Chapter- 4

Data Analysis and Interpretation

4.1 Introduction

The research work done in any field is said to be more meaningful and purposeful when the data collected is carefully processed and systematically analyzed. Based on this analysis and interpretation, the researcher will be able to arrive at meaningful conclusions and draw proper inferences. Data analysis is one of the most important parts in any research investigation. The application of statistical techniques for making decisions is known as the data analysis. The collected data must be carefully processed, systematically classified and tabulated, scientifically analyzed and rationally concluded.

In most of the educational researches the data analysis involves three major steps such as data preparation which is collecting and organizing the data collected by the tools for analysis, descriptive statistics which is describing the collected data and inferential statistics which is testing the formulated hypothesis with the drawn inferences. Analysis of data involves studying the tabulated material in order to determine the inherent facts or conclusions. It involves breaking down existing complex factors into simpler parts and putting the parts together in new arrangements for purposes of interpretation.

According to Carter, V. Good, A. S. Barr and Douglas, E. Scates ,'Analysis is a process which enters into research in one form or the other from the very beginning. It may be fair to say that in general, research consists of two larger steps – the gathering of data and the analysis of these data'. In the process of analysis, no similarities, differences, trends and outstanding factors should go unnoticed and the data should be studied from as many angles as possible to find out the facts. Further, interpretation of data is also a very important step in the total process of research. It calls for a critical examination of the results of one's analysis in the light of all the limitations of data gathering. Interpretation is the application of deductive and inductive logic to the research process.

Interpretation is purely subjective and there is scope for committing many errors at this stage. An adequate knowledge of the process and a capacity of critical thinking are very essential to safeguard against misinterpretation of data collected. In fact, analysis and interpretation of data determine the worth of the research.

4.2 Statistical Computations

The word statistics derived from Latin word "status" and from the Italian word "statista". It means 'political state'. The scientific meaning is that the

science of collecting and interpreting numerical information. It gives the measures variability, range, quartile deviation, standard deviation, mean deviation. It shows the measures of central tendency like average mean, median and mode. It helps in rank correlation. In this study One-way ANOVA and t-Test: Two-Sample Assuming Unequal Variances have been calculated and presented in this chapter.

4.3 Descriptive Analysis

The term 'Descriptive Statistics' refers to a set of concepts and methods used in organizing, summarizing, tabulating, depicting and describing collection of data. The goal of descriptive statistics is to provide a representation of the data, which describes data or the results of the researcher in the tabular, graphical or numerical form. The mean square variance is used in the analysis. The function of descriptive analysis is to describe and indicate several characteristics common to the entire sample.

4.4 Analysis of Objectives

As aptly evident from the title of the dissertation the main objective of the present investigation has been to examine the Attitude of Students, Teachers and Parents towards Online teaching learning of the Government and Private school. However, the micro objectives ultimately contributing to the main objective of the study have been as under:

1. To examine the Attitude of Students, Teachers and Parents towards Online teaching learning of government school.
2. To examine the Attitude of Students, Teachers and Parents towards Online teaching learning of private school.
3. To find out significance difference in the Attitude among Students, Teachers and Parents towards online teaching learning.

4.5 Hypotheses

There is no significant difference in attitude of students, teachers and parents

towards online teaching learning. The data for the present study was collected using the Attitude scale from total 125 samples from which 40 students, 30 teachers and 55 parents.

An array of classification coded, and tabulated data has been analyzed by using statistical tools like - One-way Analysis of Variance.

- ✓ **FIND OUT SIGNIFICANCE DIFFERENCE IN THE ATTITUDE OF STUDENTS, TEACHERS AND PARENTS TOWARDS ONLINE TEACHING LEARNING.**

4.5.1 ATTITUDE OF STUDENTS, TEACHERS AND PARENTS TOWARDS ONLINE TEACHING LEARNING ON THE BASIS OF TYPE OF MANAGEMENT OF SCHOOL.

One-way ANOVA and t-Test: Two-Sample Assuming Unequal Variances were used to test the significance difference between mean scores of attitudes of (students, teachers and parents) based on type of management.

4.5.1.1 Attitude of Students, Teachers and Parents Towards Online Teaching Learning of Government Schools

The different statistical measures for the independent variable 'type of management' are given in Table 4.5

Table 4.5: Descriptive Statistics of Attitude of Students, Teachers and Parents towards online teaching learning of Government school based on Attitude scale scores

Groups	*Count*	*Sum*	*Average*	*Variance*
Students	16	602	37.63	13.98
Teachers	12	534	44.50	31.36
Parents	29	1380	47.59	26.82

'type of management' based on Attitude scales scores

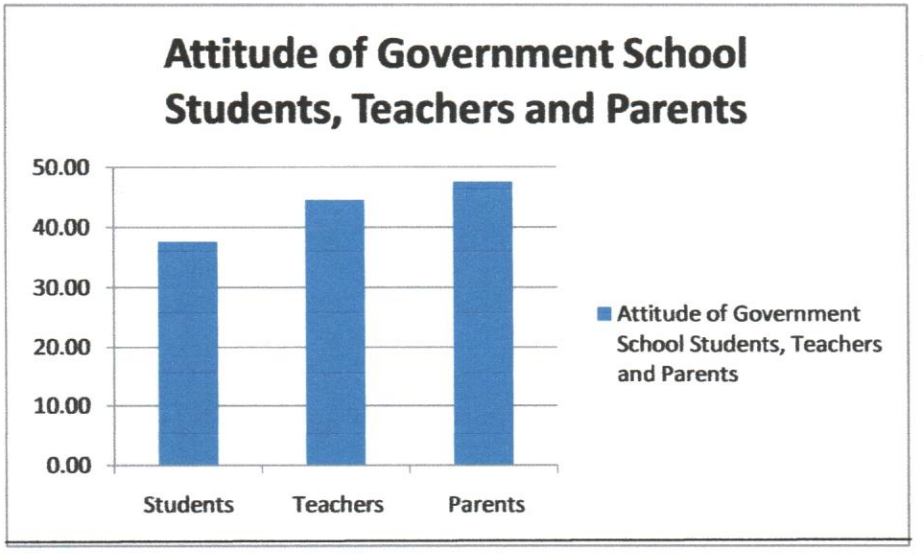

Figure 4.3: The graph showing significant difference of attitude of Government school Students, Teachers and Parents towards online teaching learning

Source of Variation	*Sum of Square*	*Df*	*Mean Square*	*Significant at 0.05 level
Between Groups	1025.09	2	512.55	21.20
Within Groups	1305.78	54	24.18	
Total	2330.88	56		

The F – ratio table for 2 degrees of freedom for greater mean square variance and 54 degrees of freedom for smaller mean square variance reveals that the computed F value (21.20) is more than the critical value of F (3.168246) at 0.05 level of significance. Hence, we can conclude that there is significant difference in the mean Attitude scores of students, teachers and parents with respect of type of management.

4.5.1.2 Attitude of Students, Teachers and Parents Towards Online Teaching Learning of Private Schools

Table 4.6: Table Descriptive Statistics of Attitude of Students, Teachers and Parents towards online teaching learning of Private school based on Attitude scale scores

Groups	*Count*	*Sum*	*Average*	*Variance*
Students	24	884	36.83	15.88
Teachers	18	813	45.17	33.32
Parents	26	1169	44.96	42.28

Result of ANOVA for differences among group mean of the independent variable 'type of management' based on Attitude scale scores

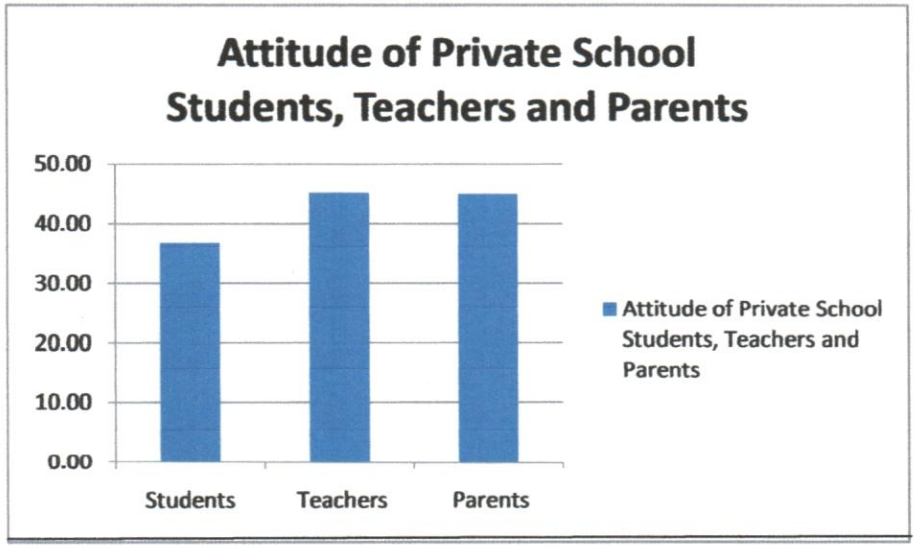

Figure 4.4: The graph showing significant difference of attitude of Private school Students, Teachers and Parents towards online teaching learning

Source of Variation	*Sum of Square*	*df*	*Mean Square*	*Significant at 0.05 level

Between Groups	1047.73	2	523.87	17.12
Within Groups	1988.79	65	30.60	
Total	3036.53	67		

The F – ratio table for 2 degrees of freedom for greater mean square variance and 65 degrees of freedom for smaller mean square variance reveals that the computed F value (17.12) is more than the critical value of F (3.138141935) at 0.05 level of significance. Hence, we can conclude that there is significant difference in the mean Attitude scores of Students, teachers and Parents with respect of type of management.

4.5.1.3 Comparison Of Attitude Preference Of Students, Teachers And Parents On The Basis Of Type Of Management

One-way ANOVA were used to test the significance of difference between mean scores of Attitudes (students, teachers and parents) based on type of management. The different statistical measures are given in Table 4.7

Table 4.7: Table Descriptive Statistics of Attitude of Students, Teachers and Parents towards online teaching learning based on Attitude scale scores

Groups	***Count***	***Sum***	***Average***	***Variance***
Students	40	1486	37.15	14.9
Teachers	30	1347	44.9	31.54
Parents	55	2549	46.35	35.23

Result of ANOVA for differences among group mean of the independent variable 'type of management' based on Attitude scale scores.

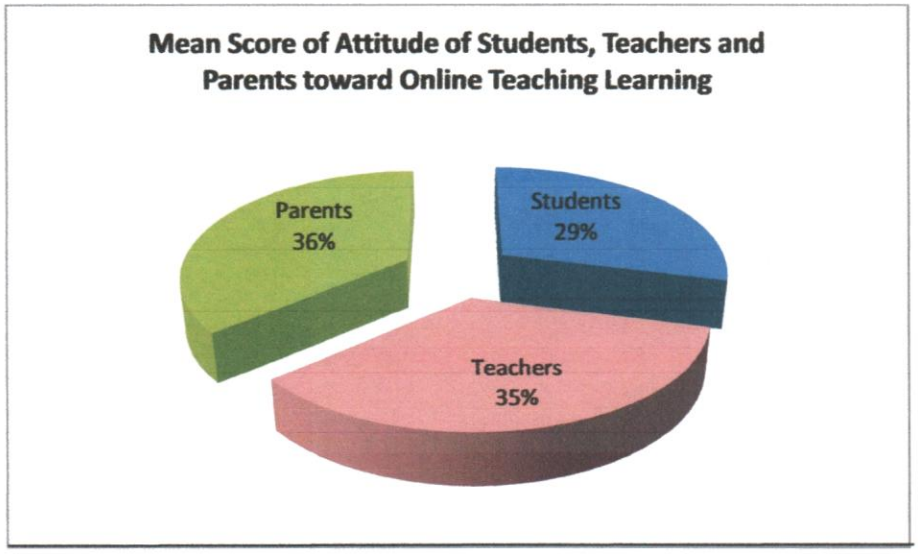

Figure4.5: Chart showing mean scores of Students, Teachers and Parents

The above chart reveals that the percentage level of students(29%), teacher (35%) and parents (36%) regarding the attitude towards online teaching Learning is found to be medium, moderate and high.

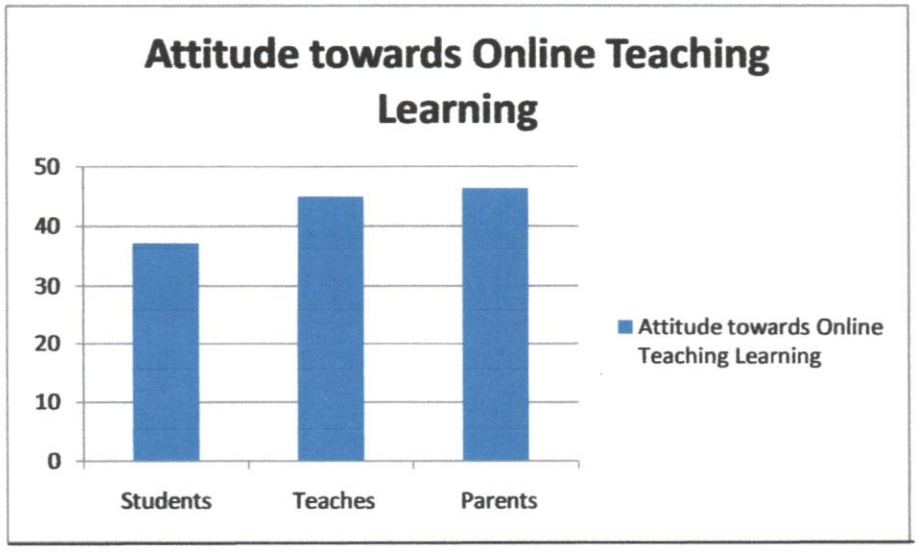

Figure 4.6: Graph shows the level of Students, Teachers and Parents Attitude towards online teaching learning of Students at the secondary level

Source of Variation	*Sum of Square*	*Df*	*Mean Square*	*Significant at 0.05 level
Between Groups	2092.37	2	1046.19	37.56
Within Groups	3398.24	122	27.85	
Total	5490.61	124		

The F – ratio table for 2 degrees of freedom for greater mean square variance and 122 degrees of freedom for smaller mean square variance reveals that the computed F value (37.56) is more than the critical value of F (3.07051216) at 0.05 level of significance. Hence, we can conclude that there is significant difference in the mean Attitude Scale scores of students, teachers and Parents with regards of online teaching learning.

Null hypothesis is rejected.

As significance difference are found for the attitude among students, teachers and parents towards online teaching learning after applying ANOVA test, which determines in general whether means are different, but it does not identify specific group differences that are significant. Therefore Students'-Test will be applied in further analysis of data to find out significant difference between two groups through multiple comparisons.

Attitude of Students about Online Teaching Learning

In this study the attitude was measured on the basis of some dimensions i.e. awareness of 40 students,30 teachers and 55 parents towards ICT, Internet facilities they had, Level of interaction to each-other through synchronous mode etc. for each dimension all three observers have to response some questionnaire statements separately, following are the findings and results of their attitude towards online teaching learning.

4.5.2 Attitude of Students towards Online Teaching Learning

Dimension 1: Awareness towards ICT

Statement No.	Students awareness towards ICT and related aspects						
	Always		Sometimes		Never		Total
	N	%	N	%	N	%	N
10	5	12.5	15	37.5	20	50	40
15	33	82.5	0	0	7	17.5	
20	9	22.5	17	42.5	14	35	
Total	47	117.5	32	80	41	102.5	-

Table 4.8Table showing response of students towards ICT awareness

The results obtaining to the students' awareness towards ICT related aspects(statements number 10, 15 and 20) shows that half percent 50% student have previous experience of learning through online mode from which 12.5% have frequently experienced online teaching learning environment and 37.5% sometimes experienced synchronous mode of learning whereas half percent of students never experienced online learning before. More than half 82.5% students had already their email accounts whereas 17.5% had not their email accounts on Google. Results also revealed that very less 22.5% students attend extra classes with their regular classes while more than half percent of students do not show much interest towards e- learning.

Dimension 2: Internet Facilities

Statement No.	Internet Facilities provided to the students						
	Always		Sometimes		Never		Total
	N	%	N	%	N	%	N
3	4	10	29	72.5	7	17.5	40
14	32	80	6	15	2	5	
Total	36	90	35	87.5	9	22.5	-

Table 4.8Table showing response of students towards internet facilities

Result shows that very less 10% students faced internet issues during their online mode of classes although 72.5% students sometimes faced technical error and 17.5% have never faced internet issue. It also revealed that more than half 80% students have proper access to the Internet at home although 20% of students do not have proper connectivity.

Dimension 3: Psychological State

Statement No.	Psychological state of the students						
	Always		Sometimes		Never		Total
	N	%	N	%	N	%	N
1	7	17.5	25	62.5	8	20	40
4	5	12.5	8	20	27	67.5	
5	4	10.5	15	37.5	21	52.5	
6	6	15	25	62.5	9	22.5	
9	10	25	18	45	12	30	
11	22	55	14	35	4	10	
19	14	35	20	50	6	15	
Total	68	170.5	125	312.5	87	217.5	-

Table 4.9Table showing response towards psychological state of students

It is reported that very less percent students 17.5% responded online classes are more interesting although 62.5% revealed that it is sometimes interesting and 20% think that is not interesting. More than half 67.5% studentsfeel online mode is better than traditional/physical mode and 52.5% feel it is not better for learning new concepts. More than half 55% students think that their timetable of the day has got changed due to online classes and 25% think they became lazy although less percentage 10%, 30% do not agree with it.

Dimension 4 Level of Interaction

Statement No.	Students' Level of Interaction						
	Always		Sometimes		Never		Total
	N	%	N	%	N	%	N
7	5	12	26	65	9	22	40
8	0	20	11	27.5	29	72	
16	8	10	25	62.5	7	17	
18	4	10.5	15	37.5	21	52	
Total	17	52.5	77	192.5	66	163	-

Table 4.10 Table showing response towards level of interaction of students

The results reveal that very less 12% students lose my attention during online classes although 65% sometimes lose their attention. More than half 72% students never bunk their classes though online mode while 82.5% students feel difficulty in concentrating in online classes. More than half 52% do not agree with assignment through online mode is more interactive than offline mode.

Dimension 5: Financial State

Statement No.	Students' Financial State						
	Always		Sometimes		Never		Total
	N	%	N	%	N	%	N
2	5	72.5	26	15	9	12.5	40
12	6	15	8	20	26	65	
13	34	85	5	12.5	1	2.5	
17	4	10	12	30	24	60	
Total	49	182.5	51	77.5	60	140	-

Table 4.11 Table showing response towards financial state of students

The results reveal more than half 72.5% students have my personal device to attend the class while 12.5% do not have, more than half 65% students reveals that their parents do not have difficulty to financial support them for online mode of learning although less percent 15% students have financial difficulty for attending online classes. More than half 85% of students have enough resources to attend online classes while very negligible percent 2.5% do not have enough resources to attend online classes.

4.5.3 Attitude of Teachers towards Online Teaching Learning

Dimension 1 Awareness towards ICT

Statement No.	Teachers' awareness towards ICT and related aspects						
	Always		Sometimes		Never		Total
	N	%	N	%	N	%	N
11	17	56	10	33.3	3	10	30
20	4	13.3	7	23.3	19	63.4	
Total	21	69.3	17	56.6	22	73.4	-

Table 4.12Table showing response of teachers towards ICT awareness

The results obtaining to the attitude of teachers regarding ICT awareness shows that more than half 56% of teachers feel more competent in offline mode in comparison to online mode while 33.3% teacher are becoming techno savvy in this pandemic situation by conducting online class. More than 63.4% of teachers have not previous experience of online teaching whereas 13.3% have previous experience.

Dimension 2: Internet Facilities

Statement No.	Internet facility provided to the Teachers

	Always		Sometimes		Never		Total
	N	%	N	%	N	%	N
21	21	70	9	30	0	0	30
22	16	53.3	14	47.7	0	0	
Total	37	123.3	23	77.7	0	0	-

Table 4.13Table showing response of teachers regarding internet facilities

The result reveals that more than 70% of teachers feel online mode of teaching is better in this pandemic situation while 30% of teachers think it should not be on regular basis. More than half 53.3% of teachers feel network issue as main problem while teaching virtually.

Dimension 3 Computer Based Evaluation

Statement No.	Computer Based Evaluation						
	Always		Sometimes		Never		Total
	N	%	N	%	N	%	N
8	17	56.7	10	33.3	3	10	30
16	12	40	15	50	3	10	
17	10	33.3	18	60	2	6.7	
Total	39	130	43	143.3	8	26.7	-

Table 4.14Table showing response of teachers regarding computer-based evaluation

The result shown in the above table reveals that more than half 56.7% of teachers feel evaluation through online mode is difficult in comparison to the offline mode although 33.3% think it is sometimes difficult and very less 10% agree think that evaluation through online mode is not difficult. 33.3% of teachers feel that more time should be given to the students for conducting online classes while very negligible 6.7% of teachers feel enough time is given to them for teaching through synchronous mode.

Dimension 4: Psychological State

Statement No.	Psychological State of the Teachers						
	Always		Sometimes		Never		Total
	N	%	N	%	N	%	N
5	21	70	8	26.7	1	3.3	30
12	2	6.7	12	40	16	53.3	
13	3	10	14	46.7	13	43.3	
14	9	30	17	56.7	4	13.3	
19	8	26.7	14	46.7	8	26.6	
Total	43	203.7	65	216.8	42	139.8	-

Table 4.15Table showing teachers' psychological state

The results reveal that 70% of teachers feel online teaching mode is safe during pandemic period while26.7% of teachers think it is better for sometimes. More than 53.3% of teacher responded that online teaching learning is the only way to continue education for students during the tough time while negligible 6.7% of teachers disagree, almost half 43.3% of teachers think that organizing and conducting online classroom environment is not burden for them although very less 10% of teachers take it as burden. Equal percent 26.6% of teachers are agree or disagree about feeling difficulty cooperate with students during online teaching learning while 46.7% of teachers are neutral towards it.

Dimension 5: Level of Interaction

Statement No.	Teachers' Level of interaction						
	Always		Sometimes		Never		Total
	N	%	N	%	N	%	N
6	3	10	17	56.7	10	33.3	30
7	3	10	21	70	6	20	
9	2	6.7	13	43.3	15	50	

10	11	36.7	15	50	4	13.3	
15	1	3.4	19	66.3	10	33.3	
18	17	56.7	10	33.3	3	10	
Total	37	123.5	95	319.6	48	149.9	-

Table 4.16Table showing response teachers' level of interaction

The result shows that 33.3% of teachers responded the participation level of students during online classes has not affected by online mode of teaching learning, half 50% of teacher responded that students are not enough responsible during online mode of interaction. Only 36.7% of teachers feel that students' level of understanding has increased through use of multimedia tools in online teaching learning environment. More than half 56.7% of teachers responded that students bunk their classes through online mode of teaching learning.

Dimension 6: Management Instructions Provided

Statement No.	Management Instructions for Teachers						
	Always		Sometimes		Never		Total
	N	%	N	%	N	%	N
1	16	53.3	12	40	2	6.7	30
2	12	40	13	43.3	5	16.7	
3	15	50	11	36.7	4	13.3	
4	10	33.3	14	46.7	6	20	
Total	53	176.6	50	166.7	17	56.7	-

Table 4.17Table showing response of teachers towards management instructions

The results reveal that more than half 53.3%, 40% of teachers have got adequate instructions and guidelines and enough resources from management for conducting online classes. 33.3% of teachers feel that proper internet facility was not provided by management to conduct online classes.

4.5.4 Attitude of Parents towards Online Teaching Learning

Dimension 1: Awareness towards ICT

Statement No.	Parents' awareness towards ICT and related aspects						
	Always		Sometimes		Never		Total
	N	%	N	%	N	%	N
9	25	45.5	17	30.9	13	23.6	55
11	18	32.7	30	54.5	7	12.6	
14	17	30.9	23	41.8	15	27.3	
Total	53	109.1	50	127.2	35	63.5	-

Table 4.18Table showing response towards ICT awareness

The results obtaining to the attitude of parents towards ICT awareness reveal that almost half 45.5% of parents feel online learning is difficult for their children although 23.6% of parents disagree with this. More than 32.7% of parents responded that teacher also promote their children for E-learning while very less 12.6% do not think so.

Dimension 2: Internet Facilities

Statement No.	Internet facility for their children						
	Always		Sometimes		Never		Total
	N	%	N	%	N	%	N
12	22	40	22	40	11	20	55
13	35	63.6	10	18.2	10	18.2	
17	7	12.7	39	70.9	9	16.4	
20	21	38.2	25	45.5	9	16.4	
Total	53	154.5	50	174.6	39	71	-

Table 4.19Table showing response towards internet facilities for their

children

The results reveal that more than 40% of parents feel that their child got more time to self-study due to online classes while 20% of parents do not agree with this. It shows that more than half 63.3% of parents attend virtual parents-teacher meeting while 18.2% do not attend virtual PTM. More than half 70.9% of parents responded that for sometimes their children could effectively use internet facility for learning through virtual mode. More than 38.2% of parents agree that online mode of teaching learning could provide them learn new things.

Dimension 3: Psychological State

Statement No.	Psychological state towards online teaching learning process						
	Always		Sometimes		Never		Total
	N	%	N	%	N	%	N
1	15	27.3	32	58.2	8	14.5	55
2	4	7.3	20	34.4	31	56.4	
3	11	20	31	56.4	13	23.6	
18	22	40	21	38.2	12	21.8	
22	10	18.2	34	61.8	11	20	
Total	53	112.8	50	249	75	136.3	-

Table 4.20Table showing response towards psychological state of their children

The results reveal that more than 27.3% of parents think that their children enjoy online classes although 58.2% of parents think that their children sometimes enjoy online classes and very less 14.5% of parents think their children do not enjoy online classes. More than 56.4% of parents feel offline classes are better than online classes in normal situation while very negligible 7.3% of parents feel online classes are better than online classes. More than 40% of parents responded that creating online teaching learning environment at home is very difficult. More than half 50% of parents

satisfied to the outcome of online teaching learning process.

Dimension 4 Level of Interaction

Statement No.	Parents' Level of Interaction						
	Always		Sometimes		Never		Total
	N	%	N	%	N	%	N
4	9	16.4	11	20	35	63.6	55
6	3	5.5	24	43.6	28	50.9	
7	26	47.3	24	43.6	5	9.1	
8	11	20	30	54.5	14	25.5	
16	11	20	29	52.7	15	27.3	
19	13	23.6	26	47.3	16	29.1	
24	8	14.5	18	32.7	29	52.8	
Total	53	147.3	50	294.4	142	258.3	-

Table 4.21Table showing response of their level of interaction

The results reveal that more than half 63.6% of parents feel that their children like to go to school rather than attend online classes. More than 47.3% of parents think that their children take serious notes during online classes although very negligible parents disagree with this. More than two-third of the parents 74.5% feel that their children get distracted during online teaching learning process. 23.6% of parents stated that they must give extra time to their children to clear their concept while 29.1% do not need to be given extra time to their children. More than half 52.8% of parents responded that their children waste time on mobile devices because of insufficient supervision by teachers.

Dimension 5: Financial State

Statement No.	Financial State

	Always		Sometimes		Never		Total
	N	%	N	%	N	%	N
21	12	21.8	33	60	10	18.2	55
Total	12	21.8	33	60	10	18.2	-

Table 4.22Table showing response towards their Financial State

The result shows that more than two-third of parents (81.8%) feel that because of insufficient resources and poor internet connections the purpose of online teaching learning could not fulfilled.

Dimension 6: Physical Health

Statement No.	Physical Health of their children						
	Always		Sometimes		Never		Total
	N	%	N	%	N	%	N
5	33	60	15	27.3	7	12.7	55
10	13	23.6	26	47.3	16	29.1	
15	26	47.3	17	30.9	12	21.8	
23	33	60	18	32.7	4	7.3	
Total	53	190.9	50	138.2	39	70.9	-

Table 4.23 Table showing response towards physical health of their children

The results states that more than two-third (87.3%), of parents feel their children' health is affecting due to sitting in the front of computer screen for a long time. 70.9% of parents think online classes are burden for their children although 29.1% of parents do not agree with this.

From the above mention Analysis and Interpretation, it is found that there has significance different among students; teachers and parents to find out significance different t-test have been applied on the data. Following are the results from t- test:

Table 4.24:Significance of difference between Students' and Teachers' Attitude towards Online Teaching Learning

Categories	N	Means	SD	T test	P
Students	40	37.15	3.86	2.01	0
Teachers	30	44.9	5.62		

Df= 49 t.05=1.68

The above table shows that the actual difference between the mean of student's attitude and teacher's attitude towards online teaching learning was found to be significant because the calculated t value (2.01) is higher than critical t value (1.68) at .05 level of significance and is also significant at 0.00 levels. The null hypothesis is, therefore, rejected. It can be concluded that there is a significance difference between the mean of attitude scores of students and teachers.

Table 4.25:Significance of difference between Students' and Parents' Attitude towards Online Teaching Learning

Categories	N	Means	SD	T test	P
Students	40	37.15	3.86	1.99	0
Parents	55	46.35	5.94		

Df= 92 t.05=1.66

The above table shows that the actual difference between the mean of student's attitude and parent's attitude towards online teaching learning was found to be significant because the calculated t value (1.99) is higher than critical t value (1.66) at .05 level of significance and is also significant at 0.00 levels. The null hypothesis is, therefore, rejected. It can be concluded that there is a significance difference between the mean of attitude scores of students and parents.

Table 4.26:Significance of difference between Teachers' and Parents' Attitude towards Online Teaching Learning

Categories	N	Means	SD	T test	P
Teachers	30	44.9	5.62	2.00	0
Parents	55	46.35	5.94		

Df= 63 t.05=1.67

The above table shows that the actual difference between the mean of teacher's attitude and parent's attitude towards online teaching learning was found to be significant because the calculated t value (2.00) is higher than critical t value (1.67) at .05 level of significance and is also significant at 0.00 levels. It can be concluded that there is a significance difference between the mean of attitude scores of teachers and parents.

The null hypothesis is, therefore, rejected.

Conclusion

This chapter extensively deals with the calculation pertaining to different statistical analysis of variables, tabulations and interpretations of results obtained.

Major findings and recommendations are given in Chapter V.