CHAPTER – IV

ANALYSIS OF DATA AND INTERPRETATION OF RESULTS AND FINDINGS

4.1.0 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.

4.2.0 LEARNING PROGRESSION IN SCIENCE OF CLASS VII STUDENTS

The first objective of the investigation was to study the Learning progression in Science of class VII students of Jharsuguda District of Odisha. The data related to the Learning progression in Science were collected with the help of administering the achievement test in Science developed by Mr Bibhuti, 2021. The maximum marks of Achievement test in Science were 20, which further converted to 100 for analysis. The data were analysed with the help of Mean, SD, Range and Percentiles. The results are presented in Table 4.1.

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

Statistical Technique	Achievement in Science	
	CONTROL	EXPERIMENTAL
N	30	30
Mean	58.06	69.53
Std. Deviation	11.66	14.65

Variance		136.06	214.74
Range		51.00	49.00
Percentiles	**5**	40.55	44.55
	25	50.00	59.75
	50	56.00	69.50
	60	59.60	73.80
	70	64.70	80.70
	75	66.50	82.25
	80	68.80	86.20
	90	72.90	89.00
	95	81.65	91.35

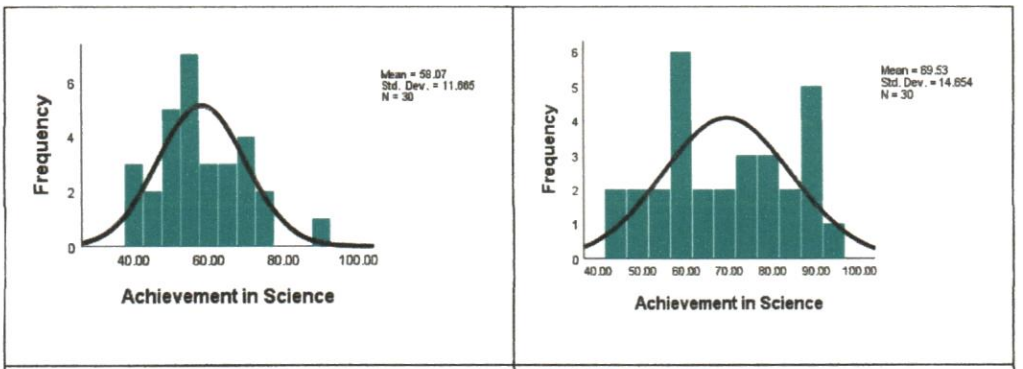
Table – 4.1 shows that the mean score of Achievement in Science of Experimental Group and Control Group are 69.53 and 58.03, respectively. The SD for Achievement in Science of Experimental Group and Control Group are 14.65 and 11.66 respectively. The Range for Achievement in Science of Experimental Group and Control Group are 49 and 51 respectively. It signifies that the mean score and SD of Achievement in Science of Experimental Group is higher than the Control Group. The SD for Achievement in Science for Experimental group is higher than the control group. The Range for Achievement in Science of Experimental Group is lower than the Control Group. It shows that there was small distribution of scores in Achievement in Science among the students of Experimental Group.

The Percentiles for Achievement in Science of Experimental Group demonstrates that 44.55 marks or below scored by 5% students. It shows that 95% students scored more than 44.55% marks. Likewise, 59.75 marks or below scored by 25% students and 69.50 marks or below scored by 50% students. It also shows that 82.25 marks or below scored by 75% of students and 89 marks or below scored by 90% students. The Table – 4.1 demonstrates that 91.35 marks or below was scored by 95% students of Experimental

Group. In other words, it can be said that 91.35 % marks are secured by 95% students of Experimental Group. It shows that 5% students scored more than 91.35 % marks.

The Percentiles for Achievement in Science of Control Group demonstrates that 40.55 marks or below scored by 5% students. It shows that 95% students scored more than 40.55 marks. Likewise, 50 marks or below scored by 25% students and 56 marks or below scored by 50% students. It also shows that 66.50 marks or below scored by 75% of students and 72.90 marks or below scored by 90% students. The Table – 4.1 demonstrates that 81.65 marks or below was scored by 95% students of Control Group. In other words, it can be said that 81.65 % are secured by 95% students of Control Group. It shows that 5% students scored more than 81.65 % marks.

Findings: The learning progression of students of Experimental Group is higher than that of Control Group students of class VII of Jharsuguda district, Odisha.



EXPERIMENTAL GROUP	CONTROL GROUP

Fig. 4.1: Achievement in Science 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 Science than their counterparts, i.e., the students of Control Group. Therefore, it can be inferred from the result of the present study that Constructive method is more effective than the Traditional Method of Teaching in terms of Achievement in Science. The Learning progression of students taught trough the constructive method was higher than the students taught through the Traditional Method of Teaching.

ATTITUDE TOWARDS SCIENCE OF CLASS VII STUDENTS

The second objective of the investigation was to study the attitude towards science of class VII students of Jharsuguda district, Odisha. The data related to the Attitude towards Science were collected with the help of administering the Attitude towards Science Scale developed by Prof. Abinash Grewal,1978. The maximum score of Attitude Test in Science was80 and the minimum score was 0. The data were analysed with the help of Mean, SD, Range and Percentiles. The results are presented in Table 4.2, below.

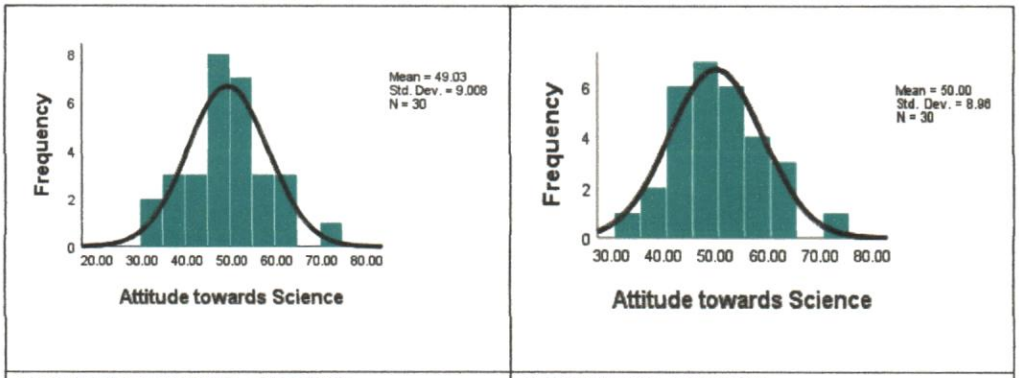
Table – 4.2: Mean, SD, Range, N and Percentiles for Attitude towards Science of Class VII Students of Experimental and Control Group

Statistical Technique	Attitude towards Science	
	Control	Experimental
N	30	30
Mean	49.0333	50.00
Std. Deviation	9.00760	8.95
Variance	81.137	80.27
Range	39.00	38

Table – 4.2 shows that the mean score of Attitude towards Science of Experimental Group and Control Group are 50 and 49.03, respectively. The SD for Attitude towards Science of Experimental Group and Control Group are 8.95 and 9, respectively. The Range for Attitude towards Science of Experimental Group and Control Group are 38 and 39, respectively. It signifies that the mean score of Attitude towards Science of Experimental Group is higher than the Control Group. The SD for Attitude towards Science of Experimental Group is lower than the Control Group. It may be inferred that there was a small deviation of the scores of Attitudes towards Science of Experimental

Group. The Range for Attitude towards Science of Experimental Group is lower than the Control Group. It shows that there was small distribution of scores in Attitude towards Science among the students of Experimental Group.

Findings- The attitude towards science of students of Experimental Group is nearly similar to that of Control Group of students of class VII of Jharsuguda district, Odisha.



EXPERIMENTAL GROUP	CONTROL GROUP

Fig. 4.2: Attitude towards Science of Class VII 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 higher attitude towards Science than their counterparts, i.e., the students of Control Group. Therefore, it can be inferred from the result of the present study that constructive method was not effective than the Traditional Method of Teaching in terms of student's Attitude towards Science. The Attitude towards Science of students taught trough the Constructivist Approach 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 SCIENCE OF CLASS VII STUDENTS

The third objective of the investigation was to study the effect of Treatment, Gender and their interaction on learning progression in Science of Class VII students by taking their previous year Achievement in Science as covariate. Treatment and Gender were two independent variables. Treatment had two levels, namely, constructive method and Traditional Method of Teaching. Gender had two levels, namely, Boys and Girls. The

data related to the Learning progression in Science were collected with the help of administering the achievement test in Science developed by Mr Bibhuti, 2021. The maximum marks of Achievement test in Science were 100. The Class VI Scores of Achievement in Science was collected from the school Register and was designated as previous year Achievement in Science, 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 Science of Class IX Students by Taking Pre-test Scores of Achievement in Science of as Covariate

Sources of Variance	df	SSy.x	MSSy.x	F-Values	Sig.
Treatment	1	424.40	424.40	**119.35****	0.000
Gender	1	8.90	8.90	2.503	0.119
Treatment X Gender	1	4.04	4.04	1.136	0.291
Error	75	195.56	3.55		
Total	78	632.90			

Table 4.4: Mean and SD for learning progression through Achievement in Science of Experimental and Control Group

Group	Gender	N	Mean	Std. Deviation
Experimental	Boys	18	74.83	12.43
	Girls	12	61.58	14.56
	Total	30	69.53	14.65
Control	Boys	18	59.50	12.88
	Girls	12	55.91	9.67

	Total	30	58.06	11.66
Total	Boys	36	67.16	14.70
	Girls	24	58.75	12.43
	Total	18	74.83	12.43

4.3.1 Effect of Treatment on learning progression in Science of Class VII Students

From the Table 4.3, it can be seen that the F- value for Treatment is 119.36 which is significant at 0.01 level with df equal to 1/58. It indicates that the adjusted mean scores of Achievement for learning progression in Science Subject of Experimental Group and Control Group differ significantly when their pre-test scores of Achievements in Science Subject were taken as covariate. It shows that there was a significant effect of Treatment on Achievement for learning progression in Science Subject of Class VII students when their Pre-test Scores of Achievement in Science Subject was taken as covariate. Thus, the null hypothesis, namely, "there is no significant effect of Treatment on Achievement for learning progression in Science Subject of Class VII students when their Pre–test Scores of Achievement in Science Subject was taken as covariate", is rejected. It is, therefore, inferred that the Treatment produced a significant differential effect on the learning progression in Science Subject of students. Thus, it may be concluded that the Treatment was effective in terms of Achievement in Science Subject of students.

Further, Table 4.4 indicates that the mean score and SD of Overall Achievement in Science Subject of Experimental Group is 69.53 and 14.43, respectively. The mean score and the SD of Overall Achievement in Science Subject of Control Group is 58.06 and 11.66, respectively. It is evident from the table that the mean score of Overall Achievement of experimental group is higher than the Control group. It, also, shows that the SD of Experimental group is more than the Control group. It can be concluded that the Experimental Group was superior to Control Group in terms of improving Overall learning progression in Science subject.

Finding: There is a significant effect of Treatment (Constructive approach of teaching) on learning progression in Science Subject of Class VII students as compared to traditional method.

4.3.2 Effect of Gender on Achievement in Science of Class VII Students

From the Table 4.3, it can be seen that the F- value for Gender is 2.51 which is not significant at 0.05 level with df equal to 1/58. It indicates that the Gender did not produce any significant differential effect on the learning progression in science. So, there was no significant effect of Gender on learning progression in Science Subject of Class VII students when their Pre-test Scores of Achievement in Science Subject was taken as covariate. Thus, the null hypothesis, namely, "there is no significant effect of Gender on Achievement in Science Subject of Class VII students when their Pre–test Scores of Achievement in Science Subject was taken as covariate", is not rejected: It signifies that the achievement in Science is independent of the Gender of the students.

Further, Table 4.4 indicates that the mean of the boys and girls taught through the constructive approach is 74.83 and 61.58. It signifies that there was some difference in the learning progression in Science between the boys and the girls. Similarly, in the traditional approach of teaching also, the mean score of achievement for learning progression of boys and girls were 59 and 55, respectively. There was no such significant difference in their achievement in Science.

Finding: There is a no significant effect of Gender on Achievement in Science Subject of Class VII students.

4.3.3 Interaction of Treatment and Gender on learning progression in Science of Class VII Students

From the Table 4.3, it can be seen that the F- value for the interaction of Treatment and Gender is 1.136 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 Science. In other words, it can be said that there was no interactional effect of Treatment and Gender on the students' Achievement in Science. Therefore, the null hypothesis, namely, "there is no significant interaction of Treatment and Gender on Achievement in Science Subject of Class VII students when their Pre–test Scores of Achievement in Science Subject was taken as covariate", is not rejected.

The students who taught through Constructive Approach 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 Science 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. Similarly, boys in the control group achieved higher than the girls of the same group. It may, therefore, be said that gender of the pupils did not affected their achievement in Science 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 Science Subject of Class VII students.

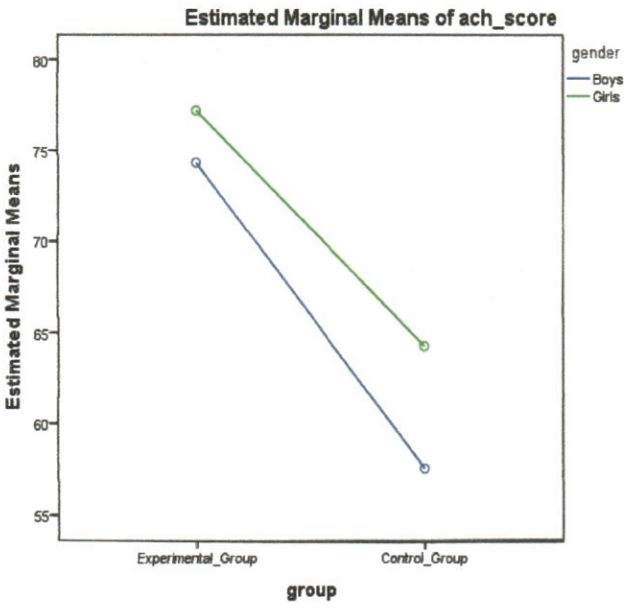


Fig. 4.3: Interaction of Treatment and Gender on Achievement in Science

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 Science than their counterparts, i.e., the students of Control Group. Therefore, it can be inferred from the

result of the present study that Constructivist Approach was effective than the Traditional Method of Teaching in terms of student's Achievement in Science. But when it comes to Gender, the result shows that there is no significant effect of it on the Achievement in Science 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 Science than those of Control group and the Girls of Experimental group have high achievement rate in Science than those of Control group. Therefore, it may be said that gender of the pupils did not affected their achievement in Science in both experimental and control group to the same degree.