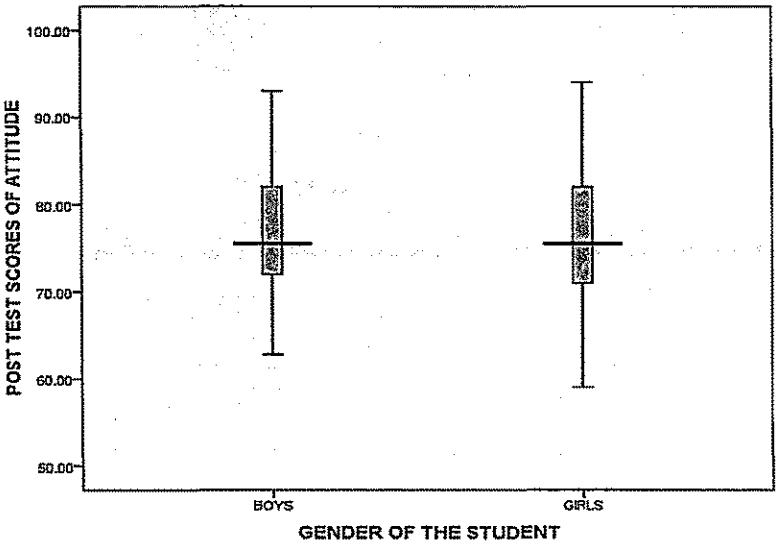
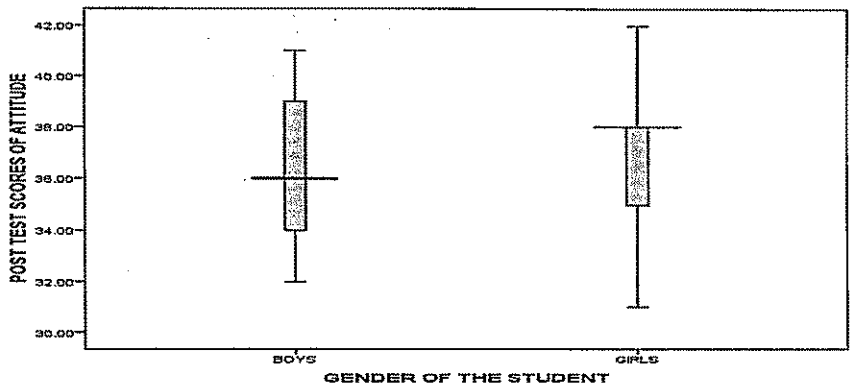


Fig. 4.6: Mean Attitude towards Science of Boys and Girls of Control Group



4.5 Effect and Interaction of Treatment, Gender on Study Habits

The fourth objective of the investigation was to study the Effect and Interaction of Treatment and Gender on Study habits by taking the pre-test scores of Study habits as covariate. The test was administered to both the experimental and control group, before the start of the treatment and after the end of the teaching of ten lessons through different approaches. The results are presented in table in 4.4 and interpretations are given in captions 4.4.1, 4.4.2 and 4.4.3.

Table 4.7: F-values for Effect ant Interaction of Treatment and Gender on Study Habits

Sources of Variance	df	SS	MSS	F-Value
Treatment	1	13189.57	13189.57	171.014*
Gender	1	69.8	69.8	.906
Treat X Gender	1	3.06	3.06	.040
Error	67	5167.42	77.15	
Total	72	18429.9	13339.58	

*** significant at 0.01 level**

Table 4.8: Mean and SD of the Boys and Girls of Experimental and Control Groups for Study Habits

Treatment	Experimental Group			Control Group			Total
Gender	N	Mean	SD	N	Mean	SD	
Boys	22	1.48	1.026	22	1.21	9.24	44
Girls	14	1.51	7.043	14	1.23	9.52	28
Total	36	1.49		36	1.22		72

4.5.1 Effect of Treatment on Study Habits

Table 4.5 reveals that the F-value of **171.014** for the Treatment is significant at 0.01 level with df equal to 1/67. It indicates that the Treatment produced a significant differential effect on the Study habits. In other words, the adjusted mean score of the Study habits of the students taught through the CAI package differs significantly from that of their counterparts taught through the Traditional Method of teaching. Therefore, the null hypothesis, namely, "There is no significant effect of Treatment on adjusted mean score of Study habits of students taught through CAI package and Traditional Approach when the student's pre-test scores of Study habits is taken as covariate", is rejected.

Further, Table 4.8 shows that the mean score of Study habits of the students taught through CAI package (**1.49**) is higher than that of those taught through the Traditional Method of teaching (**1.22**). It can therefore be said that the CAI package was found to be more effective in raising student's Study habits than the Traditional Approach of teaching.

4.5.2 Effect of Gender on Study Habits

Table 4.7 reveals that the F-value for Gender is **.906** which is not significant. It indicates that Gender did not produce any significant differential effect on students' Study habits. It shows that the students' Study habits are independent of the Gender. Therefore, the null hypothesis, namely, "There is no significant effect of Gender on adjusted mean score of Study habits of students taught through CAI package and Traditional Approach then the students' pre-test scores of Study habits is taken as covariate", is not rejected.

4.5.3 Interaction of Treatment and Gender on Study Habits

Table 4.7 reveals that the F-value of **.906** for the interaction of Treatment and Gender is not significant at 0.05 level with df equal to 1/67. It indicates that the interaction of Treatment and Gender did not produce a significant differential effect on the Study habits. In other words, it can be said that there was no interactional effect of Treatment and Gender on the students'. Study habits Therefore, the null hypothesis, namely, "There is no significant interaction of Treatment and Gender on adjusted mean score of Study habits students taught through CAI package and Traditional Approach when the students' pre-test scores of Study habits is taken as covariate, is not rejected.

Fig. 4.7: Interaction for Treatment and Gender on Study Habits

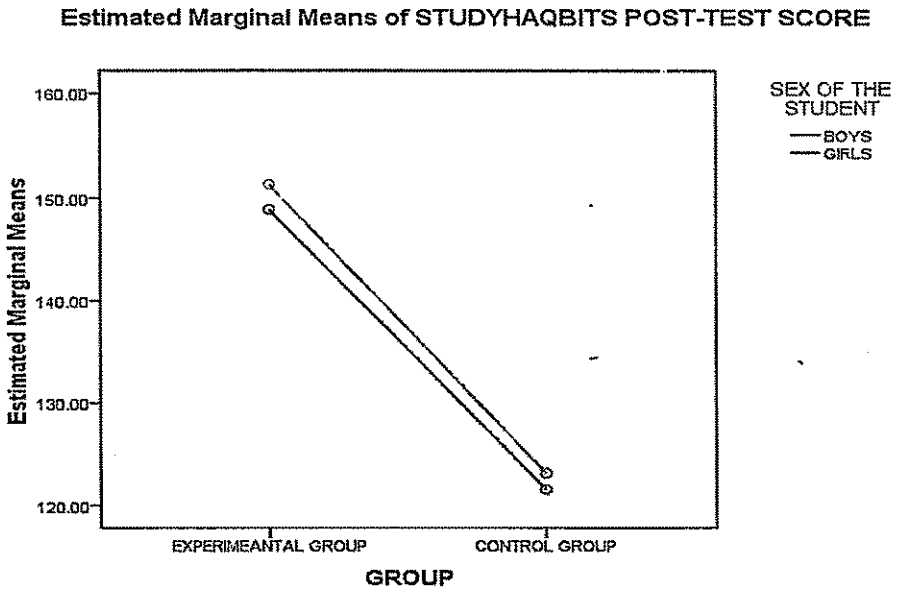


Fig. 4.8: Mean Study Habits of Boys and Girls of Experimental Group

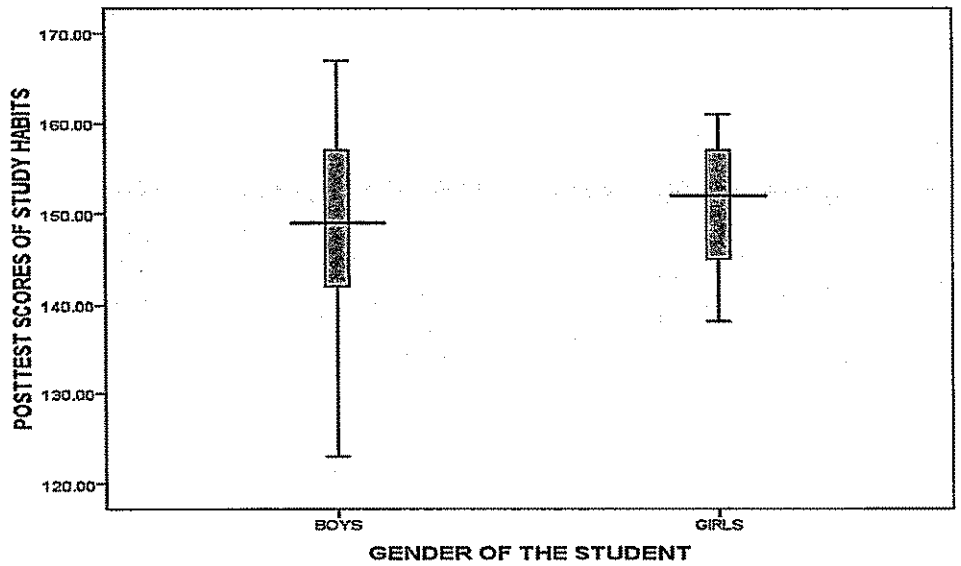
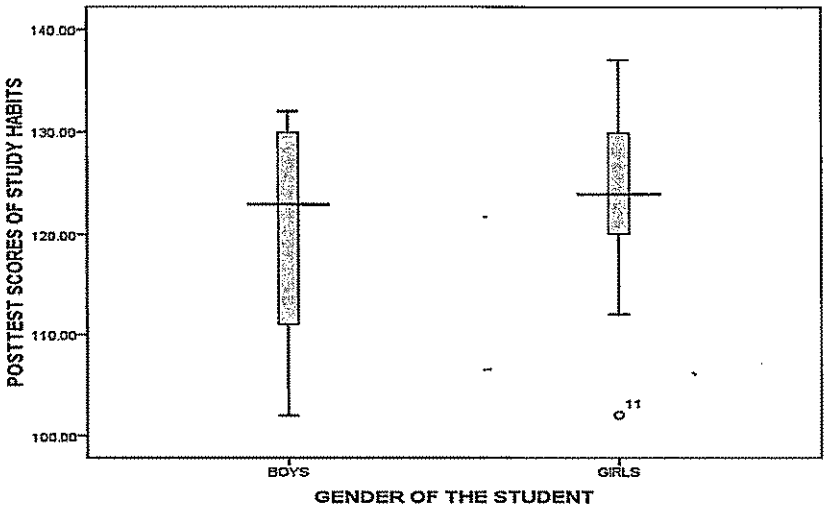


Fig. 4.9: Mean Study Habits of Boys and Girls of Control Group



4.6 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 .