

CHAPTER – IV

ANALYSIS OF DATA AND INTERPRETATION OF RESULTS AND FINDINGS

4.0.0 INTRODUCTION

The first chapter deals with the introduction, conceptual framework, rationale of the study, objectives, hypotheses and delimitations of the research. The second chapter deals with the review of related literature. The methodology, sample, design, tools and procedure of data collection and statistical techniques used for the analysis of data have been presented in detail in Chapter – III. The present chapter is devoted to the presentation of data, analysis, results and their interpretations. Objectives-wise results and its interpretations are presented, below, under separate captions

4.1.0 SELF REGULATED LEARNING IN MATHEMATICS OF CLASS IX STUDENTS

The first objective of the investigation was to study the Self-Regulated Learning in Mathematics of class IX students of Balasore District of Odisha. The data related to the Self-Regulated Learning in Mathematics were collected with the help of administering the Achievement Test in Mathematics developed by the investigator. The maximum marks of Achievement Test in Mathematics were 100. The data were analysed with the help of Mean, SD, Range and Percentiles. The results are presented in Table 4.1, below.

Table – 4.1: Mean, SD, Range, N and Percentiles for Achievement in Mathematics of Class IX Students of Experimental and Control Group

		Statistics	
		CONTROL	EXPT
N		30	30
Mean		43.46	49.33
Std. Error of Mean		1.93	2.72
Std. Deviation		10.58	14.91
Range		36.00	54.00
Percentiles	5	30.00	30.20
	10	30.20	34.20
	20	34.00	36.00

25	34.00	36.00
30	36.00	40.00
40	38.00	42.00
50	42.00	44.00
60	44.00	49.20
70	49.40	55.40
75	52.00	59.00
80	53.60	65.20
90	61.40	75.80
95	64.90	79.80

Table – 4.1 shows that the mean score of Achievement in Mathematics of Experimental Group and Control Group are 49.33 and 43.46, respectively. The SD for Achievement in Mathematics of Experimental Group and Control Group are 14.91 and 10.58, respectively. The Range for Achievement in Mathematics of Experimental Group and Control Group are 54 and 36, respectively. It signifies that the mean score of Achievement in Mathematics of Experimental Group is higher than the Control Group. The SD for Achievement in Mathematics of Experimental Group is higher than the Control Group. It may be inferred that there was a large deviations of the scores of Achievement in Mathematics of Experimental Group. The Range for Achievement in Mathematics of Experimental Group is higher than the Control Group. It shows that there was large distribution of scores in Achievement in Mathematics among the students of Experimental Group.

The Percentiles for Achievement in Mathematics of Experimental Group demonstrates that 5% students scored more than 30.20 marks out of 100. Likewise, 25% students scored more than 36 marks out of 100 and 50% students scored more than 44 marks out of 100. It also shows that 75% students scored more than 59 marks out of 100 and 90% students scored more than 75.80 marks out of 100. The Table – 4.1 demonstrates that 79.80 marks out of 100 were scored by 95% students of Experimental Group. In other words, it can be said that 79.80% marks are secured by 95% students of Experimental Group.

The Percentiles for Achievement in Mathematics of Control Group demonstrates that 5% students scored more than 30 marks out of 100. Likewise, 25% students scored more than 34 marks out of 100 and 50% students scored more than 42 marks out of 100. It also shows that 75% students scored more than 52 marks out of

100 and 90% students scored more than 61.40 marks out of 100. The Table – 4.1 demonstrates that 64.90 marks out of 100 were scored by 95% students of Control Group. In other words, it can be said that 64.90% marks are secured by 95% students of Control Group.

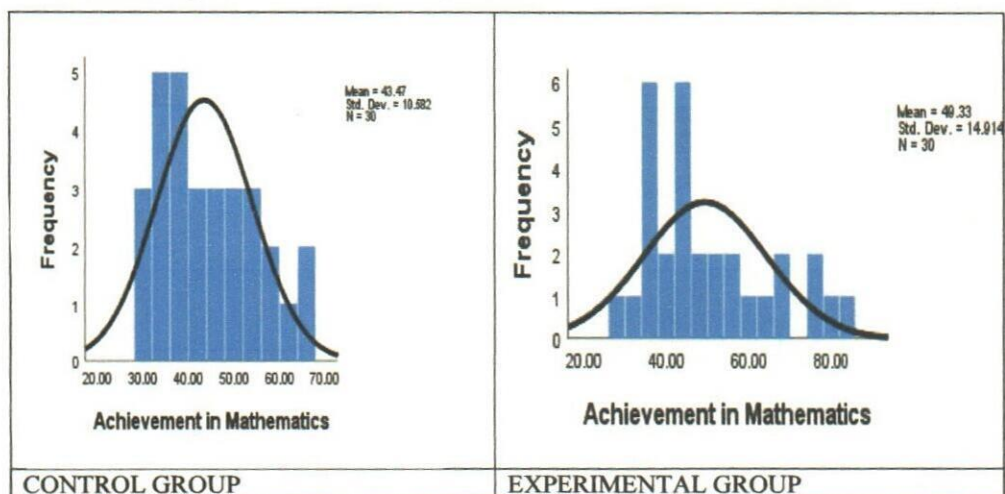


Fig. 4.1: Achievement in Mathematics of Class IX Students of Experimental and Control Group

From the above presentations of the results of the present study, it can be concluded that the students of Experimental Group achieved higher in Mathematics than their counterparts, i.e., the students of Control Group. Therefore, it can be inferred from the result of the present study that Self-Regulated Learning was more effective than the Traditional Method of Teaching in terms of Achievement in Mathematics. The students taught through the Self-Regulated Learning method were higher than the Traditional Method of Teaching.

4.2.0 ATTITUDE TOWARDS MATHEMATICS OF CLASS IX STUDENTS

The second objective of the investigation was to study the attitude towards mathematics of class IX students of Balasore district, Odisha. The data related to the Attitude towards Mathematics were collected with the help of administering the Attitude towards Mathematics Scale developed by Dr. Ali Imam (Lucknow) and Dr. TahiraKhatoon (Aligarh) (2015). The maximum score of Attitude Test in Mathematics was 110 and the minimum score was 22. The data were analyzed with the help of Mean, SD, Range and Percentiles. The results are presented in Table 4.2, below.

Table – 4.2: Mean, SD, Range, N and Percentiles for Attitude towards Mathematics of Class IX Students of Experimental and Control Group

Statistics		
	CONTROL	EXPT
N	30	30
Mean	67.66	71.93
Std. Error of Mean	0.83	2.11
Std. Deviation	4.55	11.58
Range	19.00	48.00

Table – 4.2 shows that the mean score of Attitude towards Mathematics of Experimental Group and Control Group are 71.93 and 67.66, respectively. The SD for Attitude towards Mathematics of Experimental Group and Control Group are 11.58 and 4.55, respectively. The Range for Attitude towards Mathematics of Experimental Group and Control Group are 48 and 19, respectively. It signifies that the mean score of Attitude towards Mathematics of Experimental Group is higher than the Control Group. The SD for Attitude towards Mathematics of Experimental Group is higher than the Control Group. It may be inferred that there was a small deviations of the scores of Attitude towards Mathematics of Experimental Group. The Range for Attitude towards Mathematics of Experimental Group is higher than the Control Group. It shows that there was small distribution of scores in Attitude towards Mathematics among the students of Experimental Group.

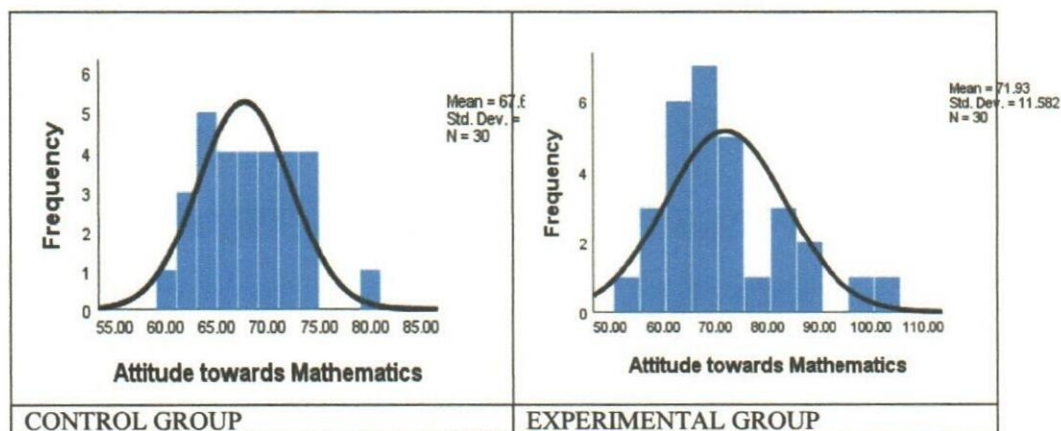


Fig. 4.2: Attitude towards Mathematics of Class IX Students of Experimental and Control Group

From the above presentations of the results of the present study, it can be concluded that the students of Experimental Group slightly lower attitude towards Mathematics than their counterparts, i.e., the students of Control Group. Therefore, it can be inferred from the result of the present study that Self-Regulated Learning method was more effective than the Traditional Method of Teaching in terms of student's Attitude towards Mathematics. The Attitude towards Mathematics of students taught through the Self-Regulated Learning was nearly similar to the students taught through the Traditional Method of Teaching.

4.3.0 EFFECT OF TREATMENT, GENDER AND THEIR INTERACTION ON ACHIEVEMENT IN MATHEMATICS OF CLASS IX STUDENTS

The third objective of the investigation was to study the effect of Treatment, Gender and their interaction on Achievement in Mathematics of Class IX students by taking their previous year Achievement in Mathematics as covariate. Treatment and Gender were two independent variables. Treatment had two levels, namely, Self-Regulated Learning and Traditional Method of Teaching. Gender had two levels, namely, Boys and Girls. The data related to the Achievement in Mathematics through Self-Regulated Learning were collected with the help of administering the Achievement Test in Mathematics developed by the Investigator. The maximum marks of Achievement Test in Mathematics were 100. The Class VIII Scores of Achievement in Mathematics was collected from the school Register and was designated as previous year Achievement in Mathematics, which was taken as covariate. The data were analyzed with the help of 2 X 2 Factorial Design ANCOVA of Unequal Cell Size. The results, interpretations and findings related to each of these above components are presented under captions 4.4.1, 4.4.2, and 4.4.3. The result has been presented, below, in Table 4.3

Table 4.3: Summary of 2 X 2 Factorial Design ANCOVA for Achievement in Mathematics of Class IX Students by Taking Pre-test Scores of Achievement in Mathematics of as Covariate.

Source	df	SSy.x	MSSy.x	F value	Sig.
Treatment	1	42.46	42.46	2.789	.101
Gender	1	5.20	5.20	.342	.561
TreatmentX Gender	1	4.84	4.84	.318	.575
Error	55	837.39	15.25		
Total	58	889.89	67.72		

Table 4.4: Mean and SD for Achievement in Mathematics of Experimental and Control Group

Group	Gender	N	Mean	Std. Deviation
EXPERIMENTAL	BOYS	25	52.24	14.49
	GIRLS	5	34.80	5.93
	Total	30	49.33	14.91
CONTROL	BOYS	24	43.33	10.03
	GIRLS	6	44.00	13.62
	Total	30	43.46	10.58
Total	BOYS	49	47.87	13.17
	GIRLS	11	39.81	11.40
	Total	60	46.40	13.15

4.3.1 Effect of Treatment on Achievement in Mathematics of Class IX Students

From the Table 4.3, it can be seen that the F- value for Treatment is 2.789 which is significant at 0.01 level with df equal to 1/58. It indicates that the adjusted mean scores of Achievement in Mathematics Subject of Experimental Group and Control Group differ significantly when their pre-test scores of Achievements in Mathematics Subject were taken as covariate. It shows that there was a significant effect of Treatment on Achievement in Mathematics Subject of Class IX students when their Pre-test Scores of Achievement in Mathematics Subject was taken as covariate. Thus, the null hypothesis, namely, "there is no significant effect of Treatment on Achievement in Mathematics Subject of Class IX students when their Pre-test Scores of Achievement in Mathematics Subject was taken as covariate", is rejected. It is, therefore, inferred that the Treatment produced a significant differential effect on the Achievements in Mathematics Subject of students. Thus, it may be concluded that the Treatment was effective in terms of Achievements in Mathematics Subject of students.

Further, Table 4.4 indicates that the mean score and SD of Overall Achievement in Mathematics Subject of Experimental Group is 49.33 and 14.91, respectively. The mean score and the SD of Overall Achievement in Mathematics Subject of Control Group is 43.46 and 10.58, respectively. It is evident from the table that the mean score of Overall Achievement of experimental group is higher than the Control group. But, It shows that the SD of Experimental group is slightly higher than

the Control group, it was negligence. It can be concluded that the Experimental Group was superior to Control Group in terms of improving Overall Achievement in Mathematics.

Finding: There is a significant effect of Treatment (Self-Regulated Learning) on Achievement in Mathematics Subject of Class IX students as compared to traditional method.

4.3.2 Effect of Gender on Achievement in Mathematics of Class IX Students

From the Table 4.3, it can be seen that the F- value for Gender is 0.342 which is not significant at 0.05 levels with df equal to 1/58. It indicates that the Gender did not produce any significant differential effect on the achievement in Mathematics. So, there was no significant effect of Gender on Achievement in Mathematics Subject of Class IX students when their Pre-test Scores of Achievement in Mathematics was taken as covariate. Thus, the null hypothesis, namely, “there is no significant effect of Gender on Achievement in Mathematics of Class IX students when their Pre-test Scores of Achievement in Mathematics was taken as covariate”, is not rejected. It signifies that the achievement in Mathematics is independent of the Gender of the students.

Further, Table 4.4 indicates that the mean of the boys and girls taught through the Self-Regulated Learning is 52.24 and 34.80, respectively. It signifies that there was minimal difference in the achievement in Mathematics between the boys and the girls. Similarly, in the traditional approach of teaching also, the mean score of achievement of boys and girls were 43.33 and 44, respectively. There was no such significant difference in their achievement in Mathematics.

Finding: There is no significant effect of Gender on Achievement in Mathematics of Class IX students.

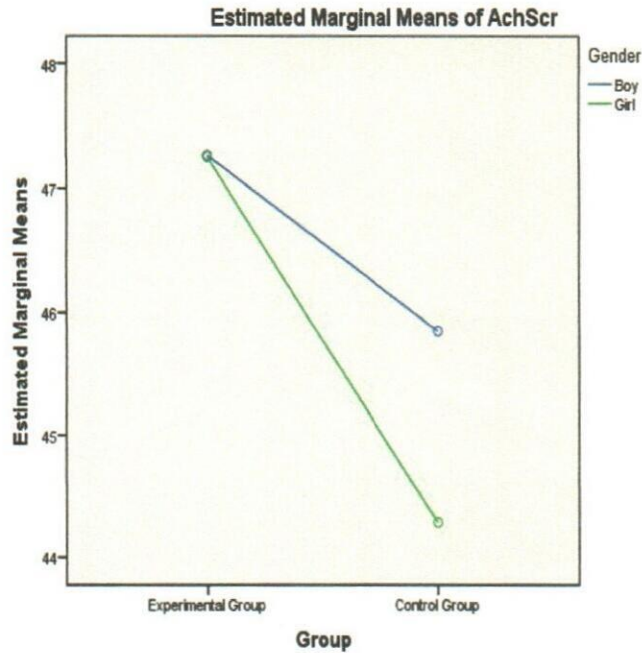
4.3.3 Interaction of Treatment and Gender on Achievement in Mathematics of Class IX Students

From the Table 4.3, it can be seen that the F- value for the interaction of Treatment and Gender is 0.318 which is not significant at 0.05 level with df equal to

1/58. It indicates that the interaction of Treatment and Gender did not produce a significant differential effect on the Achievement in Mathematics. In other words, it can be said that there was no interactional effect of Treatment and Gender on the students' Achievement in Mathematics. Therefore, the null hypothesis, namely, "there is no significant interaction of Treatment and Gender on Achievement in Mathematics of Class IX students when their Pre-test Scores of Achievement in Mathematics was taken as covariate", is not rejected. The students who taught through Self-Regulated Learning and the students who taught through the Traditional Approach were benefitted in the same way. .

The effect of interaction between Treatment and Gender on the measure of achievement in Mathematics was not found significant. The result indicates that the boys and girls were benefited to the same extent in both the modes of teaching. Thus, Gender differential was not noticed in the said interaction on Achievement. But, the mean achievement scores of boys and girls of experimental group were higher than that of the boys and girls of control group. Further, achievement of boys of experimental group was found higher than their girls' counterparts of the same group. But in the control group girls achieved higher than the boys of the same group. It may, therefore, be said that gender of the pupils did not affected their achievement in Mathematics in both experimental and control group to the same degree.

Finding: There is no significant interaction effect of Treatment and Gender on Overall Achievement in Mathematics of Class IX students.



Covariates appearing in the model are evaluated at the following values: prvMrk = 37.92

Fig. 4.3: Interaction of Treatment and Gender on Achievement in Mathematics

From the above presentations of the results of the present study, it can be concluded that the students of Experimental Group have high Achievement in Mathematics than their counterparts, i.e., the students of Control Group. Therefore, it can be inferred from the result of the present study that Self-Regulated Learning was effective than the Traditional Method of Teaching in terms of student's Achievement in Mathematics. But when it comes to Gender, the result shows that there is no significant effect of it on the Achievement in Mathematics of students. If we consider Gender independently, the presentation shows that the Treatment is effective for Boys and Girls individually, i.e. the Boys of Experimental group has high Achievement in Mathematics than those of Control group and the Girls of Experimental group have high achievement rate in Mathematics than those of Control group. Therefore, it may be said that gender of the pupils did not affect their achievement in Mathematics in both experimental and control group to the same degree.