CHAPTER IV

ANALYSIS AND INTERPRETATION OF DATA

4.1 Introduction

Data analysis and interpretation are fundamental components of any research endeavor, enabling researchers to derive the true significance of the data collected in their study. This chapter delves into the meticulous process undertaken by the researcher to analyze and interprete the data collected for the study, present the outcomes, and offer a comprehensive understanding of the research findings to the readers and stakeholders. Given the experimental nature of the investigation, the study has relied extensively on statistical techniques to analyze and interpret the collected data with respect to treatment effects.

The data analysis and interpretation encompassed a comprehensive approach, utilizing both descriptive and inferential statistical techniques. In order to gain a deeper understanding of the data, descriptive statistics like the mean and standard deviation were employed. Additionally, for a deeper examination and interpretation of the data, inferential statistics including Repeated Measures ANOVA, ANOVA and ANCOVA were utilized.

The chapter is divided into following sections:

- Section 4.2: Assumptions for Parametric Test
- Section 4.3: Data Analysis and Interpretation

4.2. Assumptions for Parametric Tests

Before conducting any parametric tests, it is important to ensure that the assumptions are met. In this study, the researcher assessed the two critical assumptions: normality and homogeneity of variances for the data collected for the ELST.

4.2.1. Normality assumption

The assumption of normality is important for the validity and reliability of parametric statistical tests. Kolmogorov-Smirnov test was conducted to assess the normality of the data for different skill categories, both in the Control Group (CG) with a sample size of 89 students and the Experimental Group (EG) with a sample size of 90

students. It examined whether the data followed a normal distribution by comparing the observed distribution to the expected normal distribution. The test results for various skill levels, both at the pre-test and post-test stages, are presented in the **Table 4.1**.

Table 4.1: Results for test of normality for both pre-test and post-test scores

Tests of Normality					
Skill	Group	Level of Test	Kolmogorov-Smirnov[a]		
			Statistic	*df*	*Sig.*
Overall Language Skill	CG	Pre-Test	0.092	89	0.059
	EG	Pre-Test	0.093	90	0.054
	CG	Post-Test	0.082	89	0.186
	EG	Post-Test	0.083	90	0.164
Listening	CG	Pre-Test	0.091	89	0.068
	EG	Pre-Test	0.084	90	0.151
	CG	Post-Test	0.093	89	0.054
	EG	Post-Test	0.092	90	0.056
Speaking	CG	Pre-Test	0.089	89	0.078
	EG	Pre-Test	0.09	90	0.066
	CG	Post-Test	0.091	89	0.065
	EG	Post-Test	0.083	90	0.165
Reading	CG	Pre-Test	0.086	89	0.108
	EG	Pre-Test	0.086	90	0.1
	CG	Post-Test	0.092	89	0.062
	EG	Post-Test	0.087	90	0.091
Writing	CG	Pre-Test	0.089	89	0.079
	EG	Pre-Test	0.09	90	0.067
	CG	Post-Test	0.089	89	0.077
	EG	Post-Test	0.084	90	0.157

From the data in the above **Table 4.1**, it is evident that significance level *(Sig)* of the pre-test and post-test are greater than *(0.05)* level which indicates that the data are normally distributed. Additionally, from the figures of boxplots and histograms (**Figure4.1 to Figure4.3**) further in this chapter it is visually evident that there are no outliers detected as well as the data is meeting the normality. This further supports the assumption of normality in the data.

Figure 4.1: Normality curve for all skill levels of CG

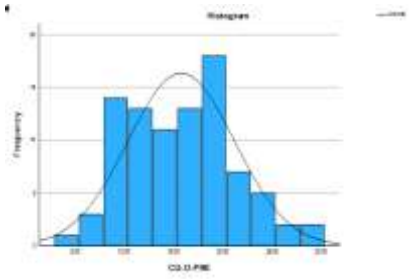
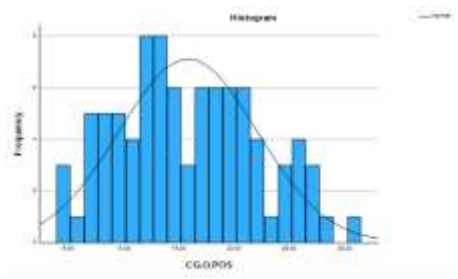
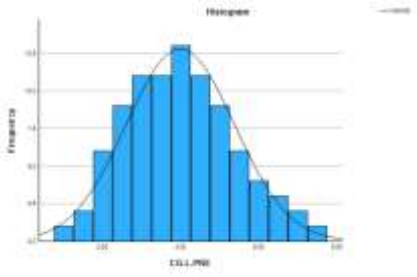
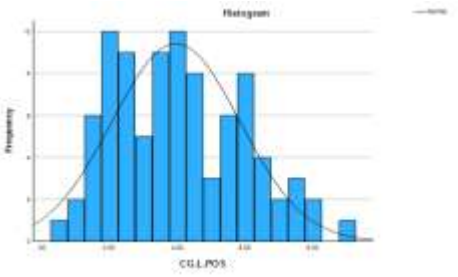
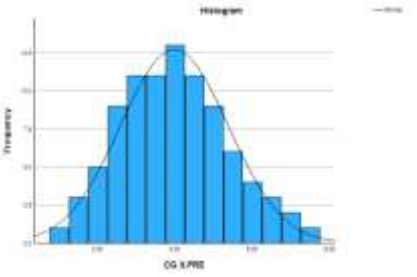
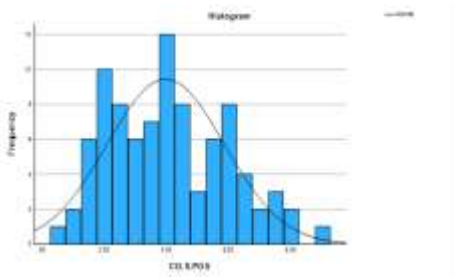
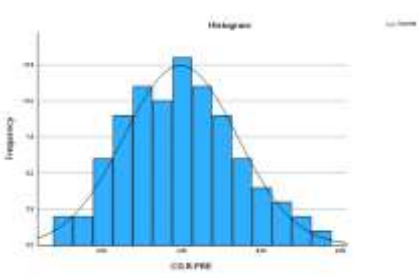
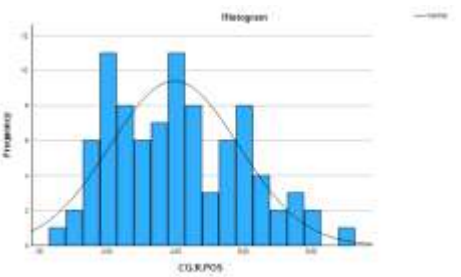
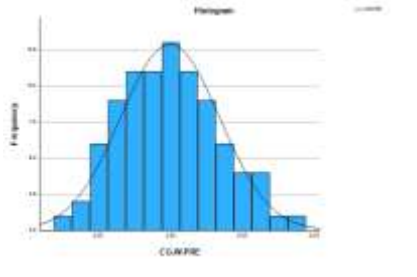
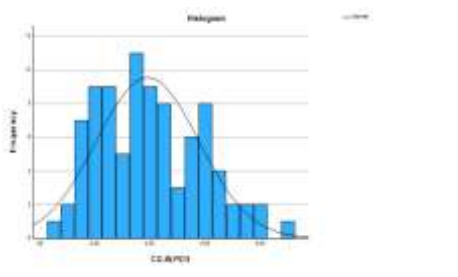
CG	Pre-Test Scores	Post-Test Scores
Overall Language Skills		
Listening Skills		
Speaking Skills		
Reading Skills		
Writing Skills		

Figure 4.2: Normality curve for all skill levels of EG

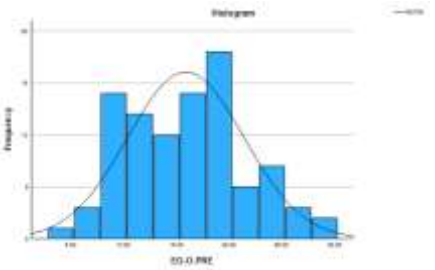
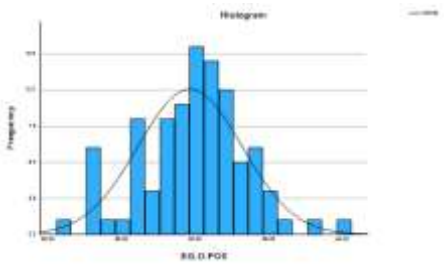
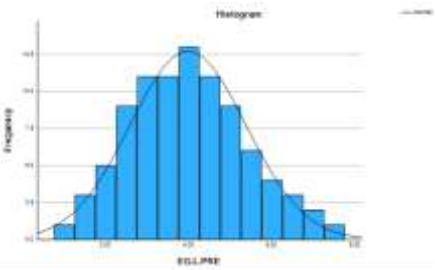
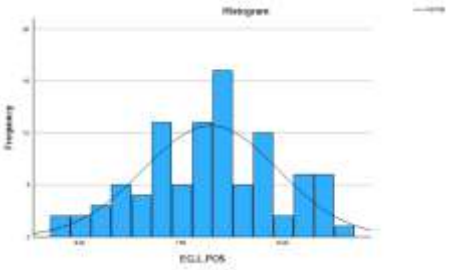
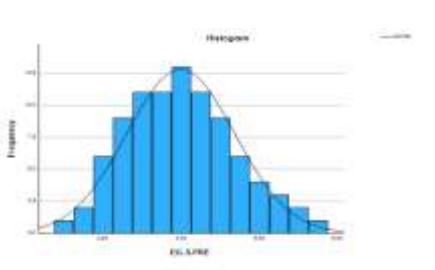
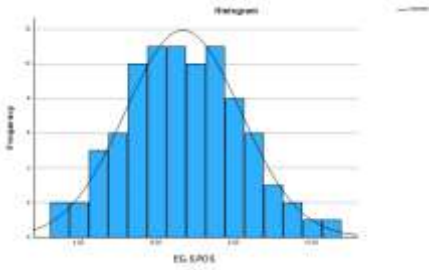
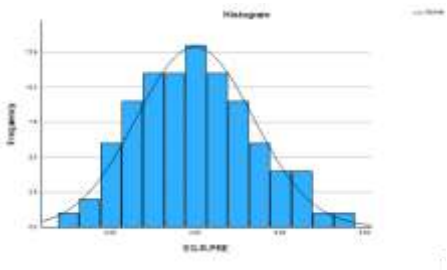
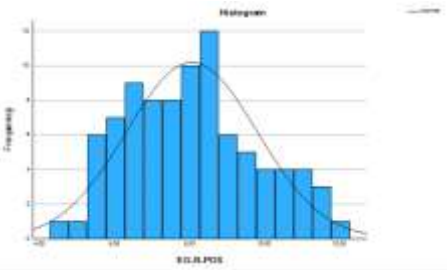
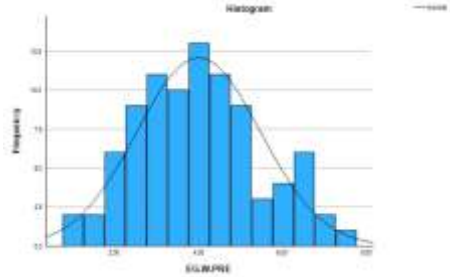
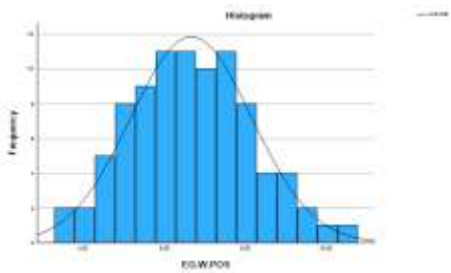
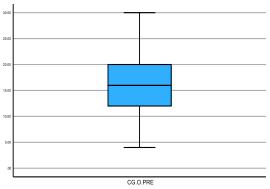
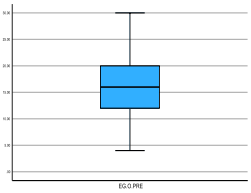
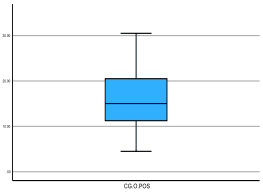
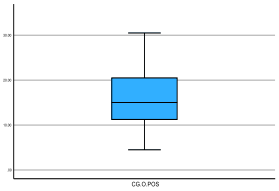
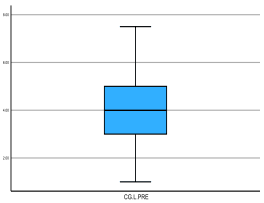
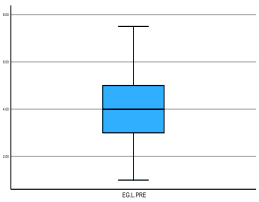
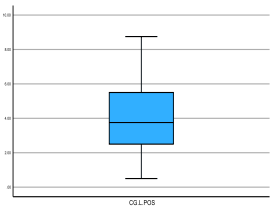
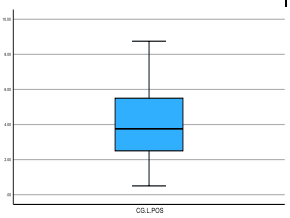
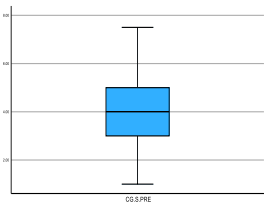
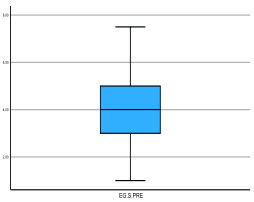
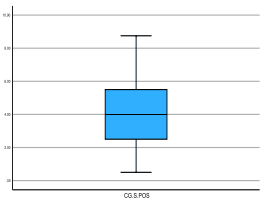
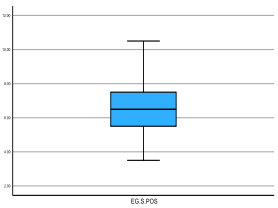
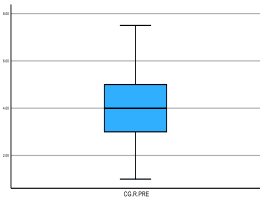
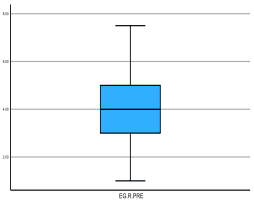
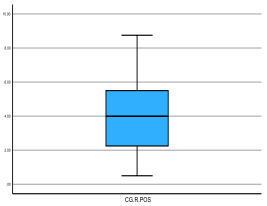
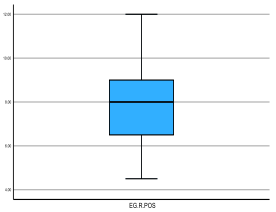
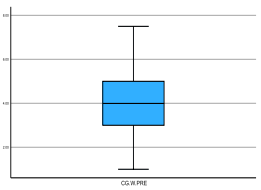
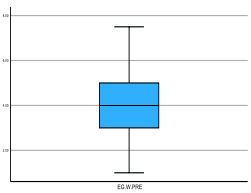
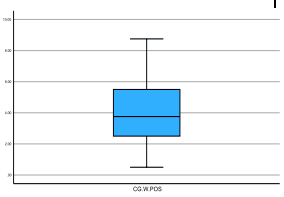
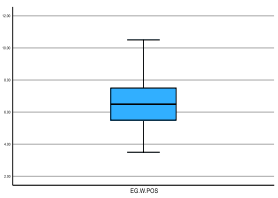
EG	Pre-Test Scores	Post-Test Scores
Overall Language Skills		
Listening Skills		
Speaking Skills		
Reading Skills		
Writing Skills		

Figure 4.3: Boxplots for all skill levels of CG and EG to verify the existence of any outliers

Skills	CG Pre-Test	CG Post-Test	EG Pre-Test	EG Post-Test
Overall Language Skills				
Listening Skill				
Speaking Skill				
Reading Skill				
Writing Skill				

4.2.2 Assumption for homogeneity of variance

Homogeneity of variance implies that the variances between CG and EG should be nearly equal. In this study, the assumption of homogeneity of variances was evaluated by employing Levene's test for ensuring the validity of subsequent statistical analyses.

Table 4.2 presented below summarizes the results of Levene's test for homogeneity of variances across various skill categories, both in CG and EG. The Levene Statistic *df*, and *p-value* are provided for both pre-test and post-test stages of each skill category. It is observed that *p-values* are higher than the significance level of (*0.05*), indicating that there is no significant difference in variances between groups. This result strengthens the assumption of homogeneity of variances, thereby enhancing the reliability of the subsequent parametric analyses.

Table 4.2: Results for test for homogeneity of variances for pre-test and post-test scores

Tests for Homogeneity of Variances					
Skill	Level of test	Levene Statistic	*df1*	*df2*	*p-value*
Overall Language Skills	Pre-Test	0.0002	1	177	0.988
	Post-Test	0.6960	1	177	0.405
Listening	Pre-Test	0.0001	1	177	0.993
	Post-Test	2.3381	1	177	0.128
Speaking	Pre-Test	0.0002	1	177	0.996
	Post-Test	3.8510	1	177	0.051
Reading	Pre-Test	0.1206	1	177	0.729
	Post-Test	0.8549	1	177	0.356
Writing	Pre-Test	0.4931	1	177	0.483
	Post-Test	3.6750	1	177	0.057

4.3. Data Analysis and Interpretation

Following are the analysis and interpretation of the data in accordance with the study's hypotheses.

4.3.1 Data analysis and interpretation of Objective 2

The objective is to study the effectiveness of TBLT module for developing listening skills in English among Class VIII students. For the present objective, necessary data has been collected through ELST. The data has been analyzed and presented it in the following tables and graphs:

Table 4.3: Frequency and percentage of the listening skills development of the Class VIII students based on range of scores

Levels	**Group**							
	CG *(n=89)*				EG *(n=90)*			
	Pre-test		Post-test		Pre-test		Post-test	
	F	*%*	*f*	*%*	*f*	*%*	*f*	*%*
Excellent	0	0.00	0	0.00	0	0.00	6	6.67
Very Good	0	0.00	0	0.00	0	0.00	2	2.22
Good	0	0.00	1	1.12	0	0.00	7	7.78
Above Average	3	3.37	0	0.00	3	3.33	31	34.44
Average	7	7.87	15	16.85	9	10.00	8	8.89
Below Average	15	16.85	13	14.61	19	21.11	13	14.44
Poor	64	71.91	60	67.42	59	65.56	23	25.56
Total	89	100	89	100	90	100	90	100

- The frequency table (**Table 4.3**) that the listening skills did not improve for CG at post-test level.
- The table indicates significant improvement in EG students at post-test level after the implementation of TBLT.
- At post-test level, the majority scores for EG were found as ‘Average’ and ‘Above Average’ level and few converted to ‘Good’, ‘Very Good’ and ‘Excellent’ level.

This transformation at post-test level highlights the substantial impact of the TBLT intervention on enhancing the listening skills of EG. To comprehensively assess this effectiveness, the researcher conducted various statistical methods, as elaborated in the subsequent sections below.

4.3.1.1 Hypothesis related to Objective 2

The researcher formulated the hypothesis based on second objective and carried forward the analysis in the following manner.

HO_1: There is no significant difference between the mean pre-test and post-test scores of the control group and experimental group in developing their listening skills in English**.**

Table 4.4.: Abbreviations and symbols used

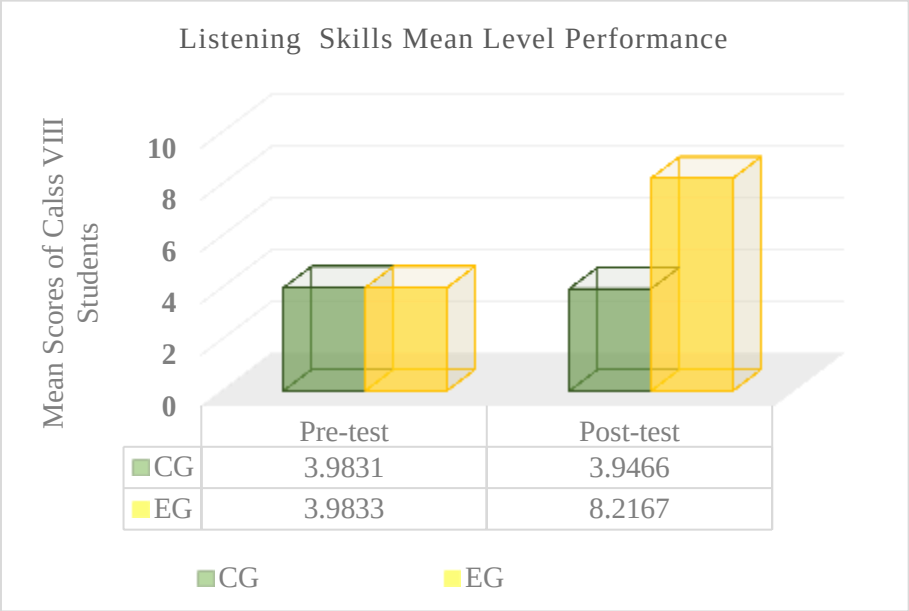
CG	Control group
EG	Experimental group
Df	Degree of freedom
ANOVA	Analysis of variance
ANCOVA	Analysis of co-variance
SD	Standard deviation
SEM	Standard error mean
P	Level of significance
M	Mean
F	Analysis of variance results
SS	Adjusted sum of squares
MS	Adjusted mean squares
SSy.x	Adjusted sum of squares (co-variance)
MSSy.x	Adjusted mean squares (co-variance)
Fy.x	Analysis of co-variance results
N	Number of students
%	Percentage
F	Frequency
TTM	Traditional Teaching Method
TBLT	Task-based language teaching
ELST	English Language Skills Test

Table4.5: Repeated Measures ANOVA results for listening skills

Group	*n*	Pre-test		Post-test		Within-Subjects		Interaction Effect		Between-Subjects Effect	
		m	*SD*	*M*	*SD*	*F*	*P*	*F*	*p*	*F*	*p*
CG	89	3.983	1.389	3.947	1.398	206.7	<0.001	213.957	<0.001	129.024	<0.001
EG	90	3.983	1.391	8.217	1.651						

From **Table 4.5**, the Repeated Measures ANOVA results for listening skills indicate that the control group (CG) and experimental group (EG) were compared with 89 and 90 participants respectively. The CG's pre-test mean was 3.983 (*SD* = 1.389) and post-test mean was 3.947 (*SD* = 1.398), showing a significant within-subjects effect (*F* = 206.7, *p*< 0.001) suggesting substantial change over time. The interaction effect between time and group was significant (*F* = 213.957, *p*< 0.001), implying different change patterns between groups. The between-subjects effect was also significant (*F* = 129.024, *p*< 0.001), indicating a notable difference in listening skills between CG and EG. For the EG, the pre-test mean was 3.983 (*SD* = 1.391) and the post-test mean increased significantly to 8.217 (*SD* = 1.651), reflecting considerable improvement. Therefore, the null hypothesis (HO_1), which posits no significant difference in listening skills between CG and EG before the TBLT treatment, is accepted.

Figure4.4: Graphical representation of mean level performance of CG and EG after pre-test and post-test



From the above, it is seen that no notable differences were found in the mean scores between CG and EG at the pre-test level. But the mean score of EG has significantly improved after TBLT treatment.

The CG and EG were not equated at the initial stage of their treatment. Consequently, it cannot be confidently concluded that the significant difference between CG results and EG results is solely due to the TBLT treatment given to EG. However, there does exist a significant difference between the results of the groups at the post-test level and there exists no significant difference between CG results and EG results at the pre-test level. Hence, the test results have to undergo ANCOVA analysis to adjust or co-relate the pre-test scores of CG and EG with their post-test scores in order to draw meaningful conclusions.

Table 4.6:(Part 4A,4B and 4C)ANCOVA summary showing the effect of TBLT over TTM for the development of listening skills in English with regard to co-variation of post-test scores with pre-test score

Part-4A: Adjusted means of post-test and pre-test scores of both CG and EG						
Level of adjustment	Adjusted means of CG (total of pre-test and post-test)	Adjusted means of EG (total of pre-test and post-test)	Adjusted means of CG and EG (pre-test and post-test)	Co-relation*(r)* within samples CG vs EG	Co-relation *(r²)* within samples CG vs. EG	
Pre-test scores adjusted with post-test scores	3.965	6.100	5.038	0.193	0.037	
Part-4B: ANOVA results after adjustment of pre-test scores with post-test scores						
Dependent variable	Source of variations	*SS*	*df*	*MS*	*F*	*p*
Listening skills	Adjusted means (Between groups)	815.911	1	815.911	260.112	<0.05
	Adjusted Error (Within group)	555.209	177	3.137		
	Adjusted Total	1371.120	178			
Part-4C: ANCOVA test for homogeneity of regressions based on above ANOVA results						
Dependent variable	Source of variations	*SSy.x*	*df*	*MSSy.x*	*Fy.x*	*p*
Listening skills	Adjusted means (between groups)	767.905	2	383.952	112.026	<0.05
	Adjusted Error (within group)	602.215	176	3.427		
	Adjusted total	1371.120	178			

In **Table 4.6 (Part 4A),** the adjusted means of pre-test and post-test scores for both CG and EG were analysed. Adjusted means of (*CG = 3.965*) and (*EG = 6.100*), and the adjusted means of CG and EG combined scores are (*5.038*). The correlation (*r*) within the samples for CG versus EG is (*0.193*). The aggregate correlation (r^2) within samples of CG versus EG is (*0.037*).

Table 4.6 (Part 4B) displays the ANOVA results after the adjustment of the pre-test scores with the post-test scores. Sum of squares is (*SS = 815.911*) for adjusted means between the groups, and for the adjusted errors within the group is (*SS = 555.209*). The F-value is (*260.112*), and the corresponding significance is less than (*0.05)* level of confidence at (*df = 1/177)*. This establishes that the adjusted mean scores of CG and EG differ significantly, and the TBLT had a substantial and significant impact on improving listening skills.

ANCOVA test for homogeneity of regression is performed based on the ANOVA result. The test is conducted with listening skills' post-test scores as the dependent variable and pre-test scores as the covariate and group as a categorical factor. In **Table 4.6 (Part 4C),** it is seen that the computed *Fy.x* value is (*112.026*), and the corresponding significance is less than (*0.05)* level of confidence at (*df = 2/176).* Following the application of a covariance procedure, which involved the adjustment of post-test scores for both CG and EG based on their pre-test scores, establishes a notable and statistically significant difference between the scores of CG and EG.

The results clearly depict the effectiveness of TBLT intervention programme on the development of listening skills among the students of class VIII. So, it is concluded that the null hypothesis $HO_1$is rejected based on this analysis.

4.3.2 Data analysis and interpretation of Objective 3

The third objective is to study the effectiveness of TBLT module for developing speaking skills in English among Class VIII students. For the present objective, necessary data has been collected through ELST. The data has been analysed and presented it in the following tables and graphs:

Table 4.7: Frequency and percentage of the speaking skills development of the Class VIII students based on range of scores

Levels	Group							
	CG *(n=89)*				EG *(n=90)*			
	Pre-test		Post-test		Pre-test		Post-test	
	f	*%*	*f*	*%*	*f*	*%*	*f*	*%*
Excellent	0	0.00	0	0.00	0	0.00	0	0.00
Very Good	0	0.00	0	0.00	0	0.00	2	2.22
Good	0	0.00	2	2.25	0	0.00	3	3.33
Above Average	2	2.25	1	1.12	0	0.00	2	2.22
Average	5	5.62	6	6.74	6	6.67	19	21.11
Below Average	14	15.73	17	19.10	13	14.44	11	12.22
Poor	68	76.40	63	70.79	71	78.89	53	58.89
Total	89	100	89	100	90	100	90	100

- The frequency table (**Table 4.7**) that speaking skills did not improve for CG at post-test level.
- The table indicates significant improvement in EG students at post-test after the implementation of TBLT.
- At the post-test level, the majority scores of EG was found as 'Average' and 'Above Average' level and few converted to 'Good', and 'Very Good' level.

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The above results highlight the substantial impact of the TBLT intervention on enhancing the speaking skills of EG. To comprehensively assess this effectiveness, the researcher conducted various statistical methods, as elaborated in the subsequent sections below.

4.3.2.1 Hypothesis related to Objective 3

The researcher formulated the hypothesis based on third objective and carried forward the analysis in the following manner:

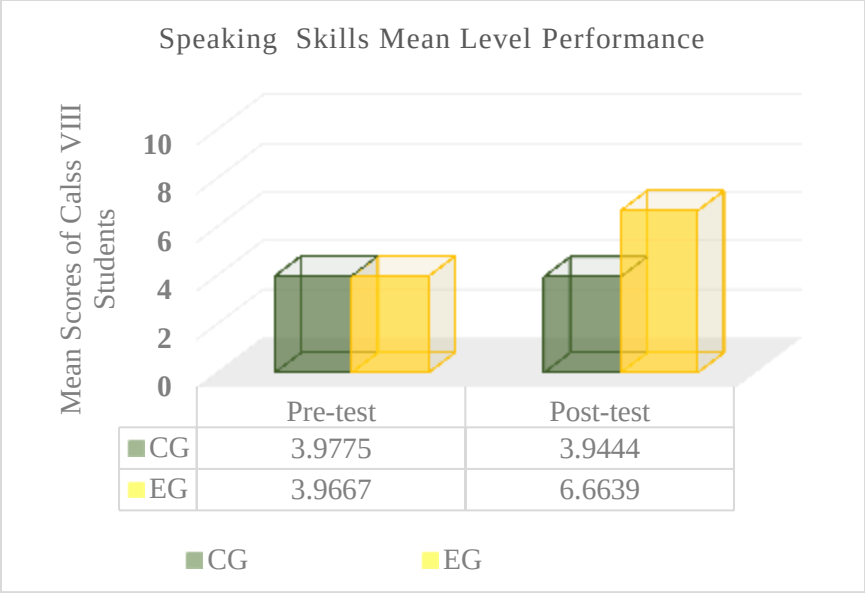
HO_2: There is no significant difference between the mean pre-test and post-test scores of the control group and experimental group in developing their speaking skills in English.

Table 4.8: Repeated Measures ANOVA results for speaking skills

Group	*N*	Pre-test		Post-test		Within-Subjects		Interaction Effect		Between-Subjects Effect	
		m	*SD*	*M*	*SD*	*F-value*	*P*	*F*	*Sig*	*F*	*p*
CG	89	3.944	1.874	3.947	1.398	75.6	<0.001	77.61	<0.001	59.72	<0.001
EG	90	3.967	1.390	6.664	1.482						

Table 4.8 presents the Repeated Measures ANOVA results for speaking skills, comparing the CG with 89 participants. For the CG, the pre-test mean was 3.944 (*SD* = 1.874) and the post-test mean was 3.947 (*SD* = 1.398). The within-subjects effect was significant ($F = 75.6$, $p < 0.001$), indicating a substantial change in speaking skills over time. The interaction effect between time and group was also significant ($F = 77.61$, $p < 0.001$), suggesting different patterns of change in speaking skills. The between-subjects effect was significant as well ($F = 59.72$, $p < 0.001$), highlighting significant differences in speaking skills across the groups. Therefore, the null hypothesis (HO_2), which posits no significant difference in speaking skills between CG and EG before the TBLT treatment, is accepted.

Figure 4.5: Graphical representation of mean level performance of CG and EG after pre-test and post-test



From the above, it is seen that no notable differences were found in the mean scores between CG and EG at the pre-test level. But the mean score of EG has significantly improved after TBLT treatment.

The CG and EG were not equated at the initial stage of their treatment. So, it cannot be concluded confidently that the significant difference between CG results and EG results is only due to the TBLT treatment given to EG. However, there does exist a significant difference between the results of the group at the post-test level and there exists no significant difference between CG results and EG results at the pre-test level. Hence, the test results have to undergo ANCOVA analysis to adjust or co-relate the pre-test scores of CG and EG with their post-test scores in order to draw meaningful conclusions.

Table 4.9: (Part 4A,4B and 4C) - ANCOVA summary showing the effect of TBLT over TTM for the development of speaking skills in English with regard to co-variation of post-test scores with pre-test scores

Part-4A: Adjusted means of post-test and pre-test scores of both CG and EG						
Level of adjustment	Adjusted means of CG (total of pre-test and post-test)	Adjusted means of EG (total of pre-test and post-test)	Adjusted means of CG and EG (pre-test and post-test)	Co-relation*(r)* within samples CG vs EG	Co-relation *(r²)* within samples CG vs. EG	
Pre-Test scores adjusted with post-test scores	3.971	5.314	4.646	0.121	0.015	
Part-4B: ANOVA results after adjustment of pre-test scores with post-test scores						
Dependent variable	Source of variations	*SS*	*df*	*MS*	*F*	*P*
Speaking skills	Adjusted means (between groups)	332.792	1	332.792	116.610	<0.05
	Adjusted Error (within group)	507.992	177	2.854		
	Adjusted Total	840.784	178			
Part-4C: ANCOVA test for homogeneity of regressions based on above ANOVA results						
Dependent variable	Source of variations	*SSy.x*	*Df*	*MSSy.x*	*Fy.x*	*P*
Speaking skills	Adjusted means(Between groups)	320.669	2	160.335	54.259	<0.05
	Adjusted Error (Within group)	520.077	176	2.955		
	Adjusted Total	840.746	178			

Table 4.9 (Part 4A), the adjusted means of pre-test and post-test scores for both the groups were analysed. Adjusted means of (CG = *3.971*) and (EG = *5.314*), and the adjusted means of CG and EG combined scores are (*4.646*). The correlation *(r)* within the samples for CG versus EG is (*0.121*). The aggregate correlation *(r^2)* within samples of CG versus EG is (*0.015*).

Table 4.9 (Part 4B) displays the ANOVA results after the adjustment of the pre-test scores with the post-test scores. Sum of squares is *(SS = 332.792)* for adjusted means between the groups, and for the adjusted errors within the group is *(SS = 507.992).* The *F-value* is (*116.610*), and the corresponding significance is less than (*0.05)* level of confidence at (*df = 1/177)*. This establishes that the adjusted mean scores of CG and EG differ significantly, and the TBLT had a substantial and significant impact on improving speaking skills.

ANCOVA test for homogeneity of regression is performed based on the ANOVA result. The test is conducted with speaking skills' post-test scores as the dependent variable and pre-test scores as the covariate and group as a categorical factor. In **Table 4.9 (Part 4C),** the computed Fy.x value is (*54.259*), and the corresponding significance is less than (*0.05)* level of confidence at (*df = 2/176)*. Following the application of a covariance procedure, which involved the adjustment of post-test scores for both the groups based on their pre-test scores, a notable and statistically significant difference emerged between the scores of CG and EG.

The results clearly depict the effectiveness of TBLT intervention program on the development of speaking skills among the students of class VIII. So, it is concluded that the null hypothesis $HO_2$is rejected based on this analysis.

4.3.3 Data analysis and interpretation of Objective 4

The fourth objective is to study the effectiveness of TBLT module for developing reading skills in English among Class VIII students. For the present objective, necessary data has been collected through ELST. The data has been analysed and presented it in the following tables and graphs:

Table 4.10: Frequency and percentage of the reading skills development of the Class VIII students based on range of scores

Levels	Group							
	CG *(n=89)*				EG *(n=90)*			
	Pre-Test		Post-Test		Pre-Test		Post-Test	
	f	*%*	*f*	*%*	*f*	*%*	*F*	*%*
Excellent	0	0.00	0	0.00	0	0.00	1	1.11
Very Good	0	0.00	0	0.00	0	0.00	0	0.00
Good	0	0.00	1	1.12	2	2.22	8	8.89
Above Average	0	0.00	5	5.62	0	0.00	4	4.44
Average	2	2.25	6	6.74	1	1.11	23	25.56
Below Average	5	5.62	7	7.87	9	10.00	19	21.11
Poor	82	92.13	70	78.65	78	86.67	35	38.89
Total	89	100	89	100	90	100.00	90	100.00

The frequency table (**Table 4.10**) indicates that reading skills did not improve for CG at post-test level.

- The table indicates significant improvement in EG students at post-test after the implementation of TBLT.
- At post-test level, the majority scored of EG were found as ‘Average’ and ‘Above Average’ level and few converted to ‘Good’, and ‘Excellent’ level.

The results obtained highlight the substantial effectiveness of the TBLT intervention on enhancing the reading skills of EG students. To comprehensively assess this effectiveness, the researcher conducted various statistical methods, as elaborated in the subsequent sections below.

4.3.3.1. Hypothesis related to Objective4

The researcher formulated the hypothesis based on fourth objective and carried forward the analysis in the following manner:

HO_3: There is no significant difference between the mean pre-test and post-test scores of the control group and experimental group in developing their reading skills in English.

Table 4.11: Repeated Measures ANOVA results for reading skills

Group	*n*	Pre-test		Post-test		Within-Subjects		Interaction Effect		Between-Subjects Effect	
		m	*SD*	*m*	*SD*	*F*	*p*	*F*	*p*	*F*	*P*
CG	89	3.955	1.424	3.941	1.890	160.68	<0.001	162.924	<0.001	127.343	<0.001
EG	90	3.983	1.371	8.050	1.739						

Table 4.11 presents the Repeated Measures ANOVA results for reading skills, comparing the CG and EG. For the CG with 89 participants, the pre-test mean was 3.955 (*SD* = 1.424) and the post-test mean was 3.941 (*SD* = 1.890). The within-subjects effect was significant ($F = 160.68$, $p < 0.001$), indicating a substantial change in reading skills over time. The interaction effect between time and group was also significant ($F = 162.924$, $p < 0.001$), suggesting different patterns of change in reading skills between the groups. The between-subjects effect was significant ($F = 127.343$, $p < 0.001$), reflecting notable differences in reading skills across the groups. For the EG with 90 participants, the pre-test mean was 3.983 (*SD* = 1.371) and the post-test mean significantly increased to 8.050 (*SD*=1.739), demonstrating a considerable improvement in reading skills. Therefore, the null hypothesis (HO_3), which posits no significant difference in speaking skills between CG and EG before the TBLT treatment, is accepted.

Figure.4.6: Graphical representation of mean level performance of CG and EG after pre-test and post-test

From the above, it is seen that no notable differences were found in the mean scores between CG and EG at the pre-test level. But the mean score of EG has significantly improved after TBLT treatment.

The CG and EG were not equated at the initial stage of their treatment, so, it cannot be concluded confidently that the significant difference in the results is only due to the TBLT treatment given to EG. However, there exist a significant difference between the results of the group at the post-test level and there exists no significant difference between CG results and EG results at the pre-test level. Hence, the test results have to undergo ANCOVA analysis to adjust or co-relate the pre-test scores of CG and EG with their post-test scores in order to draw meaningful conclusions.

Table 4.12: (Part 4A, 4B and 4C) ANCOVA summary showing the effect of TBLT over TTM for the development of readings kills in English with regard to co-variation of post-test scores with pre-test scores

Part-4A:Adjusted means of post-test and pre-test scores of both CG and EG						
Level of adjustment	Adjusted means of CG (total of pre-test and post-test)	Adjusted means of EG (total of pre-test and post-test)	Adjusted means of CG and EG (pre-test and post-test)	Co-relation*(r)* within samples CG vs EG	Co-relation *(r²)* within samples CG vs. EG	
Pre-test scores adjusted with post-test scores	3.948	6.017	4.988	0.186	0.035	
Part-4B:ANOVA results after adjustment of pre-test scores with post-test scores						
Dependent variable	Source of variations	*SS*	*df*	*MS*	*F*	*P*
Reading skills	Adjusted means (Between groups)	755.526	1	755.526	229.221	<0.05
	Adjusted Error (Within group)	583.403	177	3.296		
	Adjusted Total	1338.929	178			
Part-4C:ANCOVA test for homogeneity of regressions based on above ANOVA results						
Dependent variable	Source of variations	*SSy.x*	*df*	*MSSy.x*	*Fy.x*	*P*
Reading skills	Adjusted means (between groups)	640.998	1	320.499	80.822	<0.05
	Adjusted Error (within group)	697.931	176	3.966		
	Adjusted Total	1338.929	178			

In **Table 4.12 (Part 4A)**, the adjusted means of pre-test and post-test scores for both CG and EG were analysed. Adjusted means of (CG = *3.948*) and (EG = *6.017*), and the adjusted means of CG and EG combined scores are (*4.988*). The correlation (*r*) within the samples for CG versus EG is (*0.186*). The aggregate correlation (r^2) within samples of CG versus EG is (*0.035*).

Table 4.12 (Part 4B) displays the ANOVA results after the adjustment of the pre-test scores with the post-test scores. Sum of squares is *(SS = 755.526)* for adjusted means between the groups, and for the adjusted errors within the group is *(SS = 583.403).* The *F-value* is (*229.221*), and the corresponding significance is less than (*0.05)* level of confidence at (*df = 1/177)*. This establishes that the adjusted mean scores of CG and EG differ significantly, and the TBLT had a substantial and significant impact on improving reading skills.

ANCOVA test for homogeneity of regression is performed based on the ANOVA result. The test is conducted with reading skills' post-test scores as the dependent variable and pre-test scores as the covariate and group as a categorical factor. In **Table 4.12 (Part 4C)**, the computed *Fy.x* value is (*80.822*), and the corresponding significance is less than (*0.05)* level of confidence at *(df = 2/176*). Following the application of a covariance procedure, which involved the adjustment of post-test scores for both CG and EG based on their pre-test scores, a notable and statistically significant difference emerged between the scores of CG and EG.

The results clearly depict the effectiveness of TBLT intervention program on the development of reading skills among the students of class VIII. So, it is concluded that the null hypothesis HO_4 is rejected based on this analysis.

4.3.4 Data analysis and interpretation of Objective 5

The objective is to study the effectiveness of TBLT module for developing writing skills in English among Class VIII students. For this, necessary data has been collected through ELST. The data has been analysed and presented in the following tables and graphs:

Table 4.13: Frequency and percentage of the writing skills development of the Class VIII students based on range of scores

Levels	**Group**							
	CG *(n=89)*				EG *(n=90)*			
	Pre-test		Post-test		Pre-test		Post-test	
	F	*%*	*f*	*%*	*f*	*%*	*f*	*%*
Excellent	0	0.00	0	0.00	0	0.00	0	0.00
Very Good	0	0.00	0	0.00	0	0.00	0	0.00

Good	0	0.00	0	0.00	0	0.00	3	3.33
Above Average	0	0.00	0	0.00	0	0.00	7	7.78
Average	0	0.00	4	4.49	2	2.22	18	20.00
Below Average	5	5.62	9	10.11	5	5.56	15	16.67
Poor	84	94.38	76	85.39	83	92.22	47	52.22
Total	89	100	89	100	90	100	90	100

- The frequency table (**Table 4.13**) that the writing skills did not improve for CG at post-test level.
- The table indicates improvement in EG students at post-test after introduction of TBLT.
- At the post-test level, the majority scores for EG was found as 'Average' and 'Above Average' level and few converted to 'Good'.

This transformation highlights the substantial effectiveness of the TBLT intervention on enhancing the writing skills of EG students. To comprehensively assess this impact, the researcher conducted various statistical methods, as elaborated in the subsequent sections below.

4.3.4.1. Hypothesis related to Objective 5

The researcher formulated the hypothesis based on sixth objective and carried forward the analysis in the following manner:

HO_4: There is no significant difference between the mean pre-test and post-test scores of the control group and experimental group in developing their writing skills in English.

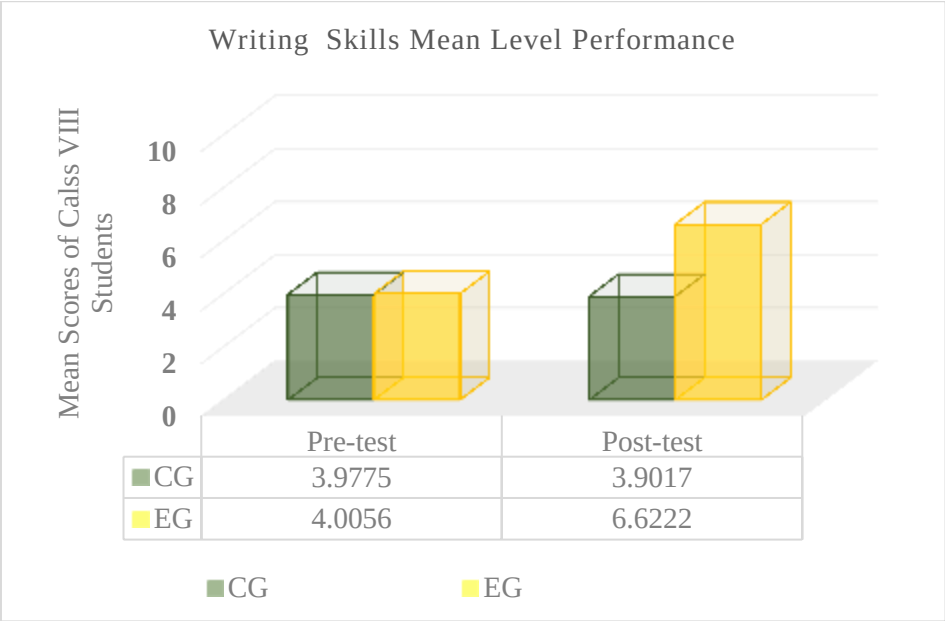
Table 4.14: Repeated Measures ANOVA results for writing skills

Group	*N*	Pre-test		Post-test		Within-Subjects		Interaction Effect		Between-Subjects Effect	
		m	*SD*	*m*	*SD*	*F*	*p*	*F*	*p*	*F*	*P*
CG	89	3.978	1.377	3.902	1.859	137.86	<0.001	159.22	<0.001	72.31	<0.001
EG	90	4.006	1.472	6.622	1.494						

Table 4.14 presents the Repeated Measures ANOVA results for writing skills, comparing the CG and EG. For the CG with 89 participants, the pre-test mean was

3.978 (*SD* = 1.377) and the post-test mean was 3.902 (*SD* = 1.859). The within-subjects effect was significant (*F* = 137.86, *p*< 0.001), indicating a substantial change in writing skills over time. The interaction effect between time and group was also significant (*F* = 159.22, *p*< 0.001), suggesting different patterns of change in writing skills between the groups. The between-subjects effect was significant as well (*F* = 72.31, *p*< 0.001), reflecting significant differences in writing skills between the groups. For the EG with 90 participants, the pre-test mean was 4.006 (*SD* = 1.472) and the post-test mean notably increased to 6.622 (*SD* = 1.494), showing considerable improvement in writing skills. Therefore, the null hypothesis (HO_4), which posits no significant difference in writing skills between CG and EG before the TBLT treatment, is accepted.

Figure4.7: Graphical representation of mean level performance of CG and EG after pre-test and post-test



From the above, it is seen that no notable differences were found in the mean scores between CG and EG at the pre-test level. But the mean score of EG has significantly improved after TBLT treatment.

Since, CG and EG were not equated at the initial stage of their treatment. So, it cannot be concluded confidently that the significant difference between CG results and EG results is only due to the TBLT treatment given to EG. However, there exist a

significant difference between the results of the group at the post-test level and there exists no significant difference between CG results and EG results at the pre-test level. Hence, the test results have to undergo ANCOVA analysis to adjust or co-relate the pre-test scores of CG and EG with their post-test scores in order to draw meaningful conclusions.

Table 4.15: (Part 4A,4B and 4C) - ANCOVA summary showing the effect of TBLT over TTM for the development of writing skills in English with regard to co-variation of post-test scores with pre-test scores

Part-4A: Adjusted means of post-test and pre-test scores of both CG and EG						
Level of Adjustment	Adjusted means of CG (total of pre-test and post-test)	Adjusted means of EG (total of pre-test and post-test)	Adjusted means of CG and EG (pre-test and post-test)	Co-relation*(r)* within samples CG vs EG	Co-relation *(r²)* within samples CG vs. EG	
Pre-Test scores adjusted with post-test scores	3.940	5.314	4.631	0.126	0.016	
Part-4B: ANOVA results after adjustment of pre-test scores with post-test scores						
Dependent variable	Source of variations	*SS*	*df*	*MS*	*F*	*P*
Writing skills	Adjusted means (between groups)	331.199	1	331.199	116.607	<0.05
	Adjusted error (Within group)	502.733	177	2.840		
	Adjusted total	1338.929	178			
Part–4C: ANCOVA test for homogeneity of regressions based on above ANOVA results						
Dependent variable	Source of variations	*SSy.x*	*df*	*MSSy.x*	*Fy.x*	*P*
Writing skills	Adjusted means (between groups)	316.396	1	158.198	53.799	<0.05
	Adjusted Error (within group)	517.536	176	2.941		
	Adjusted total	833.932	178			

In **Table 4.15 (Part 4A),** the adjusted means of pre-test and post-test scores for both CG and EG were analysed. Adjusted means of (CG = *3.940*) and (EG = *5.314*), and the adjusted means of CG and EG combined scores are (*4.631*). The correlation (*r*) within the samples for CG versus EG is (*0.126*). The aggregate correlation (r^2) within samples of CG versus EG is (*0.016*).

Table 4.15 (Part 4B) displays the ANOVA results after the adjustment of the pre-test scores with the post-test scores. Sum of squares is *(SS = 331.199)* for adjusted means between the groups, and for the adjusted errors within the group is *(SS = 502.733).* The *F-value* is (*116.607*), and the corresponding significance is less than (*0.05)* level of confidence at (*df = 1/177)*. This establishes that the adjusted mean scores of CG and EG differ significantly, and the TBLT had a substantial and significant impact on improving writing skills.

ANCOVA test for homogeneity of regression is performed based on the ANOVA result. The test is conducted with writing skills' post-test scores as the dependent variable and pre-test scores as the covariate and group as a categorical factor. In **Table 4.15 (Part 4C)**, the computed *Fy.x* value is (*53.799*), and the corresponding significance is less than (*0.05)* level of confidence at (*df = 2/176)*. Following the application of a covariance procedure, which involved the adjustment of post-test scores for both the groups based on their pre-test scores establishes a notable and statistically significant difference between the scores of CG and EG.

The results clearly depicted the effectiveness of TBLT intervention program on the development of writing skills among the students of class VIII. Hence, it is concluded there is a significant impact of TBLT for the development of writing skills. So, it is concluded that the null hypothesis $HO_4$is rejected based on this analysis.

4.3.5 Data analysis and interpretation of Objective 6

The sixth objective is to study the effectiveness of the TBLT module for developing overall language skills in English among Class VIII students.

For the present objective, necessary data has been collected through ELST. The data has been analysed and presented it in the following tables and graphs:

Table 4.16: Frequency and percentage of the overall language skills development of the Class VIII students based on range of scores

Levels	Group							
	CG *(n=89)*				EG *(n=90)*			
	Pre-Test		Post-Test		Pre-Test		Post-Test	
	F	*%*	*f*	*%*	*f*	*%*	*f*	*%*
Excellent	0	0.00	0	0.00	0	0.00	0	0.00
Very Good	0	0.00	0	0.00	0	0.00	1	1.11
Good	0	0.00	0	0.00	0	0.00	7	7.78
Above Average	1	1.12	1	1.12	1	1.11	39	43.33
Average	3	3.37	5	5.62	7	7.78	24	26.67
Below Average	12	13.48	12	13.48	3	3.33	6	6.67
Poor	73	82.02	71	79.78	79	87.78	13	14.44
Total	89	100	89	100	90	100	90	100

- The frequency table (**Table 4.16**) that the overall language skills did not improve for CG at post-test level.
- The table indicates improvement in EG students at post-test after the implementation TBLT.
- At the post-test level, the majority scores were found as ‘Average’ and ‘Above Average’ level and few converted to ‘Good’ and ‘Excellent’ level.

The above results highlight the substantial impact of the TBLT intervention on enhancing the overall language skills of EG students. To comprehensively assess this impact, the researcher conducted various statistical methods, as elaborated in the subsequent sections below.

4.3.5.1 Hypothesis related to Objective 6

The researcher formulated the hypothesis based on second objective and carried forward the analysis in the following manner:

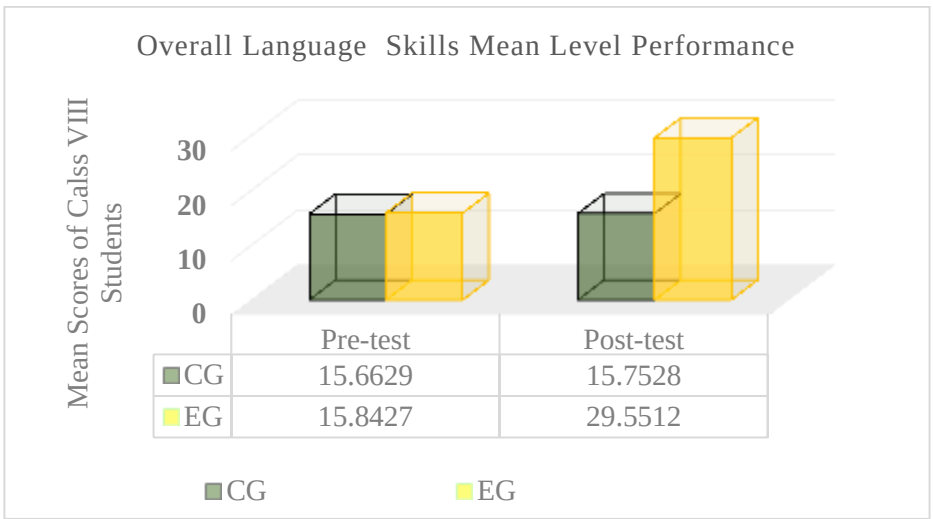
HO_5: There is no significant difference between the mean pre-test and post-test scores of the control group and EG in developing their overall language skills in English**.**

Table 4.17: Repeated Measures ANOVA results for overall language skills

Group	*n*	Pre-test		Post-test		Within-Subjects		Interaction Effect		Between-Subjects Effect	
		m	*SD*	*M*	*SD*	*F*	*p*	*F*	*p*	*F*	*P*
CG	89	15.66	5.429	15.75	6.252	184.08	<0.001	179.311	<0.001	135.18	<0.001
EG	90	15.84	5.498	29.6	3.51						

Table 4.17 presents the Repeated Measures ANOVA results for overall language skills, comparing the CG and EG. For the CG with 89 participants, the pre-test mean was 15.66 (*SD* = 5.429) and the post-test mean was 15.75 (*SD* = 6.252). The within-subjects effect was significant (*F* = 184.08, *p*< 0.001), indicating a notable change in overall language skills over time. The interaction effect between time and group was also significant (*F* = 179.311, *p*< 0.001), suggesting different patterns of change in overall language skills between the groups. The between-subjects effect was significant (*F* = 135.18, *p*< 0.001), highlighting significant differences in overall language skills between CG and EG. For the EG with 90 participants, the pre-test mean was 15.84 (SD = 5.498) and the post-test mean increased substantially to 29.6 (*SD* = 3.51), demonstrating a considerable improvement in overall language skills. These results imply that the null hypothesis (HO_5), which depicts no significant difference in overall language skills between groups before the treatment, is supported.

Figure4.8: Graphical representation for mean level performance of CG and EG after pre-test and post-test



From the above, it is seen that no notable differences were found in the mean scores between CG and EG at the pre-test level. But the mean score of EG has significantly improved after TBLT treatment.

Since CG and EG were not equated at the initial stage of their treatment, so, it cannot be concluded confidently that the significant difference between CG results and EG results is only due to the TBLT treatment given to EG. However, there does exist significant difference between results of the groups at the post-test level and there exists no significant difference between CG results and EG results at the pre-test level. Hence, the test results have to undergo ANCOVA analysis to adjust or co-relate the pre-test scores of CG and EG with their post-test scores in order to draw meaningful conclusions.

Table 4.18: (Part 4A,4B and 4C) ANCOVA summary showing the effect of TBLT over TTM for the development of overall language skills in English with regard to co-variation of post-test scores with pre-test scores

<table>
<tr><td colspan="7">Part-4A: Adjusted means of post-test and pre-test scores of both CG and EG</td></tr>
<tr><td>Level of adjustment</td><td>Adjusted means of CG (total ofpre-test and post-test)</td><td>Adjusted means of EG (total ofpre-test and post-test)</td><td>Adjusted means of CG and EG (pre-test and post-test)</td><td>Co-relation (r) within samples CG vs EG</td><td colspan="2">Co-relation (r²) within samples CG vs. EG</td></tr>
<tr><td>Pre-test scores adjusted with post-Test scores</td><td>15.708</td><td>22.703</td><td>19.225</td><td>0.113</td><td colspan="2">0.013</td></tr>
<tr><td colspan="7">Part – 4B: ANOVA results after adjustment of pre-test scores with post-test scores</td></tr>
<tr><td>Dependent variable</td><td>Source of variations</td><td>SS</td><td>df</td><td>MS</td><td>F</td><td>p</td></tr>
<tr><td rowspan="3">Overall language skills</td><td>Adjusted means (Between groups)</td><td>8518.455</td><td>1</td><td>8518.455</td><td rowspan="3">332.293</td><td rowspan="3"><0.05</td></tr>
<tr><td>Adjusted Error (Within group)</td><td>4537.462</td><td>177</td><td>25.635</td></tr>
<tr><td>Adjusted Total</td><td>13055.917</td><td>178</td><td></td></tr>
<tr><td colspan="7">Part-4C: ANCOVA test for homogeneity of regressions based on above ANOVA results</td></tr>
</table>

Dependent variable	Source of variations	*SSy.x*	*df*	*MSSy.x*	*Fy.x*	*p*
Overall language skills	Adjusted means (Between groups)	7577.463	2	3788.731	121.716	<0.05
	Adjusted Error (Within group)	4409.282	176	31.138		
	Adjusted Total	13055.917	178			

In **Table 4.18** (**Part 4A**), the adjusted means of pre-test and post-test scores for both CG and EG were analysed. Adjusted means of (*CG=15.708*) and (*EG=22.703*), and the adjusted means of CG and EG combined scores are (*19.225*). The correlation (*r*) within the samples for CG versus EG is (*0.113*). The aggregate correlation (r^2) within samples of CG versus EG is (*0.013*).

Table 4.18 (**Part 4B**) displays the ANOVA results after the adjustment of the pre-test scores with the post-test scores. Sum of squares is (*SS=8518.455*) for adjusted means between the groups, and for the adjusted errors within the group is (*SS=4537.462*). The *F-value* is (*332.293*), and the corresponding significance is less than (*0.05)* level of confidence at (*df = 1/177)*. This establishes that the adjusted mean scores of CG and EG differ significantly, and the TBLT had a substantial and significant impact on improving overall language skills.

ANCOVA test for homogeneity of regression that is performed based on the ANOVA result. The test is conducted with overall language skills' post-test scores as the dependent variable and pre-test scores as the covariate and group as a categorical factor. In **Table 4.18 (Part 4C)**, the computed *Fy.x* value is (*121.716*), and the corresponding significance is less than (*0.05)* level of confidence at (*df = 2/176)*. Following the application of a covariance procedure, which involved the adjustment of post-test scores for both CG and EG based on their pre-test scores establishes a notable and statistically significant difference between the scores of CG and EG.

The results clearly depicted the effectiveness of TBLT intervention programme on the development of overall language skills among the students of class VIII. So, it is concluded that the null hypothesis $HO_5$is rejected based on this analysis.

4.3.6 Data analysis and interpretation of Objective 7

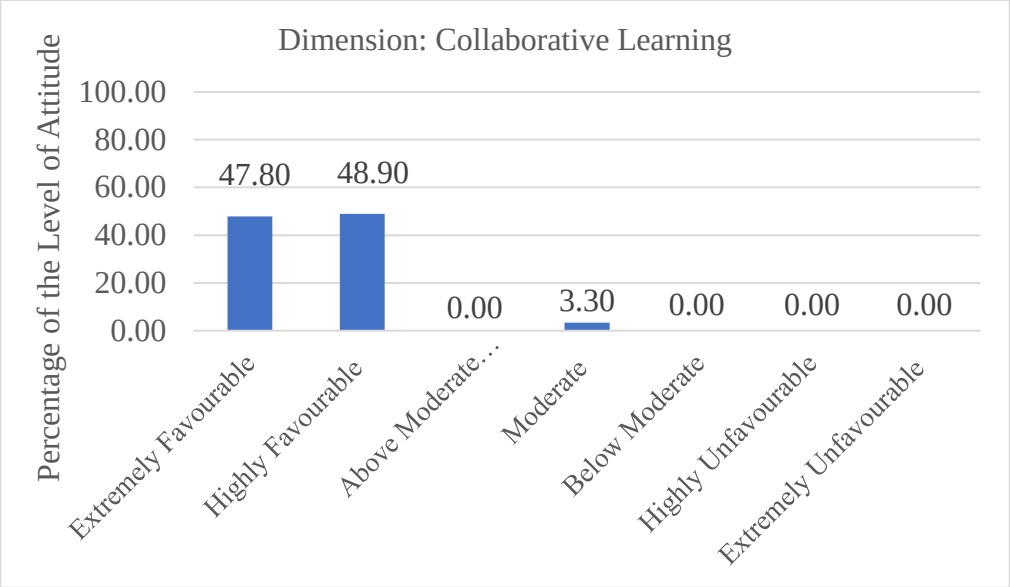
The objective is to assess the attitude of the students towards TBLT. For the present objective, necessary data has been collected with the help of a self-developed Student TBLT Attitude Scale. The data has been analysed with the following statistical techniques for *(n=90)* EG students.

As explained in the methodology chapter, the statements of the attitude scale are further categorized into six dimensions. The data collected is analysed for each individual dimension and the percentage frequency of the marks obtained against each dimension is compared with the decided norm or level of attitude. **Table 4.19** shows the details of dimensions of the attitude scale versus percentage of scores against each norm.

Table 4.19: Dimensions of the Student TBLT Attitude Scale versus percentage of scores against each norm

Dimension of the Attitude Scale	Extremely Favourable	Highly Favourable	Above Moderate Favourable	Moderate	Below Moderate	Highly Unfavourable	Extremely Unfavourable
Collaborative learning	47.80%	48.90%	0.00%	3.30%	0.00%	0.00%	0.00%
Teacher's role	8.90%	36.60%	12.30%	42.20%	0.00%	0.00%	0.00%
Motivation	92.22%	0.00%	7.78%	0.00%	0.00%	0.00%	0.00%
Practical relevance	48.88%	37.78%	10.00%	3.34%	0.00%	0.00%	0.00%
Satisfaction	41.11%	45.56%	13.33%	0.00%	0.00%	0.00%	0.00%
Relevance to assessment method	34.44%	45.46%	13.34%	4.55%	2.21%	0.00%	0.00%

Figure 4.9: Graphical representation of collaborative learning



In **Figure 4.9**, it is evident that a significant proportion of students express attitudes categorized as 'Highly Favourable' (48.90%) and 'Extremely Favourable' (47.80%), while a small percentage (3.30%) express 'Moderate' attitude. This indicates that students hold a positive attitude towards collaborative learning in TBLT.

Figure 4.10: Graphical representation of teacher's role

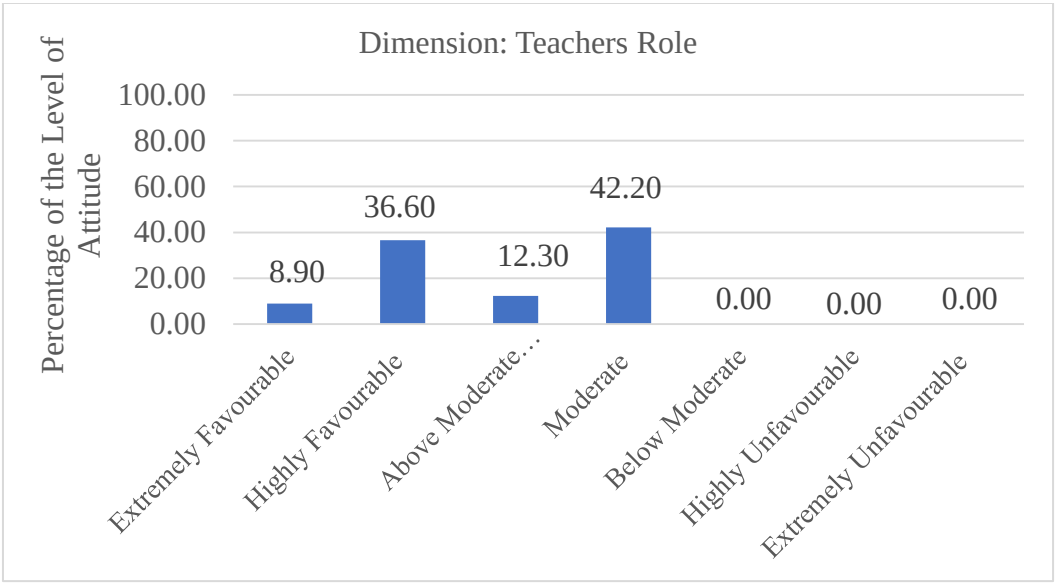
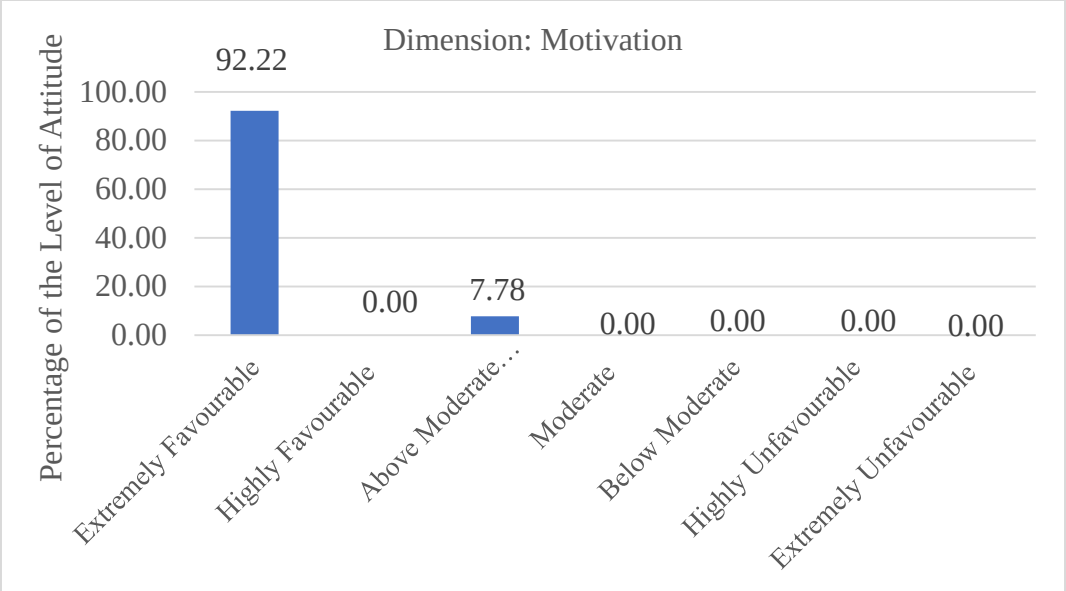


Figure 4.10 represents 'Highly Favourable' (36.6%), 'Extremely Favorable' (8.9%), 'Above Moderate' (12.30%) and 'Moderate' (42.20%). This suggests a favourable attitude among students regarding the role of teachers in the context of TBLT.

Figure 4.11: Graphical representation of motivation



In **Figure 4.11**, it is evident that 92.22% of students have an 'Extremely Favourable' attitude towards TBLT, while 7.78% are classified as 'Above Moderate'. This observation strongly indicates a positive overall attitude regarding TBLT in terms of motivation.

Figure 4.12: Graphical representation of practical relevance

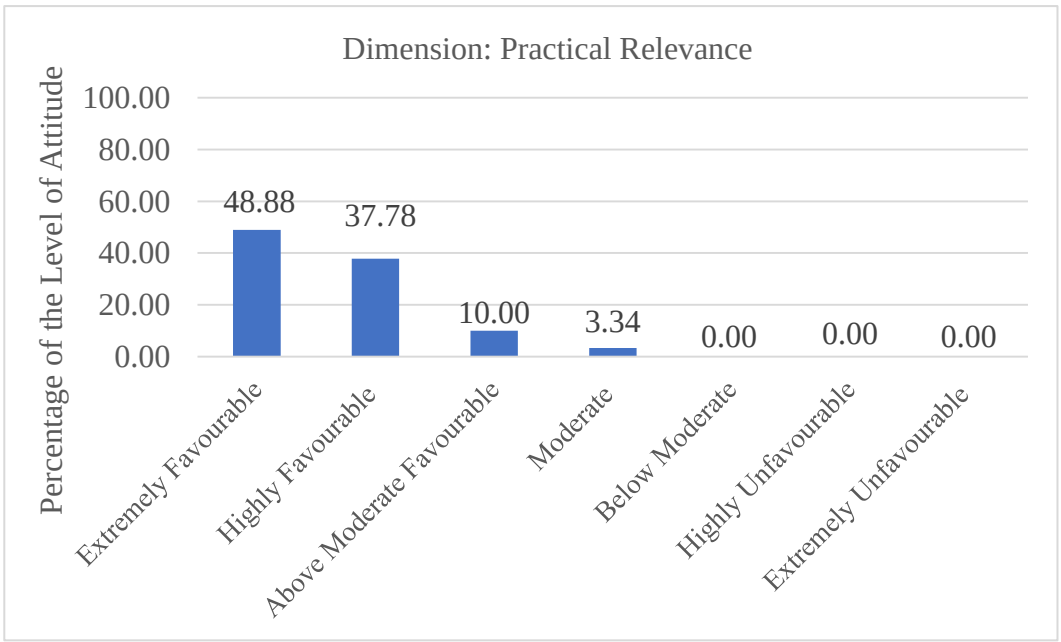


Figure 4.12 illustrates students' attitudes towards the 'practical relevance' of the task-based approach. A positive trend is evident, with a substantial proportion of students expressing attitudes categorized as 'Extremely Favourable' (48.88%), 'Highly

Favourable’ (37.78%), and 'Above Moderate' (10.00%), with a smaller percentage (3.34%) categorized as ‘Moderate’. This indicates their favourable attitude towards the dimension of ‘practical relevance’ in the context of TBLT.1

Figure 4.13: Graphical representation of satisfaction

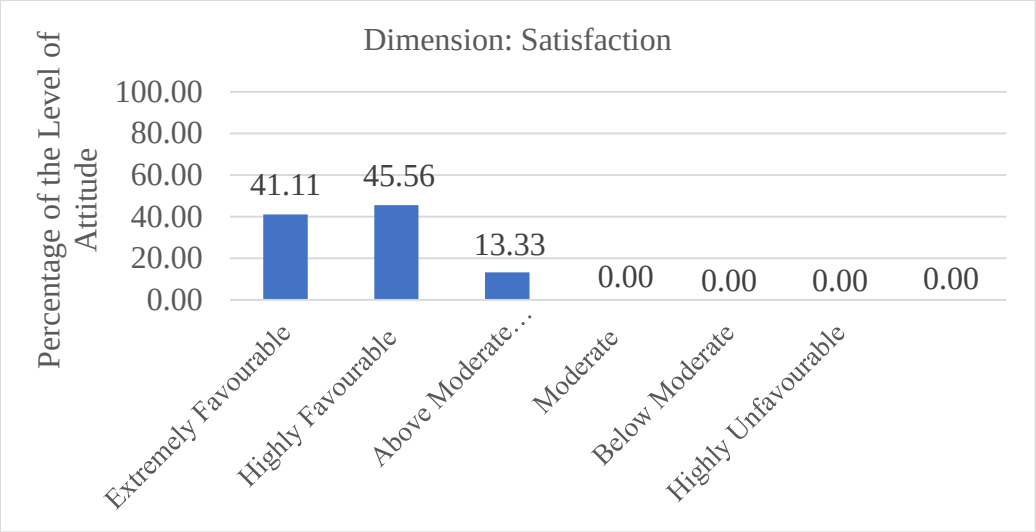


Figure 4.13 demonstrates that students’ attitudes towards satisfaction with TBLT are predominantly positive, with 41.11% of students rating it as ‘Extremely Favourable’, 45.56% as ‘Highly Favourable’, and 13.33% as ‘Above Moderate’ attitude. This indicates an overall positive attitude regarding satisfaction levels among students regarding TBLT.

Figure 4.14: Graphical representation of relevance to assessment method

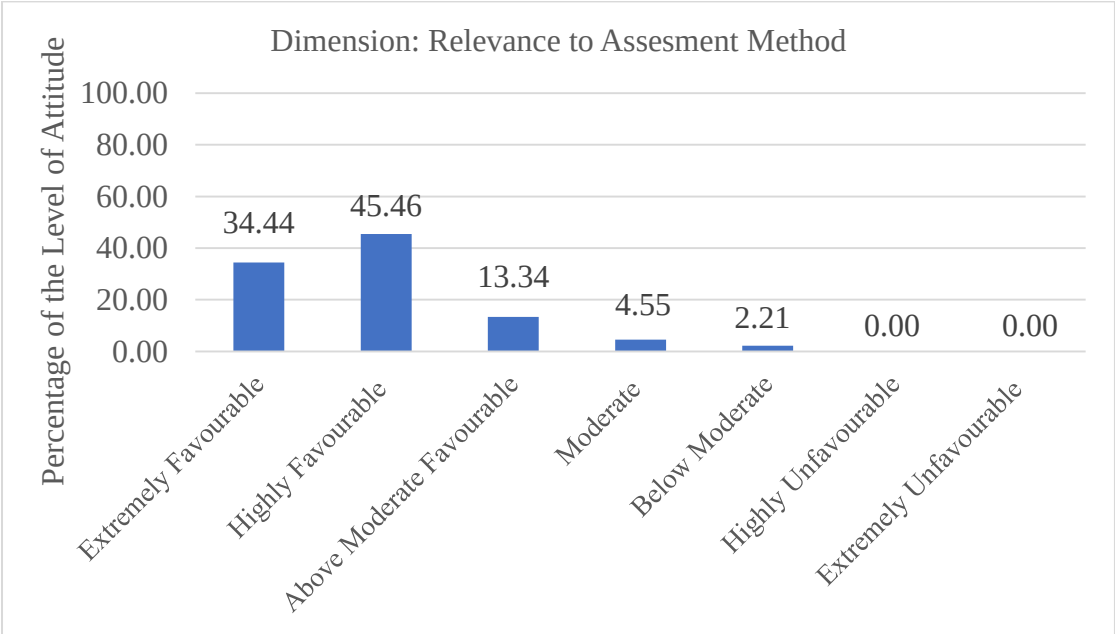


Figure 4.14 reveals student attitudes towards the relevance of TBLT to assessment methods. A positive attitude is evident, with attitudes classified as ‘Extremely Favourable’ (34.44%), ‘Highly Favourable’ (45.46%), ‘Above Moderate’ (13.34%), and ‘Moderate’ (4.55%).

Figure 4.15: Graphical representation of overall attitude

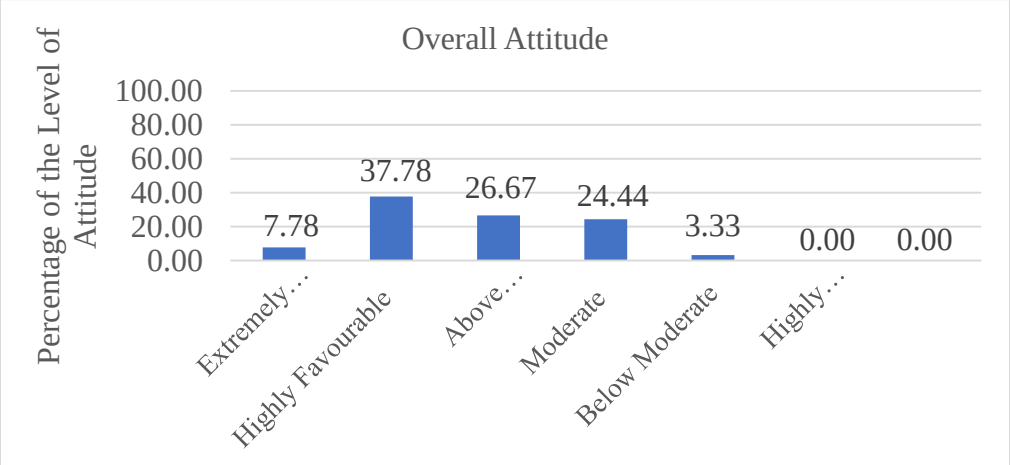


Figure 4.15 provides an overview of the overall attitude of the students. It is observed that (26.67%) of students exhibit an ‘Above Moderate’ attitude, (37.78%) are ‘Highly Favourable’, (7.78%) are ‘Extremely Favorable’, and (24.44%) have ‘Moderate Attitudes’. Therefore, it can be concluded that the majority of students prefer learning through the task-based approach over the traditional method. In summary, these results suggest that the attitudes of EG are positive towards TBLT.

In the present chapter, the author has provided a comprehensive and extensive discussion on the obtained results derived from the implementation of various statistical methods. The data is effectively presented in both graphical and tabulated forms. By analyzing the data in accordance with the defined objectives and hypotheses, the researcher facilitated the attainment of specific outcomes. The results are discussed in a detailed manner in the subsequent chapter.