Chapter 4:

Data Analysis and Results

This chapter is intended to summarize and group the collected data. This presentation of data in a systematic manner is an essential part of analysis of research for the better understanding and to draw conclusions properly.

4.1 Descriptive Quantitative Findings

4.1.1 Participating Schools &Students

From the Table 4.1 we can conclude that the number boys taking part in study were 33.93% as compared to girls i.e., 66.07% also it is clearly visible that number girls are almost double the number of boys.

S.No.	Schools	Number of Students		
		Male	Female	Total
1.	A	17	12	29
2.	B	12	41	53
3.	C	03	12	15
4.	D	06	09	15
	Grand Total	38	74	112

Table 4.1- List of participating schools and students

4.1.2 Presentation of MAT-SIM Data

Based on the marking scheme as mentioned in the blueprint the student's responses were evaluated to identify the possible causes of errors which are common in nature reflecting a particular pattern. On the basis of it the data has been grouped as per the type of questions and the responses held correct, wrong or not attempted. On the basis of evaluation, I have to consider the fact that there may have been slight cheating among the student's which may deviate the findings of the present study, although sincere efforts have been made to reduce to lowest extent.

4.1.2.1 Findings on MCQs

The pre-test consisted of 5 MCQ's with a purpose to serve the students having low level reading and writing potential and test the knowledge and understanding of them. Based on evaluations it was found that *'the mean score of students on MCQ's was 1.2054'* The quantitative findings of it are stated in Table 4.2

MCQ's Table			Correct Responses	Wrong Responses	No Responses
Q.1	A	5	82	28	2
	B	13			
	C	82			
	D	10			

Q.2	A	16	16	86	10
	B	18			
	C	63			
	D	5			
Q.3	A	46	6	98	8
	B	9			
	C	43			
	D	6			
Q.4	A	37	31	64	17
	B	31			
	C	21			
	D	6			
Q.5	A	30	30	79	3
	B	59			
	C	15			
	D	5			

Table 4.2- List of Table showing responses of students towards MCQ's in Pre-Test

4.1.2.2 Findings on True & False

The pre-test consisted of 5 questions on true and false i.e., students had to analyse whether the given statement was correct or incorrect. On the basis of evaluation following picture evolved out as stated in Table 4.3

T/F Table			Correct Responses	Wrong Responses	No Responses
Q.1	T	62	62	21	29
	F	21			
Q.2	T	50	50	30	32
	F	30			
Q.3	T	30	30	45	37
	F	45			
Q.4	T	40	39	40	33
	F	39			
Q.5	T	27	54	27	31
	F	54			

Table 4.3- List of Table showing responses of students towards True and False in Pre-Test

4.1.2.3 Findings on Matching

The below mentioned tables shows the outcomes of students i.e., the option opted by them in matching. It also evident over here that several students have not attempted the questions too.

Table of Matching								
S.N.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(NA)
Matching List(C/R)	+9	−17	−10	−24	0	(2+5)+4= 2+(5+4)	−14	
(a) Successor of -11	5	5	50	9	4	5	0	34
(b) −7+(−7)	10	1	1	1	9	5	57	28
(c) Associative Property	24	1	3	2	7	14	6	55
(d) 0÷ (−2+7)	17	8	2	2	35	9	8	31
(e) −9−(+8)	3	55	4	7	5	2	2	34
(f) (−15+3) ×2=?	5	5	11	52	5	7	1	26

Table 4.4- List of Table showing responses of students towards Matching in Pre-Test

4.1.2.4 Consolidated Data on Marks

The consolidated table for the marks scored by students in Objective and choice based questions is as below mentioned in Table 4.5 .

SCORE's TABLE				
Marks	MCQ's	T/F's	Matching	Number Line
0	15	29	30	24
1	57	13	19	02
2	29	18	09	11
3	9	25	21	25
4	2	27	10	50
5	0	0	15	-
6	-	-	8	-

**Table 4.5- List of Table representing consolidated marks in Objective or choice-based questions in Pre-Test**

4.1.3 Comparison scores between Pre-Test and Post-Test

The students have appeared in structured pre-test as well as post-test for the analysis of effect of treatment and intervention given after analysis of problem. The below mentioned Table 4.6 clears the picture of this.

Marks Scored by Students	Pre-Test	Post-Test
00 - 05	18	03
05 - 10	50	31
10 - 15	30	49
15 - 20	13	25
20 - 25	01	04
20 - 30	00	00
Table 4.6- Comparison of marks in Pre-Test and Post Test		
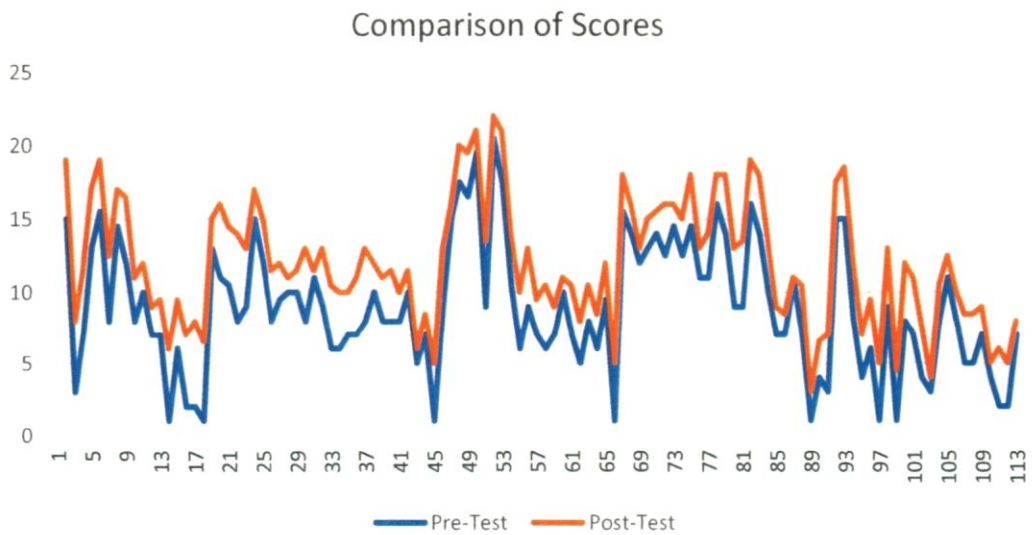
Chart 4.1- Chart showing the achievement of students Pre and Post Treatment

Both the Table 4.6 and Chart 4.1 are clearly depict that treatment given was effective and had some positive impacts on the learning of students.

4.1.4 Statistical Calculations

With respect to intermediate values used in calculations,

t=5.2618

df=222

standard error of difference=0.579

The two tailed p-value is less than 0.0001

Group	Pre-Test	Post-Test
Mean	8.892900	11.937500
SD	4.535400	4.222000
SEM	0.419106	0.398942
N	112	112
Table 4.7- Table of Statistical Calculations		

With reference to Table 4.7, the mean difference between scores of pre-test and post-test is **3.0446** which is significant at **0.05 alpha level** i.e., Null Hypothesis is rejected. t-value is greater than critical value; hence, investigator concludes that this mean difference is due to the intervention of the investigator. And this difference isconsidered extremely significant.

4.2 Descriptive Qualitative Findings

The investigator was interested in knowing whether the teacher has a clear-cut understanding on the basics of Integers because a teacher is considered as an authority in class and whatever s/he teaches in the class is learnt by students, so it is the utmost responsibility of teacher that he has clarity of topic before taking class. If a teachers adopt wrong methodology while teaching the principles, theorems, and laws of mathematics without justification then it becomes difficult for a student to accommodate with that knowledge and promotes rote learning weakening the idea of mathematisation as mentioned in NCF-2005. Since, mathematics as a subject is highly logical so it has justification for all its rule, laws, and theorems. The questions posed to teachers were designed so, that it gives a crystal-clear idea of what a teacher knows. The subjective questionnaire was designed for phenomenological design. This factor also becomes essential because generally it is reported that teacher involves rote learning in mathematics which is a completely absurd idea. The questions posed in questionnaire were as below: -

Q.1 Generallyin mathematics, Zero (0) is used to denote absence of anything. Therefore, in mathematics is there anything less than Zero, If yes than what is it?

Q.2 In mathematics when any number is divided by the same number the answer is One (1), like 30÷30 = 1. Hence, what is 0÷0 (Zero divided by zero) andwhy?

Q.3 Why dividing any number by zero is undefined?

Q.4 Elaborate the idea of Additive Inverse in mathematics. State its utility if any.

Q.5 In mathematics, Integers are denoted in ascending order on equidistant points of number line. Why are these points kept equidistant in number line? Also, state the utility of number-line in teaching-learning process.

Q.6 Why the product of two negative integers is positive?

Q.7 The number −5 is less than −3, but the temperature −5°C is colder than −3°C temperature. Why?

Q.8 Division is done from left to right whereas multiplication is done right to left. Why?

To analyse this, 15 mathematics teachers gave their responses for study, and the table representing responses is below:

Questions	Answered Descriptively	Left Unanswered
Q.1	15	00
Q.2	14	01
Q.3	14	01
Q.4	13	02
Q.5	08	07
Q.6	13	02
Q.7	11	04
Q.8	11	04
Table 4.8 Analysis of Qualitative Data		

4.2.1 Observation from analysis of PU-MTA:

I have identified that the some of the subject teachers also don't have very clear understanding and idea of operation, theorem, axiom, postulates of mathematics, as well as the philosophical basis of mathematics.

To contexualise them in common person language by teacher is also a very challenging task.