CHAPTER IV

DATA ANALYSIS AND INTERPRETATION

4.0.0 INTRODUCTION

Analysis of the data is as important as any other component of the research process says Gay (1976). This chapter deals with analysis of the data. Data interpretations are also made to account for the results. In this study the researcher tried to inculcate certain values while teaching science among students of standard IX through experiential learning. The data for the present study were obtained with the help of various tools such as, achievement test in Science, value perception test, value knowledge test and reaction scale. The collected data were statistically analyzed as per the objective of the study. In the present study, data analysis is done quantitatively with the help of statistics like, Mean, Standard deviation, Standard errors of Mean, Mann-Whitney U-test and the Intensity Index.

To achieve objective 1 of the present study i.e "To develop an intervention programme through value integrated experiential learning approach for teaching of science to standard IX students for the inculcation of values like: Learning to live together, Team work , Loyalty to duty , Tolerance, Flexibility, Curiosity, Environmental ethics, Compassion, Gratitude, Quest for knowledge, Discrimination, ,Honesty, Spirit of inquiry, Co-operation, Equality, Simplicity, Determination, Common goal, Dignity of labour, Discipline", an intervention programme called Value integrated Experiential Learning (ViEL) was developed by the researcher, the details of which is described in chapter III. Similarly, to achieve objective 2 of the present study i.e "To implement the developed intervention programme for teaching of science through Integrated experiential learning approach for the inculcation of the taken values", the developed ViEL was implemented during term 1 of the academic session 2015-16 on the sample students, details of which is also described in chapter III. To achieve objective 3 and objective 4 i.e. "to study the effectiveness of the intervention programme on integrated experiential learning approach for value inculcation in teaching science in terms of value conceptual knowledge, value perception and value practice of the taken values along with the achievement in science" and "to study the effectiveness of the intervention programme on integrated

experiential learning approach for value inculcation in teaching science in terms of the reaction of students", collected data have been analyzed in the present chapter as follow.

4.1.0 DATA ANALYSIS AND INTERPRETATION

In order to achieve objective 3 and 4 of the present study and to test 43 null hypotheses, data analysis and interpretation is done as follow.

4.2.0 EFFECTIVENESS OF THE INTERVENTION PROGRAMME IN TERMS OF VALUE CONCEPTUAL KNOWLEDGE

In order to achieve a part of objective 3 of the present study and to test the null hypothesis number $H_0$01 to $H_0$21, data analysis and interpretation is presented as follow through tables 4.1 to 4.42.

4.2.1 Effectiveness of the ViEL in terms of Value Conceptual Knowledge of the Value 'Learning to live together'.

To study the effectiveness of the ViEL in terms of the value conceptual knowledge of the value 'learning to live together' and to test the hypotheses $H_0$1, the summary of the analyzed data is presented in tables 4.1 and 4.2 along with the interpretation and discussion.

Table 4.1: Mean, Standard Deviation (S.D), and Standard Error of Mean(SEM) wise distribution of value conceptual knowledge score of standard IX CBSE students in the value 'Learning to live together'.

Groups	N	Mean	S.D	SEM
Experimental	37	2.57	2.15	0.35
Control	37	1.92	1.71	0.28

From the table 4.1 it was observed that the mean value conceptual knowledge of the value 'learning to live together' of the experimental group and control group were 2.57 and 1.92 respectively out of the total score of 5 marks. The standard deviation from the mean scores of value conceptual knowledge for the value in students were found to be 2.15 and 1.71 respectively for the experimental group and control group with standard error of means 0f 0.35 and 0.28 for the respective groups. Observing the

mean value conceptual knowledge for the value, it was found that the experimental group progressively scored more than 50% marks in the value conceptual knowledge in value 'learning to live together'. From the standard deviation and standard Error of means of both the groups, it was also observed that the students of experimental group were more heterogeneous in terms of their value conceptual knowledge in the value 'learning to live together' in comparison to their counterpart.

To find whether the difference in the mean value conceptual knowledge scores of the value 'learning to live together' the control group and experimental group was significant or by chance and to test the null hypothesis $H_0$1 **"**There will be no significant difference between mean post- test value conceptual knowledge scores of the learners taught through the value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'learning to live together", Mann- Whitney U- test was used. The summary of the Mann- Whitney U- test is given in the table 4.2 followed by analysis.

Table 4.2: Summary of Mann- Whitney U- test for value conceptual knowledge of the value 'Learning to live together' of Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1495	577.00	-1.16	0.1230
Control	37	1280			

From the table 4.2, it was observed that the sum of ranks of the experimental and control groups for the value conceptual knowledge of the value 'learning to live together' were 1495 and 1280 respectively. The value of U and z were found to be 577.00 and -1.16 respectively. Referring table for normal probability (Table A of the Siegel,1956) under the null hypothesis(H_0)of z, for z $\leq$ -1.16 ,the two tailed probability was found to be 0.1230 which is more than our decided significance level(**α)** i.e α =0.05. Hence, the null hypothesis $H_0$1 was retained. Therefore, it can be concluded that the value conceptual knowledge of experimental group and control group students in terms of their value conceptual knowledge in the value 'learning to live together' was not affected by value integrated experiential learning approach used in teaching standard IX Science.

4.2.2 Effectiveness of Value Conceptual Knowledge of Experimental and Control Group for the Value 'Team work'.

To study the effectiveness of the ViEL in terms of the value conceptual knowledge of the value 'team work' and to test the hypothesis $H_0$2, the summary of the analyzed data is presented in tables 4.3 and 4.4 along with the interpretation and discussion.

Table 4.3: Mean, S.D and S.E.M wise distribution of value conceptual knowledge score of standard IX CBSE students in the value 'Team Work'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	2.32	2.04	0.34
Control	37	2.43	1.76	0.29

From the table 4.3, it was observed that the mean value conceptual knowledge of the value 'team work' of the experimental group and control group were 2.32 and 2.43 respectively out of the total 5 marks. The standard deviation from the mean scores of value conceptual knowledge for the value 'team work' in students were found to be 2.04 and 1.76 respectively for the experimental group and control group with standard error of mean was 0.34 and 0.29 for the respective groups. Observing the mean value conceptual knowledge for the value 'team work' it was found that the experimental group and control group did scored well more than 45% marks in the value conceptual knowledge in value 'team work'. Further, it was also found that the mean value conceptual knowledge in value 'team work' of the experimental group and control group is equally scattered. From the standard deviation and standard error of means of both the groups, it was also observed that the students of experimental group were more heterogeneous in terms of their value conceptual knowledge in the value 'team work' in comparison to their counterpart.

To find whether the difference in the mean value conceptual knowledge scores of the value 'team work' the control group and experimental group was significant or by chance and to test the null hypothesis $H_0$2 **"**There will be no significant difference between mean post- test value knowledge scores of the learners taught through the Value integrated Experiential Learning approach and learners taught through the traditional teaching approach in the value of 'team work*"* Mann- Whitney U- test was used as the sample was taken purposively. The summary of the Mann- Whitney U-test is given in the table 4.4 followed by analysis.

Table 4.4: Summary of Mann- Whitney U- test for value conceptual knowledge of the value 'Team Work' of Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1386	686.00	0.02	0.4920
Control	37	1389			

From the table 4.4 it was observed that the sum of ranks of the experimental and control groups for the value conceptual knowledge of the value 'team work' were 1386 and 1389 respectively. The value of U and z were found to be 686.00 and 0.02 respectively. Referring table for normal probability under the null hypothesis(H_0)of z, for z $\leq$0.02 ,the two tailed probability was found to be 0.4920 which is more than our decided significance level(α**)** i.e α =0.05. Hence the null hypothesis $H_0$23 was retained. Therefore, it can be conclude that the value conceptual knowledge of experimental group and control group students in terms of their value conceptual knowledge in the value 'team work' was not affected by ViEL approach used in teaching standard IX Science.

4.2.3 Effectiveness of Value Conceptual Knowledge of Experimental and Control Group for the Value 'Loyalty to Duty'.

To study the effectiveness of the ViEL in terms of the value conceptual knowledge of the value 'loyalty to duty' and to test the hypothesis $H_0$3, the summary of the analyzed data is presented in tables 4.5 and 4.6 along with the interpretation and discussion.

Table 4.5: Mean, SD And SEM Wise Distribution of Value Conceptual Knowledge Score of Standard IX CBSE Students in the Value 'Loyalty To Duty'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	2.19	1.90	0.31
Control	37	2.22	2.00	0.33

From the table 4.5 it was observed that the mean value conceptual knowledge of the value 'loyalty to duty' of the experimental group and control group were 2.19 and 2.22 respectively. The standard deviation from the mean scores of value conceptual knowledge for the value in students was found to be 1.90 and 2.00 respectively for the

experimental group and control group. The standard error of mean was 0.31 and 0.33 for the respective groups. On comparing mean value conceptual knowledge scores, it is observed that both experimental group and control group mean is very close to each other .From the standard deviation data it is clear that the experimental group is more heterogeneous than the control group. The lower mean scores of experimental group in value knowledge score of the value *loyalty to duty* is presumably due to the ViEL treatment given to the experimental group.

To find whether the difference in the mean value conceptual knowledge scores of the value 'loyalty to duty' the control group and experimental group was significant or by chance and to test the null hypothesis $H_0$3 **"**There will be no significant difference between mean post- test value conceptual knowledge of the learners taught through the value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'loyalty to duty" Mann- Whitney U- test was used as the sample was taken purposively. The summary of the Mann- Whitney U- test is given in the table 4.6 followed by analysis.

Table 4.6: Summary of Mann- Whitney U- test for value conceptual knowledge of the value 'Loyalty to Duty' of Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1387	685.00	0.01	0.4960
Control	37	1388			

From Table 4.6, it is observed that the sum of ranks for the value conceptual knowledge for the value 'loyalty to duty' for experimental and control group were 1387 and 1388 respectively. The value of U and z were calculated to be 685 and 0.01. As per the table for normal probability for the null hypothesis, the value of z is found to be 0.01 and the two tailed probability was found to be 0.4960 which is more than our decided value i.e α =0.05.Hence the null hypothesis $H_0$3 was retained. It is clear that experimental and control group students do not differ significantly in terms of value conceptual knowledge for the said value. Therefore, it can be conclude that the value conceptual knowledge of experimental group students was similar to the control group students and ViEL is having no effect on experimental group for the inculcation of value 'loyalty to duty' used in teaching standard IX Science.

4.2.4 Effectiveness of Value Conceptual Knowledge of Experimental and Control Group for the Value 'Tolerance'.

To study the effectiveness of the ViEL in terms of the value conceptual knowledge of the value 'tolerance' and to test the hypothesis $H_0$4, the summary of the analyzed data is presented in tables 4.7 and 4.8 along with the interpretation .

Table 4.7: Mean, SD and SEM Wise Distribution of Value conceptual Knowledge of Standard IX CBSE Students in the Value 'Tolerance'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	2.43	1.81	0.30
Control	37	1.65	1.56	0.26

From Table 4.7, it was observed that the mean value conceptual knowledge of the value 'tolerance' of the experimental group and control group were 2.43 and 1.65 respectively out of 5 marks. The standard deviation from the mean scores of value conceptual knowledge for the value in students were found to be 1.81 and 1.56 respectively for the experimental group and control group students with standard error of means of 0.30 and 0.26 for the respective groups. Observing the mean value conceptual knowledge scores in 'tolerance' it was found that both the experimental progressively scored more than 48% marks in the value conceptual knowledge in the value 'tolerance'. From the standard deviations and standard error of means of both the groups, it was also observed that the students of experimental group and control group were equally scattered around their mean in terms of their value conceptual knowledge in 'tolerance'.

To find whether the difference in the mean value conceptual knowledge of the value 'tolerance' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$4, **"**There will be no significant difference between mean post- test value conceptual knowledge of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'tolerance", Mann- Whitney U- test was used which is given in the table 4.8 followed by analysis.

Table 4.8: Summary of Mann- Whitney U- test for value conceptual knowledge of the value 'Tolerance'. Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1554	518.00	-1.80	0.0359
Control	37	1221			

From the table 4.8 it was observed that the sum of ranks of the experimental and control groups for the value conceptual knowledge of the value 'Tolerance' were 1554and 1221 respectively with 37 students in both the groups. The value of U and z were found to be 518.00 and -1.80 respectively. Referring table for normal probability under null hypothesis (H_0) of z, for $z \leq -1.80$ and the two tailed probability was found to be 0.0359 which is less than our decided significance level (α) i.e $\alpha = 0.05$. Hence the null hypothesis $H_0$4, is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their Value conceptual knowledge in the value 'tolerance'. Further referring table 4.7 it was found that the mean scores of experimental group in value conceptual knowledge in the value was quite higher than that of the control group, which may be due to good understanding about the value. Therefore it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value conceptual knowledge of students in the value 'tolerance'.

4.2.5 Effectiveness of Value Conceptual Knowledge of Experimental and Control Group for the Value 'Flexibility'.

To study the effectiveness of the ViEL in terms of the value conceptual knowledge of the value 'flexibility' and to test the hypotheses $H_0$5, the summary of the analyzed data is presented in tables 4.9 and 4.10 along with the interpretation and discussion.

Table 4.9: Mean, S.D and S.E.M Wise Distribution of Value conceptual Knowledge of Standard IX CBSE Students in the Value 'Flexibility'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	1.76	1.71	0.28
Control	37	1.27	1.57	0.26

From Table 4.9, it was observed that the mean value conceptual knowledge of the value 'flexibility' of the experimental group and control group were 1.76 and 1.27 respectively out of 5 marks. The standard deviation from the mean scores of value conceptual knowledge for the value in students was found to be 1.71 and 1.57 respectively for the experimental group and control group students with standard error of means of 0.28 and 0.26 for the respective groups. Observing the mean value conceptual knowledge scores in 'flexibility' it was found that the experimental group did well scoring more than 35% marks in the value conceptual knowledge in the value than control group. From the standard deviations and standard error of means of both the groups, it was also observed that the students of experimental group and control group were equally spreaded in terms of their value conceptual knowledge in 'flexibility''.

To find whether the difference in the mean value conceptual knowledge of the value 'flexibility 'of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$5, **"**There will be no significant difference between mean post- test value conceptual knowledge of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'flexibility" Mann- Whitney U- test was used which is given in the table 4.10 followed by analysis.

Table 4.10: Summary of Mann- Whitney U- test for value conceptual knowledge of the value 'Flexibility' Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	**N**	**Sum of Ranks**	**U-Value**	**z-Value**	**Probability (p)**
Experimental	37	1501	571.50	-1.22	0.1112
Control	37	1275			

From Table 4.10, it was observed that the sum of ranks of the experimental and control groups for the value conceptual knowledge of the value 'flexibility' were 1501 and 1275 respectively with 37 students in both the groups. The value of U and z were found to be 571.50 and -1.22 respectively. Referring table for normal probability under null hypothesis (H_0) of z, for $z \leq -1.22$ and the two tailed probability was found to be 0.1112 which is more than our decided significance level(α**)** i.e $\alpha = 0.05$.Hence the null hypothesis $H_0$5, is retained and it can be said that the experimental group and

control group students do not differ significantly in the terms of their value conceptual knowledge in the said value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was not found to significantly effective in terms of enhancing value conceptual knowledge of students in the value 'flexibility'.

4.2.6 Effectiveness of Value Conceptual Knowledge of Experimental and Control Group for the Value 'Curiosity'.

To study the effectiveness of the ViEL in terms of the value conceptual knowledge of the value 'curiosity' and to test the hypotheses $H_0$6, the summary of the analyzed data is presented in tables 4.11 and 4.12 along with the interpretation and discussion.

Table 4.11: Mean, S.D and S.E.M wise Distribution of Value Conceptual Knowledge Score of Standard IX CBSE Students in the Value 'Curiosity'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	3.59	1.73	0.28
Control	37	2.78	1.44	0.24

From Table 4.11, it was observed that the mean value conceptual knowledge of the value 'curiosity' of the experimental group and control group were 3.59 and 2.78 respectively out of 5 marks. The standard deviation from the mean scores of value conceptual knowledge for the value in students was found to be 1.73 and 1.44 respectively for the experimental group and control group students with standard error of means of 0.28 and 0.24 for the respective groups. Observing the mean value conceptual knowledge scores in 'curiosity', it was found that the experimental did well scoring more than 70% marks in the value knowledge in the value than control group. Further, it was also found that the mean value conceptual knowledge scores for the value 'curiosity' of the experimental group were higher than that of control group. From the standard deviations and standard error of means of both the groups, it was also observed that the students of experimental group and control group were equally spreaded in terms of their value conceptual knowledge in 'curiosity'.

To find whether the difference in the mean value perception scores of the value 'Curiosity' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$6, **"**There will be no significant difference between mean post- test value conceptual knowledge of the learners taught through value

integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'curiosity", Mann- Whitney U- test was used which is given in the table 4.12 followed by analysis.

Table 4.12: Summary of Mann- Whitney U- test for value conceptual knowledge of the value 'Curiosity'. Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1624	448.50	-2.55	0.0054
Control	37	1152			

From Table 4.12, it was observed that the sum of ranks of the experimental and control groups for the value conceptual knowledge of the value 'curiosity' were 1624 and 1152 respectively with 37 students in both the groups. The value of U and z were found to be 448.50 and -2.55 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -2.55$ and the two tailed probability was found to be 0.0054 which is less than our decided significance level(α) i.e $\alpha = 0.05$.Hence the null hypothesis $H_0$6, is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value conceptual knowledge in the value 'curiosity'. Further referring table 4.11 it was found that the mean scores of experimental group in value conceptual knowledge in the value 'curiosity' was quite higher than that of the control group, which may be due to good understanding about the value 'curiosity'. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found to stochastically effective in terms of enhancing value knowledge of students in the value 'curiosity'.

4.2.7 Effectiveness of Value Knowledge of Experimental and Control Group for the Value 'Environmental Ethics'.

To study the effectiveness of the ViEL in terms of the value conceptual knowledge of the value 'environmental ethics' and to test the hypotheses $H_0$7, the summary of the analyzed data is presented in tables 4.13 and 4.14 along with the interpretation and discussion.

Table 4.13: Mean, SD, And SEM Wise Distribution of Value conceptual Knowledge of Standard IX CBSE Students in the Value 'Environmental Ethics'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	3.38	1.85	0.30
Control	37	1.84	2.22	0.37

From Table 4.13, it was observed that the mean value conceptual knowledge of the value 'environmental ethics' of the experimental group and control group were 3.38 and 1.84 respectively out of 5 marks. The standard deviation from the mean scores of value conceptual knowledge for the value in students was found to be 1.85 and 2.22 respectively for the experimental group and control group students with standard error of means of 0.30 and 0.37 for the respective groups. Observing the mean value conceptual knowledge scores in the value, it was found that the experimental did well scoring more than 65% marks in the value conceptual knowledge in the value than control group. From the standard deviations and standard error of means, it was also observed that the students of experimental group are more homogeneous than control group in terms of their value conceptual knowledge in 'environmental ethics'.

To find whether the difference in the mean value conceptual knowledge of the value 'environmental ethics' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$7, **"**There will be no significant difference between mean post- test value conceptual knowledge of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'environmental ethics", Mann- Whitney U- test was used which is given in the table 4.14 followed by analysis.

Table 4.14: Summary of Mann- Whitney U- test for value conceptual knowledge of the value 'Environmental Ethics'. Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1631	441.00	-2.63	0.0043
Control	37	1144			

From Table 4.14, it was observed that the sum of ranks of the experimental and control groups for the value conceptual knowledge of the value 'environmental ethics' were 1631 and 1144 respectively with 37 students in both the groups. The value of U and z were found to be 441.00 and -2.63 respectively. Referring table for normal probability under null hypothesis (H_0)of z ,for $z \leq -2.63$ and the two tailed probability was found to be 0.0043 which is less than our decided significance level(α**)** i.e α =0.05. Hence the null hypothesis $H_0$7 is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value conceptual knowledge in the value 'environmental ethics'. Further, referring table 4.13 it was found that the mean scores of experimental group in value conceptual knowledge in the value 'environmental ethics' was quite higher than that of the control group, which may be due to good understanding about the value 'environmental ethics'. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value conceptual knowledge of students in the value 'environmental ethics'.

4.2.8 Effectiveness of Value conceptual Knowledge of Experimental and Control Group for the Value 'Compassion'.

To study the effectiveness of the ViEL in terms of the value conceptual knowledge of the value 'compassion' and to test the hypotheses $H_0$8, the summary of the analyzed data is presented in tables 4.15 and 4.16 along with the interpretation and discussion.

Table 4.15: Mean, SD, and SEM Wise Distribution of Value conceptual Knowledge of Standard IX CBSE Students in the Value 'Compassion'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	2.84	2.02	0.33
Control	37	0.92	1.42	0.23

From Table 4.15, it was observed that the mean value conceptual knowledge of the value 'compassion' of the experimental group and control group were 2.84 and 0.92 respectively out of 5 marks. The standard deviation from the mean scores of value conceptual knowledge for the value in students was found to be 2.02 and 1.42 respectively for the experimental group and control group students with standard error of means of 0.33 and 0.23 for the respective groups. Observing the mean value

conceptual knowledge in the value, it was found that the experimental did well scoring more than 55% marks in the value conceptual knowledge in the value 'compassion' than control group. Further, it was also found that the mean value conceptual knowledge for the value of the experimental group were higher than that of control group. From the standard deviations and standard error of means, it was also observed that both the students of experimental group and control group are equally spreaded in terms of their value conceptual knowledge in the value 'Compassion'.

To find whether the difference in the mean value conceptual knowledge of the value 'compassion' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$8, **"**There will be no significant difference between mean post- test value conceptual knowledge scores of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'compassion", Mann- Whitney U-test was used which is given in the table 4.16 followed by analysis.

Table 4.16: Summary of Mann- Whitney U- test for value conceptual knowledge of the value 'Compassion'. Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1722	350.00	-3.62	0.00016
Control	37	1053			

From Table 4.16, it was observed that the sum of ranks of the experimental and control groups for the value conceptual knowledge of the value 'compassion' were 1722 and 1053 respectively with 37 students in both the groups. The value of U and z were found to be 350.00 and -3.62 respectively. Referring table for normal probability under null hypothesis (H_0)of z ,for $z \leq -3.62$ and the two tailed probability was found to be 0.00016 which is less than our decided significance level(**α)** i.e $\alpha = 0.05$ Hence the null hypothesis $H_0$8, is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value knowledge in the value 'compassion'. Further referring table 4.15 it was found that the mean scores of experimental group in value conceptual knowledge in the value was quite higher than that of the control group, which may be due to good understanding about the value

'compassion'. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value conceptual knowledge of students in the value 'compassion'.

4.2.9 Effectiveness of Value Conceptual Knowledge of Experimental and Control Group for the Value 'Gratitude'.

To study the effectiveness of the ViEL in terms of the value conceptual knowledge of the value 'gratitude' and to test the hypotheses $H_0$9, the summary of the analyzed data is presented in tables 4.17 and 4.18 along with the interpretation and discussion.

Table 4.17: Mean, SD, and SEM Wise Distribution of Value conceptual Knowledge of Standard IX CBSE Students in the Value 'Gratitude'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	2.46	1.93	0.32
Control	37	1.41	1.72	0.28

From Table 4.17, it was observed that the mean value conceptual knowledge of the value 'gratitude' of the experimental group and control group were 2.46 and 1.41 respectively out of 5 marks. The standard deviation from the mean scores of value conceptual knowledge for the value in students was found to be 1.93 and 1.72 respectively for the experimental group and control group students with standard error of means of 0.32 and 0.28 for the respective groups. Observing the mean value conceptual knowledge in 'gratitude', it was found that the experimental did well scoring more than 45% marks in the value conceptual knowledge in the value than control group. Further it was also found that the mean value conceptual knowledge for the value of the experimental group were higher than that of control group. From the standard deviations and standard error of means, it was also observed that both the students of experimental group and control group are equally spreaded in terms of their value conceptual knowledge in 'gratitude'.

To find whether the difference in the mean value conceptual knowledge of the value 'gratitude' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$9, **"**There will be no significant difference between mean post- test value conceptual knowledge of the learners taught through value

integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'gratitude", Mann- Whitney U- test was used which is given in the table 4.18 followed by analysis.

Table 4.18: Summary of Mann- Whitney U- test for value conceptual knowledge of the value 'Gratitude'. Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1577	495.00	-2.05	0.0202
Control	37	1198			

From Table 4.18, it was observed that the sum of ranks of the experimental and control groups for the value conceptual knowledge of the value 'gratitude' were 1577 and 1198 respectively with 37 students in both the groups. The value of U and z were found to be 495.00 and -2.05 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -2.05$ and the two tailed probability was found to be 0.0202 which is less than our decided significance level(**α)** i.e **α =0.05.** Hence the null hypothesis $H_0$9, is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value knowledge in the value 'gratitude'. Further referring table 4.17 it was found that the mean scores of experimental group in value conceptual knowledge in the value was quite higher than that of the control group, which may be due to good understanding about the value 'gratitude'. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value conceptual knowledge of students in the value 'gratitude'.

4.2.10 Effectiveness of Value Conceptual Knowledge of Experimental and Control Group for the Value 'Quest for Knowledge'.

To study the effectiveness of the ViEL in terms of the value conceptual knowledge of the value 'quest for knowledge' and to test the hypotheses $H_0$10, the summary of the analyzed data is presented in tables 4.19 and 4.20 along with the interpretation and discussion.

Table 4.19: Mean, SD, and SEM Wise Distribution of Value conceptual Knowledge of Standard IX CBSE Students in the Value 'Quest for Knowledge'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	3.11	1.86	0.31
Control	37	1.35	1.92	0.32

From Table 4.19, it was observed that the mean value conceptual knowledge of the value 'quest for knowledge' of the experimental group and control group were 3.11 and 1.35 respectively out of 5 marks. The standard deviation from the mean scores of value conceptual knowledge for the value in students was found to be 1.86 and 1.92 respectively for the experimental group and control group students with standard error of means of 0.31 and 0.32 for the respective groups. Observing the mean value conceptual knowledge in 'quest for knowledge' it was found that the experimental did well scoring more than 60% marks in the value conceptual knowledge in the value than the control group. Further it was also found that the mean value conceptual knowledge for the value of the experimental group were higher than that of control group. From the standard deviations and standard error of means, it was also observed that both the students of experimental group and control group are equally spreaded in terms of their value conceptual knowledge in 'quest for knowledge'.

To find whether the difference in the mean value conceptual knowledge of the value 'quest for knowledge' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$10, **"**There will be no significant difference between mean post- test value conceptual knowledge of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'quest for knowledge", Mann- Whitney U- test was used which is given in the table 4.20 followed by analysis.

Table 4.20: Summary of Mann- Whitney U- test for value conceptual knowledge of the value 'Quest for Knowledge' Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1698	374.50	-3.35	0.0005
Control	37	1078			

From Table 4.20, it was observed that the sum of ranks of the experimental and control groups for the value conceptual knowledge of the value 'quest for knowledge' were 1698 and 1078 respectively with 37 students in both the groups. The value of U and z were found to be 374.50 and -3.35 respectively. Referring table for normal probability under null hypothesis (H_0) of z, for $z \leq -3.35$ and the two tailed probability was found to be 0.0005 which is less than our decided significance level (α) i.e $\alpha = 0.05$.Hence the null hypothesis $H_0$10, is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value conceptual knowledge in the value 'quest for knowledge'. Further referring table 4.19 it was found that the mean scores of experimental group in value conceptual knowledge in the value 'quest for knowledge' was quite higher than that of the control group, which may be due to good understanding about the value 'quest for knowledge'. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value conceptual knowledge of students in the value 'quest for knowledge'.

4.2.11 Effectiveness of Value Conceptual Knowledge of Experimental and Control Group for the Value 'Discrimination'.

To study the effectiveness of the ViEL in terms of the value conceptual knowledge of the value 'discrimination' and to test the hypotheses $H_0$11, the summary of the analyzed data is presented in tables 4.21 and 4.22 along with the interpretation and discussion.

Table 4.21: Mean SD and SEM Wise Distribution of Value conceptual Knowledge of Standard IX CBSE Students in the Value 'Discrimination'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	2.92	1.79	0.29
Control	37	2.62	1.71	0.28

From Table 4.21, it was observed that the mean value conceptual knowledge of the value 'discrimination' of the experimental group and control group were 2.92 and 2.62 respectively out of 5 marks. The standard deviation from the mean scores of value conceptual knowledge for the value in students was found to be 1.79 and 1.71 respectively for the experimental group and control group students with standard error

of means of 0.29 and 0.28 for the respective groups. Observing the mean value conceptual knowledge scores in 'discrimination' it was found that the experimental group did well scoring more than 55% marks in the value conceptual knowledge in the value than the control group. Further it was also found that the mean value conceptual knowledge for the value, of the experimental group were higher than that of control group. From the standard deviations and standard error of means, it was also observed that both the students of experimental group and control group are equally spreaded in terms of their value conceptual knowledge in 'discrimination'.

To find whether the difference in the mean value conceptual knowledge of the value 'discrimination' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$11, **"**There will be no significant difference between mean post- test value conceptual knowledge of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'discrimination", Mann- Whitney U- test was used which is given in the table 4.22 followed by analysis.

Table 4.22: Summary of Mann- Whitney U- test for value conceptual knowledge of the value 'Discrimination' Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1459	613.00	-0.77	0.2206
Control	37	1316			

From Table 4.22, it was observed that the sum of ranks of the experimental and control groups for the value conceptual knowledge of the value 'discrimination' were 1459 and 1316 respectively with 37 students in both the groups. The value of U and z were found to be 613.00 and -0.77 respectively. Referring table for normal probability under null hypothesis (H_0) of z, for $z \leq -0.77$ and the two tailed probability was found to be 0.2206 which is more than our decided significance level (**α)** i.e $\alpha = 0.05$ Hence the null hypothesis $H_0$32, is retained and it can be said that the experimental group and control group students does not differ significantly in the terms of their value conceptual knowledge in the said value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was

not found significantly effective in terms of enhancing value conceptual knowledge of students in the value 'discrimination'.

4.2.12 Effectiveness of Value Conceptual Knowledge of Experimental and Control Group for the Value 'Honesty'.

To study the effectiveness of the ViEL in terms of the value conceptual knowledge of the value 'honesty' and to test the hypotheses $H_0$12, the summary of the analyzed data is presented in tables 4.23 and 4.24 along with the interpretation and discussion.

Table 4.23: Mean, SD, and SEM Wise Distribution of Value Conceptual Knowledge of Standard IX CBSE Students in the Value 'Honesty'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	3.70	1.72	0.28
Control	37	3.49	1.46	0.24

From Table 4.23, it was observed that the mean value conceptual knowledge of the value 'honesty' of the experimental group and control group were 3.70 and 3.49 respectively out of 5 marks. The standard deviation from the mean scores of value conceptual knowledge for the value in students was found to be 1.72 and 1.46 respectively for the experimental group and control group students with standard error of means of 0.28 and 0.24 for the respective groups. Observing the mean value conceptual knowledge in 'honesty', it was found that the experimental group did well scoring more than 70% marks in the value conceptual knowledge in the value than the control group. Further it was also found that the mean value conceptual knowledge for the value, of the experimental group were higher than that of control group. From the standard deviations and standard error of means, it was also observed that both the students of experimental group and control group were equally spreaded in terms of their value conceptual knowledge in 'honesty'.

To find whether the difference in the mean value conceptual knowledge scores of the value 'honesty' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$12, **"**There will be no significant difference between mean post- test value conceptual knowledge of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'honesty", Mann- Whitney U- test was used which is given in the table 4.24 followed by analysis.

Table 4.24: Summary of Mann- Whitney U- test for value conceptual knowledge of the value 'Honesty' Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1480	592.50	-0.99	0.1611
Control	37	1296			

From Table 4.24, it was observed that the sum of ranks of the experimental and control groups for the value conceptual knowledge of the value 'honesty' were 1480 and 1296 respectively with 37 students in both the groups. The value of U and z were found to be 592.50 and -0.99 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -0.99$ and the two tailed probability was found to be 0.1611 which is more than our decided significance level(α) i.e $\alpha = 0.05$.Hence the null hypothesis $H_0$12**,** is retained and it can be said that the experimental group and control group students does not differ significantly in the terms of their value conceptual knowledge in the said value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was not found significantly effective in terms of enhancing value conceptual knowledge of students in the value 'honesty'.

4.2.13 Effectiveness of Value Conceptual Knowledge of Experimental and Control Group for the Value 'Spirit of Inquiry'.

To study the effectiveness of the ViEL in terms of the value conceptual knowledge of the value 'spirit of inquiry' and to test the hypotheses $H_0$13, the summary of the analyzed data is presented in tables 4.25 and 4.26 along with the interpretation and discussion.

Table 4.25: Mean, SD, and SEM Wise Distribution of Value conceptual Knowledge of Standard IX CBSE Students in the Value 'Spirit of Inquiry'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	2.14	1.80	0.30
Control	37	1.27	1.94	0.32

From Table 4.25, it was observed that the mean value conceptual knowledge of the value 'spirit of inquiry' of the experimental group and control group were 2.14 and 1.27 respectively out of 5 marks. The standard deviation from the mean scores of value conceptual knowledge for the value in students was found to be 1.80 and 1.94 respectively for the experimental group and control group students with standard error of means of 0.30 and 0.32 for the respective groups. Observing the mean value conceptual knowledge scores in 'spirit of inquiry', it was found that the experimental did well scoring more than 42% marks in the value conceptual knowledge in the value than control group. Further it was also found that the mean value conceptual knowledge for the value, of the experimental group were higher than that of control group. From the standard deviations and standard error of means, it was also observed that both the students of experimental group is more homogeneous than control group in terms of their value conceptual knowledge in 'spirit of inquiry'.

To find whether the difference in the mean value conceptual knowledge of the value 'spirit of inquiry' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$13**, "**There will be no significant difference between mean post- test value conceptual knowledge of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'spirit of inquiry", Mann- Whitney U-test was used which is given in the table 4.26 followed by analysis.

Table 4.26: Summary of Mann- Whitney U- test for value conceptual knowledge of the value 'Spirit of Inquiry' Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1601	471.50	-2.30	0.0107
Control	37	1175			

From Table 4.26, it was observed that the sum of ranks of the experimental and control groups for the value conceptual knowledge of the value 'spirit of inquiry' were 1601 and 1175 respectively with 37 students in both the groups. The value of U and z were found to be 471.50 and -2.30 respectively. Referring table for normal probability under null hypothesis (H_0) of z, for $z \leq -2.30$ and the two tailed probability was found to be 0.0107 which is less than our decided significance level (α) i.e α

=0.05.Hence the null hypothesis $H_0$13**,** is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value conceptual knowledge in the value 'spirit of inquiry'. Further referring table 4.25 it was found that the mean scores of experimental group in value conceptual knowledge in the value 'spirit of inquiry' was quite higher than that of the control group, which may be due to good understanding about the said value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value conceptual knowledge of students in the value 'spirit of inquiry'.

4.2.14 Effectiveness of Value conceptual Knowledge of Experimental and Control Group for the Value 'Co-operation'.

To study the effectiveness of the ViEL in terms of the value conceptual knowledge of the value 'co-operation' and to test the hypotheses $H_0$14, the summary of the analyzed data is presented in tables 4.27 and 4.28 along with the interpretation and discussion.

Table 4.27: Mean, S.D, And S.E.M Wise Distribution of Value conceptual Knowledge of Standard IX CBSE Students in the Value 'Co-Operation'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	3.95	0.90	0.15
Control	37	4.14	0.87	0.14

From the table 4.27 it was observed that the mean value conceptual knowledge of the value 'co-operation' of the experimental group and control group was 3.95 and 4.14 respectively out of 5 marks. The standard deviation from the mean scores of value conceptual knowledge for the value in students was found to be 0.90 and 0.87 respectively for the experimental group and control group students with standard error of means of 0.15 and 0.14 for the respective groups. Observing the mean value conceptual knowledge in 'co-operation' it was found that the experimental group did well scoring more than 75% marks in the value conceptual knowledge in the value than the control group. Further, it was also found that the mean value conceptual knowledge for the value, of the experimental group were higher than that of control group. From the standard deviations and standard error of means, it was also observed that both the students of experimental group and control group were equally spreaded in terms of their value conceptual knowledge in 'co-operation'.

To find whether the difference in the mean value knowledge scores of the value 'Co-operation' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$14, **"**There will be no significant difference between mean post- test value conceptual knowledge of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'Co-operation",Mann- Whitney U- test was used which is given in the table 4.28 followed by analysis.

Table 4.28: Summary of Mann- Whitney U- test for value conceptual knowledge of the value 'Co-operation' Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1304	768.00	0.90	0.1841
Control	37	1471			

From Table 4.28, it was observed that the sum of ranks of the experimental and control groups for the value conceptual knowledge of the value 'co-operation' were 1304 and 1471 respectively with 37 students in both the groups. The value of U and z were found to be 768.00 and 0.90 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -0.90$ and the two tailed probability was found to be 0.1841 which is more than our decided significance level(α) i.e $\alpha = 0.05$.Hence the null hypothesis $H_0$14**,** is retained and it can be said that the experimental group and control group students does not differ significantly in the terms of their value conceptual knowledge in the said value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was not found significantly effective in terms of enhancing value conceptual knowledge of students in the value 'co-operation'.

4.2.15 Effectiveness of Value Conceptual Knowledge of Experimental and Control Group for the Value 'Equality'.

To study the effectiveness of the ViEL in terms of the value conceptual knowledge of the value 'equality' and to test the hypotheses $H_0$15, the summary of the analyzed data is presented in tables 4.29 and 4.30 along with the interpretation and discussion.

Table 4.29: Mean, SD, and SEM Wise Distribution of Value conceptual Knowledge of Standard IX CBSE Students in the Value 'Equality'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	3.30	1.35	0.22
Control	37	4.14	1.26	0.21

From Table 4.29, it was observed that the mean value conceptual knowledge of the value 'equality' of the experimental group and control group were 3.30 and 4.14 respectively out of 5 marks. The standard deviation from the mean scores of value conceptual knowledge for the value in students was found to be 1.35 and 1.26 respectively for the experimental group and control group students with standard error of means of 0.22 and 0.21 for the respective groups. Observing the mean value conceptual knowledge in 'equality', it was found that the experimental group and control group students did well scoring more than 60% marks in the value conceptual knowledge in the value. From the standard deviations and standard error of means, it was also observed that both the students of experimental group and control group are spreaded in terms of their value conceptual knowledge in 'equality'.

To find whether the difference in the mean value conceptual knowledge of the value 'equality' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$15, **"**There will be no significant difference between mean post- test value conceptual knowledge of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'equality" Mann- Whitney U- test was used which is given in the table 4.30 followed by analysis.

Table 4.30: Summary of Mann- Whitney U- test for value conceptual knowledge of the value 'Equality' Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1123	949.00	2.86	0.0021
Control	37	1652			

From Table 4.30, it was observed that the sum of ranks of the experimental and control groups for the value conceptual knowledge of the value 'equality' were 1123

and 1652 respectively with 37 students in both the groups. The value of U and z were found to be 949.00 and 2.86 respectively. Referring table for normal probability under null hypothesis (H_0)of z ,for $z \leq 2.86$ and the two tailed probability was found to be 0.0021which is less than our decided significance level(α) i.e α =0.05. Hence the null hypothesis $H_0$15 is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value knowledge in the said value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value conceptual knowledge of students in the value 'equality'.

4.2.16 Effectiveness of Value Knowledge of Experimental and Control Group for the Value 'Simplicity'.

To study the effectiveness of the ViEL in terms of the value conceptual knowledge of the value 'simplicity' and to test the hypotheses $H_0$16, the summary of the analyzed data is presented in tables 4.31 and 4.32 along with the interpretation and discussion.

Table 4.31: Mean, S.D, and S.E.M Wise Distribution of Value conceptual Knowledge of Standard IX CBSE Students in the Value 'Simplicity'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	3.35	1.51	0.25
Control	37	3.27	1.27	0.21

From Table 4.31, it was observed that the mean value conceptual knowledge of the value 'simplicity' of the experimental group and control group were 3.35 and 3.27 respectively out of 5 marks. The standard deviation from the mean scores of value conceptual knowledge for the value in students was found to be 1.51 and 1.27 respectively for the experimental group and control group students with standard error of means of 0.25 and 0.21 for the respective groups. Observing the mean value conceptual knowledge in 'simplicity', it was found that the experimental group did well scoring more than 70 % marks in the value conceptual knowledge in the value than the control group. Further, it was also found that the mean value knowledge scores for the value, of the experimental group were higher than that of control group. From the standard deviations and standard error of means, it was also observed that

both the students of experimental group and control group are equally spreaded in terms of their value conceptual knowledge in 'simplicity'.

To find whether the difference in the mean value conceptual knowledge of the value 'simplicity' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$16**, "**There will be no significant difference between mean post- test value conceptual knowledge of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'simplicity", Mann- Whitney U- test was used which is given in the table 4.32 followed by analysis.

Table 4.32: Summary of Mann- Whitney U- test for value Conceptual Knowledge of the value 'Simplicity' Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1446	626.00	-0.63	0.2643
Control	37	1329			

From Table 4.32, it was observed that the sum of ranks of the experimental and control groups for the value conceptual knowledge of the value 'simplicity' were 1446 and 1329 respectively with 37 students in both the groups. The value of U and z were found to be 626.00 and -0.63 respectively. Referring table for normal probability under null hypothesis (H_0)of z ,for $z \leq -0.63$ and the two tailed probability was found to be 0.2643 which is more than our decided significance level(α**)** i.e $\alpha = 0.05$. Hence the null hypothesis $H_0$16**,** is retained and it can be said that the experimental group and control group students does not differ significantly in the terms of their Value conceptual knowledge in the said value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was not found significantly effective in terms of enhancing value conceptual knowledge of students in the value 'simplicity'.

4.2.17 Effectiveness of Value Conceptual Knowledge of Experimental and Control Group for the Value 'Determination'.

To study the effectiveness of the ViEL in terms of the value conceptual knowledge of the value 'determination' and to test the hypotheses $H_0$17, the summary of the

analyzed data is presented in tables 4.33 and 4.34 along with the interpretation and discussion.

Table 4.33: Mean, S.D, And S.E.M Wise Distribution of Value conceptual Knowledge of Standard IX CBSE Students in the Value 'Determination'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	2.84	1.81	0.30
Control	37	2.49	1.70	0.28

From Table 4.33, it was observed that the mean value conceptual knowledge of the value 'determination' of the experimental group and control group were 2.84 and 2.49 respectively out of 5 marks. The standard deviation from the mean scores of value conceptual knowledge for the value in students was found to be 1.81 and 1.70 respectively for the experimental group and control group students with Standard Error of Means of 0.30 and 0.28 for the respective groups. Observing the mean value conceptual knowledge in 'determination', it was found that the experimental group did well scoring more than 55 % marks in the value conceptual knowledge in the value than the control group. Further it was also found that the mean value conceptual knowledge for the value, of the experimental group were higher than that of control group. From the standard deviations and standard error of means, it was also observed that both the students of experimental group and control group are equally spreaded in terms of their value conceptual knowledge in 'determination'.

To find whether the difference in the mean value conceptual knowledge of the value 'determination' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$17**, "**There will be no significant difference between mean post- test value conceptual knowledge of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'determination", Mann- Whitney U- test was used which is given in the table 4.34 followed by analysis.

Table 4.34: Summary of Mann- Whitney U- test for value conceptual Knowledge of the value 'Determination'. Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1467	605.50	-0.85	0.1977
Control	37	1309			

From Table 4.34, it was observed that the sum of ranks of the experimental and control groups for the value conceptual knowledge of the value 'determination' were 1467 and 1309 respectively with 37 students in both the groups. The value of U and z were found to be 605.50 and -0.85 respectively. Referring table for normal probability under null hypothesis (H_0)of z ,for $z \leq -0.85$ and the two tailed probability was found to be 0.1977 which is more than our decided significance level(α) i.e $\alpha = 0.05$.Hence the null hypothesis $H_0$17, is retained and it can be said that the experimental group and control group students does not differ significantly in the terms of their value conceptual knowledge in the said value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was not found significantly effective in terms of enhancing value conceptual knowledge of students in the value 'determination'.

4.2.18 Effectiveness of Value Knowledge of Experimental and Control Group for the Value 'Common Goal'.

To study the effectiveness of the ViEL in terms of the value conceptual knowledge of the value 'common goal' and to test the hypotheses $H_0$18, the summary of the analyzed data is presented in tables 4.35 and 4.36 along with the interpretation and discussion.

Table 4.35: Mean, S.D, And S.E.M Wise Distribution of Value Conceptual Knowledge of Standard IX CBSE Students in the Value 'Common Goal'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	2.86	1.60	0.26
Control	37	2.22	1.83	0.30

From Table 4.35, it was observed that the mean value conceptual knowledge of the value 'common goal' of the experimental group and control group were 2.86 and 2.22 respectively out of 5 marks. The standard deviation from the mean scores of value conceptual knowledge for the value in students was found to be 1.60 and 1.83 respectively for the experimental group and control group students with standard error of means of 0.26 and 0.30 for the respective groups. Observing the mean value conceptual knowledge in 'common goal', it was found that the experimental group did well scoring more than 55 % marks in the value conceptual knowledge in the value 'common goal' than the control group. Further it was also found that the mean value conceptual knowledge for the value, of the experimental group were higher than that of control group. From the standard deviations and standard error of means, it was also observed that both the students of experimental group and control group are equally spreaded in terms of their value conceptual knowledge in 'common goal'.

To find whether the difference in the mean value conceptual knowledge of the value 'common goal' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$18, **"**There will be no significant difference between mean post- test value conceptual knowledge of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'common goal", Mann- Whitney U- test was used which is given in the table 4.36 followed by analysis.

Table 4.36: Summary of Mann- Whitney U- test for value Conceptual Knowledge of the value Common Goal' Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	**N**	**Sum of Ranks**	**U-Value**	**z-Value**	**Probability (p)**
Experimental	37	1517	555.50	-1.39	0.0823
Control	37	1259			

From Table 4.36 it was observed that the sum of ranks of the experimental and control groups for the value conceptual knowledge of the value 'common goal' were 1517 and 1259 respectively with 37 students in both the groups. The value of U and z were found to be 555.50 and -1.39 respectively. Referring table for normal probability under null hypothesis (H_0)of z ,for $z \leq -1.39$ and the two tailed probability was found to be 0.0823 which is more than our decided significance level(α) i.e $\alpha = 0.05$. Hence

the null hypothesis $H_0$18 is retained and it can be said that the experimental group and control group students does not differ significantly in the terms of their value knowledge in the said value. Therefore it can be said that the implemented value integrated experiential learning approach for teaching Science was not found significantly effective in terms of enhancing value conceptual knowledge of students in the value 'common goal'.

4.2.19 Effectiveness of Value conceptual Knowledge of Experimental and Control Group for the Value 'Dignity of labour'.

To study the effectiveness of the ViEL in terms of the value conceptual knowledge of the value 'dignity of labour' and to test the hypotheses $H_0$19, the summary of the analyzed data is presented in tables 4.37 and 4.38 along with the interpretation and discussion.

Table 4.37: Mean, SD, and SEM Wise Distribution of Value Conceptual Knowledge of Standard IX CBSE Students in the Value 'Dignity of Labour'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	2.70	1.77	0.29
Control	37	1.95	2.00	0.33

From Table 4.37, it was observed that the mean value conceptual knowledge of the value 'dignity of labour' of the experimental group and control group were 2.70 and 1.95 respectively out of 5 marks. The standard deviation from the mean scores of value conceptual knowledge for the value in students was found to be 1.77 and 2.00 respectively for the experimental group and control group students with standard error of means of 0.29 and 0.33 for the respective groups. Observing the mean value conceptual knowledge in 'dignity of labour', it was found that the experimental group and control group students did well scoring more than 50% marks in the value conceptual knowledge in the value. From the standard deviations and standard error of means, it was also observed that both the students of experimental group and control group are spreaded in terms of their value conceptual knowledge in 'dignity of labour'.

To find whether the difference in the mean value conceptual knowledge of the value 'dignity of labour' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$19, **"**There will be no significant difference

between mean post- test value conceptual knowledge of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'Dignity of labour", Mann- Whitney U-test was used which is given in the table 4.38 followed by analysis.

Table 4.38: Summary of Mann- Whitney U- test for value conceptual Knowledge of the value 'Dignity of labour'' Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1542	530.50	-1.66	0.0485
Control	37	1234			

From Table 4.38, it was observed that the sum of ranks of the experimental and control groups for the value conceptual knowledge of the value 'dignity of labour'' were 1542 and 1234 respectively with 37 students in both the groups. The value of U and z were found to be 530.50 and -1.66 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq 2.86$ and the two tailed probability was found to be 0.0485 which is less than our decided significance level(α) i.e $\alpha = 0.05$.Hence the null hypothesis $H_0$19**,** is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value conceptual knowledge in the value 'dignity of labour''. Also it was earlier confirmed form the table 4.37 that the mean scores of value conceptual knowledge is more for experimental group, for the said value which can be attributed to teaching science through the value integrated experiential leaning. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value conceptual knowledge of students in the value 'dignity of labour'.

4.2.20 Effectiveness of Value conceptual Knowledge of Experimental and Control Group for the Value 'Discipline'.

To study the effectiveness of the ViEL in terms of the value conceptual knowledge of the value 'discipline' and to test the hypotheses $H_0$20, the summary of the analyzed data is presented in tables 4.39 and 4.40 along with the interpretation and discussion.

Table 4.39: Mean, SD, and SEM Wise Distribution of Value conceptual Knowledge of Standard IX CBSE Students in the Value 'Discipline'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	3.59	1.85	0.30
Control	37	3.24	1.68	0.28

From Table 4.39, it was observed that the mean value conceptual knowledge of the value 'discipline' of the experimental group and control group were 3.59 and 3.24 respectively out of 5 marks. The standard deviation from the mean scores of value conceptual knowledge for the value in students was found to be 1.85 and 1.68 respectively for the experimental group and control group students with standard error of means of 0.30 and 0.28 for the respective groups. Observing the mean value conceptual knowledge in 'discipline', it was found that the experimental group did well scoring more than 70 % marks in the value conceptual knowledge in the value than the control group. Further, it was also found that the mean value conceptual knowledge for the value , of the experimental group were higher than that of control group. From the standard deviations and standard error of means, it was also observed that both the students of experimental group and control group are equally spreaded in terms of their value conceptual knowledge in 'discipline'.

To find whether the difference in the mean value conceptual knowledge of the value 'discipline' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$20, **"**There will be no significant difference between mean post- test value conceptual knowledge of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'discipline", Mann- Whitney U- test was used which is given in the table 4.40 followed by analysis.

Table 4.40: Summary of Mann- Whitney U- test for value Conceptual Knowledge of the value 'Discipline' Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1508	564.50	-1.30	0.0968
Control	37	1268			

From Table 4.40, it was observed that the sum of ranks of the experimental and control groups for the value conceptual knowledge of the value 'discipline' were 1508 and 1268 respectively with 37 students in both the groups. The value of U and z were found to be 564.50 and -1.30 respectively. Referring table for normal probability under null hypothesis (H_0)of z ,for $z \leq -1.30$ and the two tailed probability was found to be 0.0968 which is more than our decided significance level(α) i.e $\alpha = 0.05$**.** Hence the null hypothesis $H_0$20**,** is retained and it can be said that the experimental group and control group students does not differ significantly in the terms of their value knowledge in the said value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was not found significantly effective in terms of enhancing value conceptual knowledge of students in the value 'discipline'.

4.2.21 Effectiveness of Value Conceptual Knowledge of Experimental and Control Group for all the Values

To study the effectiveness of the ViEL in terms of the value conceptual knowledge of the all the values and to test the hypotheses $H_0$21, the summary of the analyzed data is presented in tables 4.41 and 4.42 along with the interpretation and discussion.

Table 4.41: Mean, S.D, And S.E.M Wise Distribution of Value Conceptual Knowledge of Standard IX CBSE Students in All Twenty Values.

Groups	N	Mean	S.D	S.E.M
Experimental	37	58.00	24.01	3.95
Control	37	46.59	17.14	2.82

From Table 4.41, it was observed that the mean value conceptual knowledge of all the twenty values of the experimental group and control group were 58.00 and 46.59 respectively out of 100 marks. The standard deviation from the mean scores of value conceptual knowledge for all the twenty values in students was found to be 24.01 and 17.14 respectively for the experimental group and control group students with standard error of means of 3.95 and 2.82 for the respective groups. Observing the mean value conceptual knowledge in all twenty values it was found that the experimental group and control group students did well scoring more than 55% marks in the value conceptual knowledge in all the twenty value. From the standard deviations and standard error of means, it was also observed that both the students of

experimental group and control group are spreaded in terms of their value conceptual knowledge in all twenty values.

To find whether the difference in the mean value conceptual knowledge of all the twenty values of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$21 **"**There will be significant difference between mean post value conceptual knowledge of learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the twenty selected values, Mann- Whitney U- test was used which is given in the table 4.42 followed by analysis.

Table 4.42: Summary of Mann- Whitney U- test for value Conceptual Knowledge of all the twenty values of Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1615	457.00	-2.46	0.0069
Control	37	1160			

From Table 4.42, it was observed that the sum of ranks of the experimental and control groups for the value conceptual knowledge of all the twenty values were 1615 and 1160 respectively with 37 students in both the groups. The value of U and z were found to be 457.00 and -2.46 respectively. Referring table for normal probability under null hypothesis (H_0)of z ,for $z \leq 2.46$ and the two tailed probability was found to be 0.0069 which is less than our decided significance level(α) i.e $\alpha = 0.05$. Hence the null hypothesis $H_0$21, is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value conceptual knowledge in all the twenty values. Also it was earlier confirmed form the table 4.41 that the mean scores of value conceptual knowledge is more for experimental group, for all the twenty values which can be attributed to teaching science through ViEL. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value conceptual knowledge of students in all the twenty values.

4.3.0 EFFECTIVENESS OF THE INTERVENTION PROGRAMME IN TERMS OF VALUE PERCEPTION

In order to achieve a part of objective 3 of the present study and to test the null hypothesis number $H_0$22 to $H_0$42, data analysis and interpretation is presented as follow through tables 4.43 to 4.84.

4.3.1 Effectiveness of the ViEL in terms of Value Perception of the Value 'Learning to live together'.

To study the effectiveness of the ViEL in terms of the value perception of the value 'learning to live together' and to test the hypotheses $H_0$22, the summary of the analyzed data is presented in tables 4.43 and 4.44 along with the interpretation and discussion.

Table 4.43: Mean, Standard Deviation, and Standard Error of mean wise distribution of value perception of standard IX CBSE students in the value 'learning to live together'.

Groups	N	Mean	SD	SEM
Experimental	37	20.16	2.79	0.46
Control	37	16.76	3.76	0.62

From the table 4.43, it was observed that the mean value perception score of the value 'learning to live together' of the experimental group and control group were 20.16 and 16.76 respectively out of the total score of 25. The standard deviations from the mean scores of value perception for the same value were found to be 2.79 and 3.76 respectively for the experimental group and control group. The standard errors of means were found 0.46 and 0.62 for the respective groups. Observing the mean value perception scores for the value, it was found that both the experimental and control groups scored well having more than 80% and 60% of scores respectively. Further, it was observed that the mean value perception score of the experimental group in the said value was higher than that of the control group. From the standard deviations and standard error of means of both the groups, it was also observed that the students of experimental group were more homogeneous in terms of their value perceptions in the said value in comparison to their counterpart.

To find whether the difference in the mean value perception of the experimental group was significant or by chance and to test the null hypothesis, $H_0$22, **"**There will be no significant difference between mean post- test value perception of the learners

taught through Value integrated Experiential learning approach and learners taught through the traditional approach in the value of 'learning to live together", Mann-Whitney U- test was used which is given in the table 4.44 followed by analysis.

Table 4.44: Summary of Mann-Whitney U test for value perception of the value 'learning to live together' of Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1745	327.00	-3.86	0.00007
Control	37	1030			

From table 4.44, it was observed that the sum of ranks of the experimental and control groups for the value perception of the value 'learning to live together' were 1745 and 1030 respectively with 37 students in both the groups. The value of U and z were found to be 327.00 and -3.86 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -3.86$ and the two tailed probability was found to be 0.00007 which is less than our decided significance level (α) i.e. 0.05. Hence, the null hypothesis $H_0$22, is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value perception in the value 'learning to live together'. Further referring table 4.43, it was found that the mean scores of experimental group in value perception in the said value was more than that of the control group, which may be due to teaching science through ViEL approach. Therefore, it can be said that the ViEL for teaching Science was found to be significantly effective in terms of enhancing value perception of students in the value 'learning to live together'.

4.3.2 Effectiveness of Value Perception of Experimental and Control Group for the Value 'Team Work'

To study the effectiveness of the ViEL in terms of the value perception of the value 'team work' and to test the hypotheses $H_0$23, the summary of the analyzed data is presented in tables 4.45 and 4.46 along with the interpretation and discussion.

Table 4.45: Mean, S.D And S.E.M Wise Distribution of Value Perception of Standard IX CBSE Students in the Value 'Team Work'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	17.22	4.02	0.66
Control	37	14.81	4.16	0.68

From the table 4.45 it was observed that the mean value perception of the value 'team work'of the experimental group and control group were 17.22 and 14.81 respectively out of 25 marks. The standard deviation from the mean scores of value perception for the value in students was found to be 4.02 and 4.16 respectively for the experimental group and control group. The standard error of mean was 0.66 and 0.68 for the respective groups. Observing the mean value perception in 'team work', it was found that both the experimental and control group scored well more than 60% and 50% marks in the value perception of the 'team work'. Further, it was found that the mean value perception for the value, of the experimental group was quite higher than that of control group. From the standard deviations and standard error of means of both the groups, it was also observed that the students of experimental group were more homogeneous in terms of their value perceptions in 'team work' in comparison to their counterpart.

To find whether the difference in the mean value perception of the value 'team work' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$23, **"**There will be no significant difference between mean post- test value perception of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of team work" ,Mann- Whitney U- test was used which is given in the table 4.46 followed by analysis.

Table 4.46: Summary of Mann- Whitney U- test for value perception of the value 'Team Work' Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1592	480.50	-2.21	0.0136
Control	37	1184			

From the table 4.46 it was observed that the sum of ranks of the experimental and control groups for the value perception of the value 'team work' were 1592 and 1184 respectively with 37 students in both the groups. The value of U and z were found to be 480.50 and -2.21 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -2.21$ and the two tailed probability was found to be 0.0136 which is less than our decided significance level (α) i.e $\alpha = 0.05$ Hence the null hypothesis $H_0$23, is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value perception in the value 'team work' .Further referring table 4.45, it was found that the mean scores of experimental group in value perception in the said value was more than that of the control group, which may be due to teaching science through ViEL approach. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value perception of students in the value 'team work'.

4.3.3 Effectiveness of Value Perception of Experimental and Control Group for the Value 'Loyalty to Duty'.

To study the effectiveness of the ViEL in terms of the value perception of the value 'learning to live together' and to test the hypotheses $H_0$24, the summary of the analyzed data is presented in tables 4.47 and 4.48 along with the interpretation and discussion.

Table 4.47: Mean, S.D And S.E.M Wise Distribution of Value Perception of Standard IX CBSE Students in the Value 'loyalty to duty'

Groups	N	Mean	S.D	S.E.M
Experimental	37	18.59	4.71	0.77
Control	37	14.59	4.91	0.81

From the table 4.47 it was observed that the mean value perception of the value 'loyalty to duty' of the experimental group and control group was 18.59 and 14.59 respectively out of 25 marks. The standard deviation from the mean scores of value perception for the value in students was found to be 4.71 and 4.91 respectively for the experimental group and control group. The standard error of mean was 0.77 and 0.81 for the respective groups. Observing the mean value perception scores in 'loyalty to duty', it was found that both the experimental and control group scored well more

than 70% and 50% marks in the value perception of the 'loyalty to duty'. Further it was found that the mean value perception scores for the value, of the experimental group was quite higher than that of control group. From the standard deviations and standard error of means of both the groups, it was also observed that the students of experimental group were more homogeneous in terms of their value perceptions in 'loyalty to duty' in comparison to their counterpart.

To find whether the difference in the mean value perception scores of the value 'loyalty to duty' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$24, **"**There will be no significant difference between mean post- test value perception of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'loyalty to duty" ,Mann- Whitney U- test was used which is given in the table 4.48 followed by analysis.

Table 4.48: Summary of Mann- Whitney U- test for value perception of the value 'Loyalty to Duty' Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1684	388.00	-3.21	0.0007
Control	37	1091			

From the table 4.48 it was observed that the sum of ranks of the experimental and control groups for the value perception of the value "loyalty to duty" were 1684 and 1091 respectively with 37 students in both the groups. The value of U and z were found to be 388.00 and -3.21 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -3.21$ and the two tailed probability was found to be 0.0007 which is less than our decided significance level (α) i.e $\alpha = 0.05$. Hence the null hypothesis $H_0$24, is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value perception in the value 'loyalty to duty'. Further referring table 4.47, it was found that the mean scores of experimental group in value perception in the said value was more than that of the control group, which may be due to teaching science through value integrated experiential leaning approach. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly

effective in terms of enhancing value perception of students in the value 'loyalty to duty'.

4.3.4 Effectiveness of Value Perception of Experimental and Control Group for the Value 'Tolerance'.

To study the effectiveness of the ViEL in terms of the value perception of the value 'tolerance' and to test the hypotheses $H_0$25, the summary of the analyzed data is presented in tables 4.49 and 4.50 along with the interpretation and discussion.

Table 4.49: Mean, S.D And S.E.M Wise Distribution of Value Perception of Standard IX CBSE Students in the Value 'Tolerance'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	19.08	3.84	0.63
Control	37	17.84	3.80	0.63

From the table 4.49, it was observed that the mean value perception of the value 'tolerance' of the experimental group and control group were 19.08 and 17.84 respectively out of the total score of 25. The standard deviations from the mean scores of value perception for the same value were found to be 3.84 and 3.8 respectively for the experimental group and control group. The standard errors of means were found to be 0.63 for both the groups. Observing the mean value perception scores for the value 'tolerance', it was found that both the experimental and control groups scored well having nearly 75% of scores. Further, it was observed that the mean value perception of the experimental group in the said value was higher than that of the control group. From the standard deviations and standard error of means of both the groups, it was also observed that the students of both the experimental group and the control group were equally scattered around their mean scores.

To find whether the difference in the mean value perception of the experimental group was significant or by chance and to test the null hypothesis, $H_0$25, **"**There will be no significant difference between mean post- test value perception of the students taught through value integrated experiential learning approach and students taught through the traditional approach in the value of 'Tolerance", Mann-Whitney U- test was used which is given in the table 4.50 followed by analysis.

Table 4.50: Summary of Mann- Whitney U- test for value perception of the value 'Tolerance'. Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1517	555.50	-1.39	0.0823
Control	37	1259			

From table 4.50, it was observed that the sum of ranks of the experimental and control groups for the value perception of the value 'tolerance' were 1517 and 1259 respectively with 37 students in both the groups. The value of U and z were found to be 555.5 and -1.39 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -1.39$ and the two tailed probability was found to be 0.0823 which is more than our decided significance level (α) i.e. 0.05**.** Hence, the null hypothesis $H_0$25 is retained and it can be said that the experimental group and control group students do not differ significantly in the terms of their value perception in the said value. The difference observed in the mean scores of experimental group and control group from the table 4.49 is by chance. Therefore, it can be said that the ViEL for teaching Science was not found effective in terms of enhancing value perception of students in the value 'tolerance'.

4.3.5 Effectiveness of Value Perception of Experimental and Control Group for the Value 'Flexibility'.

To study the effectiveness of the ViEL in terms of the value perception of the value 'flexibility' and to test the hypotheses $H_0$26, the summary of the analyzed data is presented in tables 4.51 and 4.52 along with the interpretation and discussion.

Table 4.51: Mean, S.D And S.E.M Wise Distribution of Value Perception of Standard IX CBSE Students in the Value 'Flexibility'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	8.03	9.31	1.53
Control	37	14.59	6.66	1.09

From the table 4.51, it was observed that the mean value perception of the value 'flexibility' of the experimental group and control group were 8.03 and 14.59

respectively out of the total score of 25. The standard deviations from the mean scores of value perception for the same value were found to be 9.31 and 6.66 respectively for the experimental group and control group. The standard errors of means were 1.53 and 1.09 for the respective groups. Observing the mean value perception for the value, it was found that both the experimental and control groups scored more than 30% and 50% of scores respectively. Further, it was observed that the mean value perception of the control group in the said value was higher than that of the experiment group. From the standard deviations and standard error of means of both the groups, it was also observed that the students of the experimental group were more heterogeneous in terms of their mean scores in comparison to their counterpart.

To find whether the difference in the mean value perception of the experimental group was significant or by chance and to test the null hypothesis, $H_0$26, **"**There will be no significant difference between mean post- test value perception of the students taught through value integrated experiential learning approach and students taught through the traditional approach in the value of 'flexibility", Mann-Whitney U- test was used which is given in the table 4.52 followed by analysis.

Table 4.52: Summary of Mann- Whitney U- test for value perception of the value 'Flexibility Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1145	927.50	2.63	0.0043
Control	37	1631			

From the table 4.52 it was observed that the sum of ranks of the experimental and control groups for the value perception of the value 'flexibility' were 1145 and 1631 respectively with 37 students in both the groups. The value of U and z were found to be 927.50 and 2.63 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq 2.63$ and the two tailed probability was found to be 0.0043 which is less than our decided significance level (α) i.e 0.05 Hence the null hypothesis $H_0$26, is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value perception in the said value. Further referring table 4.51, it was surprisingly found that the mean scores of experimental group in value perception in the value 'flexibility' was less than that of

the control group. Therefore, it can be said that the ViEL for teaching Science was not found to be effective in terms of enhancing value perception of students in the value 'flexibility'.

4.3.6 Effectiveness of Value Perception of Experimental and Control Group for the Value 'Curiosity'.

To study the effectiveness of the ViEL in terms of the value perception of the value 'Curiosity' and to test the hypotheses $H_0$27, the summary of the analyzed data is presented in tables 4.53 and 4.53 along with the interpretation and discussion.

Table 4.53: Mean, S.D And S.E.M Wise Distribution of Value Perception of Standard IX CBSE Students in the Value 'Curiosity'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	18.46	2.66	0.44
Control	37	15.89	2.94	0.48

From the table 4.53 it was observed that the mean value perception of the value 'curiosity 'of the experimental group and control group were 18.46 and 15.89 respectively out of 25 marks. The standard deviation from the mean scores of value perception for the value in students was found to be 2.66 and 2.94 respectively for the experimental group and control group. The standard error of mean was 0.44 and 0.48 for the respective groups. Observing the mean value perception in 'curiosity', it was found that both the experimental and control group scored well more than 70% and 60% marks in the value perception of the 'curiosity'. Further, it was found that the mean value perception for the value, of the experimental group was quite higher than that of control group. From the standard deviations and standard error of means of both the groups, it was also observed that the students of experimental group were more homogeneous in terms of their value perceptions in 'curiosity' in comparison to their counterpart.

To find whether the difference in the mean value perception of the value 'curiosity' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$27, **"**There will be no significant difference between mean post- test value perception of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the

value of 'curiosity'" ,Mann- Whitney U- test was used which is given in the table 4.54 followed by analysis.

Table 4.54: Summary of Mann- Whitney U- test for value perception of the value 'Curiosity' Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1674	398.00	-3.10	0.0010
Control	37	1101			

From the table 4.54 it was observed that the sum of ranks of the experimental and control groups for the value perception of the value 'curiosity' were 1674 and 1101 respectively with 37 students in both the groups. The value of U and z were found to be 398.00 and -3.10 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -3.10$ and the two tailed probability was found to be 0.0010 which is less than our decided significance level (α) i.e $\alpha = 0.05$**.** Hence the null hypothesis $H_0$27 is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value perception in the value 'curiosity'. Further referring table 4.53, it was found that the mean scores of experimental group in value perception in the value 'curiosity' was quite higher than that of the control group, which may be due to very good understanding about the said value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value perception of students in the value 'curiosity'.

4.3.7 Effectiveness of Value Perception of Experimental and Control Group for the Value 'Environmental Ethics'.

To study the effectiveness of the ViEL in terms of the value perception of the value 'environmental ethics' and to test the hypotheses $H_0$28, the summary of the analyzed data is presented in tables 4.55 and 4.56 along with the interpretation and discussion.

Table 4.55: Mean, S.D And S.E.M Wise Distribution of Value Perception of Standard IX CBSE Students in the Value 'Environmental Ethics'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	20.32	4.01	0.66
Control	37	16.68	4.19	0.69

From the table 4.55 it was observed that the mean value perception of the value 'environmental ethics' of the experimental group and control group were 20.32 and 16.68 respectively out of 25 marks. The standard deviation from the mean scores of value perception for the value 'environmental ethics' in students was found to be 4.01 and 4.19 respectively for the experimental group and control group. The standard error of mean was 0.66 and 0.69 for the respective groups. Observing the mean value perception in 'environmental ethics' it was found that both the experimental and control group scored well more than 80% and 60% marks in the value perception of the 'environmental ethics'. Further it was found that the mean value perception for the value, of the experimental group was quite higher than that of control group. From the standard deviations and standard error of means of both the groups, it was also observed that the students of experimental group were more homogeneous in terms of their value perceptions in 'environmental ethics' in comparison to their counterpart.

To find whether the difference in the mean value perception scores of the value 'environmental ethics' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$28, "There will be no significant difference between mean post- test value perception of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'environmental ethics'' ,Mann- Whitney U- test was used which is given in the table 4.56 followed by analysis.

Table 4.56: Summary of Mann- Whitney U- test for value perception of the value 'Environmental Ethics'. Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1729	343.00	-3.69	0.00016
Control	37	1046			

From the table 4.56 it was observed that the sum of ranks of the experimental and control groups for the value perception of the value 'Environmental Ethics' were 1729 and 1046 respectively with 37 students in both the groups. The value of U and z were found to be 343.00 and -3.69 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -3.69$ and the two tailed probability was found to be 0.00016 which is less than our decided significance level (**α**) i.e $\alpha = 0.05$. Hence

the null hypothesis $H_0$28, is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value perception in the value 'environmental ethics'. Further referring table 4.55, it was found that the mean scores of experimental group in value perception in the value 'environmental ethics' was quite than that of the control group, which may be due to very good understanding about the said value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value perception of students in the value 'environmental ethics'.

4.3.8 Effectiveness of Value Perception of Experimental and Control Group for the Value 'Compassion'.

To study the effectiveness of the ViEL in terms of the value perception of the value 'compassion' and to test the hypotheses $H_0$29, the summary of the analyzed data is presented in tables 4.57 and 4.58 along with the interpretation are discussion.

Table 4.57: Mean S.D and S.E.M Wise Distribution of Value Perception of Standard IX CBSE Students in the Value 'Compassion'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	19.78	3.26	0.54
Control	37	18.27	3.45	0.57

From the table 4.57 it was observed that the mean value perception of the value 'compassion' of the experimental group and control group was 19.78 and 18.27 respectively out of 25 marks. The standard deviation from the mean scores of value perception for the value in students was found to be 3.26 and 3.45 respectively for the experimental group and control group. The standard error of mean was 0.54 and 0.57 for the respective groups. Observing the mean value perception in 'compassion', it was found that both the experimental and control group scored well more than 70% and 70% marks in the value perception of the 'compassion'. Further it was found that the mean value perception for the value, of the experimental group was higher than that of control group. From the standard deviations and standard error of means of both the groups, it was also observed that the students of experimental group were more homogeneous in terms of their value perceptions in 'compassion' in comparison to their counterpart.

To find whether the difference in the mean value perception of the value 'compassion' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$29, **"**There will be no significant difference between mean post- test value perception of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'compassion" , Mann- Whitney U- test was used which is given in the table 4.58 followed by analysis.

Table 4.58: Summary of Mann- Whitney U- test for value perception of the value 'Compassion'. Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1596	476.00	-2.25	0.0122
Control	37	1179			

From the table 4.58 it was observed that the sum of ranks of the experimental and control groups for the value perception of the value 'Compassion' were 1596 and 1179 respectively with 37 students in both the groups. The value of U and z were found to be 476.00 and -2.25 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -2.25$ and the two tailed probability was found to be 0.0122 which is less than our decided significance level (α**)** i.e $\alpha = 0.05$. Hence the null hypothesis $H_0$29 is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value perception in the value 'compassion'. Further referring table 4.57, it was found that the mean scores of experimental group in value perception in the said value was higher than that of the control group, which may be due to very good understanding about the value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value perception of students in the value 'compassion'.

4.3.9 Effectiveness of Value Perception of Experimental and Control Group for the Value 'Gratitude'.

To study the effectiveness of the ViEL in terms of the value perception of the value 'gratitude' and to test the hypotheses $H_0$30, the summary of the analyzed data is presented in tables 4.59 and 4.60 along with the interpretation are discussed.

Table 4.59: Mean S.D and S.E.M Wise Distribution of Value Perception of Standard IX CBSE Students in the Value 'Gratitude'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	19.86	4.14	0.68
Control	37	17.11	4.72	0.78

From the table 4.59 it was observed that the mean value perception of the value 'gratitude' of the experimental group and control group was 19.86 and 17.11 respectively out of 25 marks. The standard deviation from the mean scores of value perception for the value 'gratitude' in students was found to be 4.14 and 4.72 respectively for the experimental group and control group. The standard error of mean was 0.68 and 0.78 for the respective groups. Observing the mean value perception in 'gratitude', it was found that both the experimental and control group scored well more than 70% and 60% marks in the value perception of the 'gratitude'. Further it was found that the mean value perception for the said value of the experimental group was higher than that of control group. From the standard deviations and standard error of means of both the groups, it was also observed that the students of experimental group were more homogeneous in terms of their value perceptions in 'gratitude' in comparison to their counterpart.

To find whether the difference in the mean value perception of the value 'gratitude' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$30, **"**There will be no significant difference between mean post- test value perception of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'gratitude", Mann- Whitney U- test was used which is given in the table 4.60 followed by analysis.

Table 4.60: Summary of Mann- Whitney U- test for value perception of the value 'Gratitude'. Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1607	465.00	-2.37	0.0089
Control	37	1168			

From the table 4.60 it was observed that the sum of ranks of the experimental and control groups for the value perception of the value 'gratitude' were 1607 and 1168 respectively with 37 students in both the groups. The value of U and z were found to be 465.00 and -2.37 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -2.37$ and the two tailed probability was found to be 0.0089 which is less than our decided significance level (α) i.e $\alpha = 0.05$. Hence the null hypothesis $H_0$30 is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value perception in the said value. Further referring table 4.59, it was found that the mean scores of experimental group in value perception in the value 'gratitude' was higher than that of the control group, which may be due to very good understanding about the value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value perception of students in the value 'gratitude'.

4.3.10 Effectiveness of Value Perception of Experimental and Control Group for the Value 'Quest for Knowledge'.

To study the effectiveness of the ViEL in terms of the value perception of the value 'quest for knowledge' and to test the hypotheses $H_0$31, the summary of the analyzed data is presented in tables 4.61 and 4.62 along with the interpretation and discussion.

Table 4.61: Mean, S.D And S.E.M Wise Distribution of Value Perception of Standard IX CBSE Students in the Value 'Quest For Knowledge'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	20.08	3.98	0.65
Control	37	16.30	4.54	0.75

From the table 4.61 it was observed that the mean value perception of the value 'quest for knowledge' of the experimental group and control group was 20.08 and 16.30 respectively out of 25 marks. The standard deviation from the mean scores of value perception for the value in students was found to be 3.98 and 4.54 respectively for the experimental group and control group. The standard error of mean was 0.65 and 0.75 for the respective groups. Observing the mean value perception in 'quest for knowledge', it was found that both the experimental and control group scored well more than 80% and 60% marks in the value perception of the 'quest for knowledge'.

Further it was found that the mean value perception for the value, of the experimental group was quite higher than that of control group. From the standard deviations and standard error of means of both the groups, it was also observed that the students of experimental group were more homogeneous in terms of their value perceptions in 'quest for Knowledge' in comparison to their counterpart.

To find whether the difference in the mean value perception of the value 'quest for knowledge' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$31, **"**There will be no significant difference between mean post- test value perception of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'quest for knowledge", Mann- Whitney U- test was used which is given in the table 4.62 followed by analysis.

Table 4.62: Summary of Mann- Whitney U- test for value perception of the value 'Quest for knowledge'. Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1714	358.00	-3.53	0.00023
Control	37	1061			

From the table 4.62 it was observed that the sum of ranks of the experimental and control groups for the value perception of the value 'quest for knowledge' were 1714and 1061 respectively with 37 students in both the groups. The value of U and z were found to be 358.00 and -3.53 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -3.53$ and the two tailed probability was found to be 0.00023 which is less than our decided significance level (α) i.e $\alpha = 0.05$ .Hence the null hypothesis $H_0$31, is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value perception in the value 'quest for knowledge'. Further referring table 4.19, it was found that the mean scores of experimental group in value perception in the said value was significantly higher than that of the control group, which may be due to very good understanding about the value 'quest for knowledge'. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found

significantly effective in terms of enhancing value perception of students in the value 'quest for knowledge'.

4.3.11 Effectiveness of Value Perception of Experimental and Control Group for the Value 'Discrimination'.

To study the effectiveness of the ViEL in terms of the value perception of the value 'discrimination' and to test the hypotheses $H_0$32, the summary of the analyzed data is presented in tables 4.63 and 4.64 along with the interpretation and discussion.

Table 4.63: Mean, S.D And S.E.M Wise Distribution of Value Perception of Standard IX CBSE Students in the Value 'Discrimination'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	19.27	2.80	0.46
Control	37	17.95	4.27	0.70

From the table 4.63 the mean value perception of the value 'discrimination' of the experimental group and control group was 19.27 and 17.95 respectively out of 25 marks. The standard deviation from the mean scores of value perception for the value in students was found to be 2.80 and 4.27 respectively for the experimental group and control group. The standard error of mean was 0.46 and 0.70 for the respective groups. Observing the mean value perception in 'discrimination', it was found that both the experimental and control group scored well more than 70% each marks in the value perception of the 'discrimination'. Further it was found that the mean value perception for the value, of the experimental group and control group differs slightly. From the standard deviations and standard error of means of both the groups, it was also observed that the students of experimental group and control group are equally spreaded in terms of their value perceptions in 'discrimination'.

To find whether the difference in the mean value perception of the value 'discrimination' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$32, **"**There will be no significant difference between mean post- test value perception of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'discrimination", Mann- Whitney U- test was used which is given in the table 4.64 followed by analysis.

Table 4.64: Summary of Mann- Whitney U- test for value perception of the value 'Discrimination'. Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1430	642.50	-0.45	0.3264
Control	37	1346			

From the table 4.64 it was observed that the sum of ranks of the experimental and control groups for the value perception of the value 'discrimination' were 1430 and 1346 respectively with 37 students in both the groups. The value of U and z were found to be 642.50 and -0.45 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -0.45$ and the two tailed probability was found to be 0.3264 which is more than our decided significance level (α) i.e $\alpha = 0.05$. Hence the null hypothesis $H_0$32 is retained and it can be said that the experimental group and control group students does not differ significantly in the terms of their value perception in the said value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science had no impact on students in terms of enhancing value perception of students in the value 'discrimination'.

4.3.12 Effectiveness of Value Perception of Experimental and Control Group for the Value 'Honesty'

To study the effectiveness of the ViEL in terms of the value perception of the value 'honesty' and to test the hypotheses $H_0$33, the summary of the analyzed data is presented in tables 4.65 and 4.66 along with the interpretation and discussion.

Table 4.65: Mean, S.D and S.E.M Wise Distribution of Value Perception of Standard IX CBSE Students in the Value 'Honesty'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	20.14	3.39	0.56
Control	37	16.68	5.13	0.84

From the table 4.65 it was observed that the mean value perception of the value 'honesty' of the experimental group and control group was 20.14 and 16.68

respectively out of 25 marks. The standard deviation from the mean scores of value perception for the value in students was found to be 3.39 and 5.13 respectively for the experimental group and control group. The standard error of mean was 0.56 and 0.84 for the respective groups. Observing the mean value perception in 'honesty', it was found that both the experimental and control group scored well more than 80% and 60% marks in the value perception of the 'honesty'. Further it was found that the mean value perception for the value, of the experimental group was quite higher than that of control group. From the standard deviations and standard error of means of both the groups, it was also observed that the students of experimental group were more homogeneous in terms of their value perceptions in 'honesty' in comparison to their counterpart.

To find whether the difference in the mean value perception of the value 'honesty' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$33, **"**There will be no significant difference between mean post- test value perception of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'honesty'', Mann- Whitney U- test was used which is given in the table 4.66 followed by analysis.

Table 4.66: Summary of Mann- Whitney U- test for value perception of the value 'Honesty' Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1662	410.50	-2.96	0.0015
Control	37	1114			

From the table 4.66 it was observed that the sum of ranks of the experimental and control groups for the value perception of the value 'honesty' were 1662 and 1114 respectively with 37 students in both the groups. The value of U and z were found to be 410.50 and -2.96 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -2.96$ and the two tailed probability was found to be 0.0015 which is less than our decided significance level (α) i.e $\alpha = 0.05$. Hence the null hypothesis $H_0$33, is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value perception in the

value 'honesty'. Further referring table 4.65, it was found that the mean scores of experimental group in value perception in the value 'honesty' was significantly higher than that of the control group, which may be due to very good understanding about the said value. Therefore it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value perception of students in the value 'honesty'.

4.3.13 Effectiveness of Value Perception of Experimental and Control Group for the Value 'Spirit of Inquiry'.

To study the effectiveness of the ViEL in terms of the value perception of the value 'spirit of inquiry' and to test the hypotheses $H_0$34, the summary of the analyzed data is presented in tables 4.67 and 4.68 along with the interpretation and discussion.

Table 4.67: Mean, S.D And S.E.M Wise Distribution of Value Perception of Standard IX CBSE Students in the Value 'Spirit Of Inquiry'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	21.43	3.40	0.56
Control	37	17.14	4.21	0.69

From the table 4.67 it was observed that the mean value perception of the value 'spirit of inquiry' of the experimental group and control group was 21.43 and 17.14 respectively out of 25 marks. The standard deviation from the mean scores of value perception for the value in students was found to be 3.40 and 4.21 respectively for the experimental group and control group. The standard error of mean was 0.56 and 0.69 for the respective groups. Observing the mean value perception in 'spirit of inquiry', it was found that both the experimental and control group scored well more than 80% and 60% marks in the value perception of the 'spirit of inquiry'. Further it was found that the mean value perception for the value, of the experimental group was quite higher than that of control group. From the standard deviations and standard error of means of both the groups, it was also observed that the students of experimental group were more homogeneous in terms of their value perceptions in 'spirit of inquiry' in comparison to their counterpart.

To find whether the difference in the mean value perception of the value 'spirit of inquiry' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$34, **"**There will be no significant difference between

mean post- test value perception of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'spirit of inquiry", Mann- Whitney U- test was used which is given in the table 4.68 followed by analysis.

Table 4.68: Summary of Mann- Whitney U- test for value perception of the value 'Spirit of inquiry'. Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1785	287.50	-4.29	0.00003
Control	37	990.5			

From the table 4.68 it was observed that the sum of ranks of the experimental and control groups for the value perception of the value 'spirit of inquiry' were 1785 and 990.5 respectively with 37 students in both the groups. The value of U and z were found to be 287.50 and -4.29 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -4.29$ and the two tailed probability was found to be 0.00003 which is less than our decided significance level (α) i.e $\alpha = 0.05$ Hence the null hypothesis $H_0$34, is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value perception in the value 'spirit of inquiry'. Further referring table 4.67, it was found that the mean scores of experimental group in value perception in the value 'spirit of inquiry' was significantly higher than that of the control group, which may be due to very good understanding about the value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value perception of students in the value 'spirit of inquiry'.

4.3.14 Value Perception of Experimental and Control Group for the Value 'Co-operation'.

To study the effectiveness of the ViEL in terms of the value perception of the value 'co-operation' and to test the hypotheses $H_0$35, the summary of the analyzed data is presented in tables 4.69 and 4.70 along with the interpretation and discussion.

Table 4.69: Mean, S.D And S.E.M Wise Distribution of Value Perception of Standard IX CBSE Students in the Value 'Co-Operation'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	17.43	4.64	0.76
Control	37	14.86	6.06	1.00

From the table 4.69 it was observed that the mean value perception of the value 'co-operation' of the experimental group and control group was 17.43 and 14.86 respectively out of 25 marks. The standard deviation from the mean scores of value perception for the value in students was found to be 4.64 and 6.06 respectively for the experimental group and control group. The standard error of mean was 0.76 and 1.00 for the respective groups. Observing the mean value perception in 'co-operation', it was found that both the experimental and control group scored well more than 60% and 50% marks in the value perception of the 'co-operation'. Further it was found that the mean value perception for the value, of the experimental group was higher than that of control group. From the standard deviations and standard error of means of both the groups, it was also observed that the students of experimental group were more homogeneous in terms of their value perceptions in 'co-operation' in comparison to their counterpart.

To find whether the difference in the mean value perception scores of the value 'co-operation' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$35, **"**There will be no significant difference between mean post- test value perception of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'co-operation'' Mann- Whitney U- test was used which is given in the table 4.70 followed by analysis.

Table 4.70: Summary of Mann- Whitney U- test for value perception of the value 'Co-operation'. Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1553	519.00	-1.79	0.0367
Control	37	1222			

From the table 4.70 it was observed that the sum of ranks of the experimental and control groups for the value perception of the value 'co-operation' were 1553and 1222 respectively with 37 students in both the groups. The value of U and z were found to be 519.00 and -1.79 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -1.79$ and the two tailed probability was found to be 0.0367 which is less than our decided significance level (α) i.e $\alpha = 0.05$. Hence the null hypothesis $H_0$35 is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value perception in the value 'co-operation'. Further referring table 4.69, it was found that the mean scores of experimental group in value perception in the value 'co-operation' was higher than that of the control group, which may be due to good understanding about the said value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value perception of students in the value 'co-operation.'

4.3.15 Value Perception of Experimental and Control Group for the Value 'Equality'.

To study the effectiveness of the ViEL in terms of the value perception of the value 'equality' and to test the hypotheses $H_0$36, the summary of the analyzed data is presented in tables 4.71 and 4.72 along with the interpretation and discussion.

Table 4.71: Mean, S.D and S.E.M wise distribution of value perception score of standard IX CBSE students in the value 'Equality'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	19.19	3.54	0.58
Control	37	15.97	4.61	0.76

From the table 4.71it was observed that the mean value perception of the value 'equality' of the experimental group and control group were 19.19 and 15.97 respectively out of 25 marks. The standard deviation from the mean scores of value perception for the value in students was found to be 3.54 and 4.61 respectively for the experimental group and control group. The standard error of mean was 0.58 and 0.76 for the respective groups. Observing the mean value perception in 'equality, it was found that both the experimental and control group scored well more than 70% and 60% marks in the value perception of the 'equality'. Further it was found that the

mean value perception for the value, of the experimental group was higher than that of control group. From the standard deviations and standard error of means of both the groups, it was also observed that the students of experimental group were more homogeneous in terms of their value perceptions in 'equality' in comparison to their counterpart.

To find whether the difference in the mean value perception of the value 'equality' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$36, **"**There will be no significant difference between mean post- test value perception of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'equality",Mann- Whitney U- test was used which is given in the table 4.72 followed by analysis.

Table 4.72: Summary of Mann- Whitney U- test for value perception of the value Equality Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	**N**	**Sum of Ranks**	**U-Value**	**z-Value**	**Probability (p)**
Experimental	37	1659	413.00	-2.94	0.0016
Control	37	1116			

From the table 4.72 it was observed that the sum of ranks of the experimental and control groups for the value perception of the value 'equality' were 1659 and 1116 respectively with 37 students in both the groups. The value of U and z were found to be 413.00 and -2.94 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -2.94$ and the two tailed probability was found to be 0.0016 which is less than our decided significance level (α**)** i.e $\alpha = 0.05$. Hence the null hypothesis $H_0$36 is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value perception in the value 'equality'. Further referring table 4.71, it was found that the mean scores of experimental group in value perception in the value 'equality' was higher than that of the control group, which may be due to good understanding about the said value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value perception of students in the value 'equality'.

4.3.16 Effectiveness of Value Perception of Experimental and Control Group for the Value 'Simplicity'.

To study the effectiveness of the ViEL in terms of the value perception of the value 'simplicity' and to test the hypotheses $H_0$37, the summary of the analyzed data is presented in tables 4.73 and 4.74 along with the interpretation are discussion.

Table 4.73: Mean, S.D and S.E.M Wise Distribution of Value Perception of Standard IX CBSE Students in the Value 'Simplicity'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	17.92	3.36	0.55
Control	37	16.22	4.53	0.74

From the table 4.73 it was observed that the mean value perception of the value 'simplicity' of the experimental group and control group was 17.92 and 16.22 respectively out of 25 marks. The standard deviation from the mean scores of value perception for the value in students was found to be 3.36 and 4.53 respectively for the experimental group and control group. The standard error of mean was 0.55 and 0.74 for the respective groups. Observing the mean value perception in 'simplicity, it was found that both the experimental and control group scored well more than 70% and 60% marks in the value perception of the 'simplicity'. Further it was found that the mean value perception for the value, of the experimental group was higher than that of control group. From the standard deviations and standard error of means of both the groups, it was also observed that the students of experimental group were more homogeneous in terms of their value perceptions in 'simplicity' in comparison to their counterpart.

To find whether the difference in the mean value perception of the value 'simplicity' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$37, **"**There will be no significant difference between mean post- test value perception of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'simplicity", Mann- Whitney U- test was used which is given in the table 4.74 followed by analysis.

Table 4.74: Summary of Mann- Whitney U- test for value perception of the value 'Simplicity'. Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1515	557.50	-1.37	0.0853
Control	37	1261			

From the table 4.74 it was observed that the sum of ranks of the experimental and control groups for the value perception of the value 'simplicity' were 1515 and 1261 respectively with 37 students in both the groups. The value of U and z were found to be 557.50 and -1.37 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -1.37$ and the two tailed probability was found to be 0.0853 which is more than our decided significance level (α) i.e $\alpha = 0.05$. Hence the null hypothesis $H_0$37 is retained and it can be said that the experimental group and control group students does not differ significantly in the terms of their value perception in the said value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was not having any impact on students in terms of enhancing value perception of students in the value 'simplicity.'

4.3.17 Effectiveness of Value Perception of Experimental and Control Group for the Value 'Determination'.

To study the effectiveness of the ViEL in terms of the value perception of the value 'determination' and to test the hypotheses $H_0$38, the summary of the analyzed data is presented in tables 4.75 and 4.76 along with the interpretation and discussion.

Table 4.75: Mean, S.D And S.E.M Wise Distribution of Value Perception Score of Standard IX CBSE Students in the Value 'Determination'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	16.97	3.90	0.64
Control	37	13.78	5.23	0.86

From the table 4.75 it was observed that the mean value perception of the value 'determination' of the experimental group and control group were 16.97and 13.78

respectively out of 25 marks. The standard deviation from the mean scores of value perception for the value in students was found to be 3.90 and 5.23 respectively for the experimental group and control group. The standard error of mean was 0.64 and 0.86 for the respective groups. Observing the mean value perception in 'determination' it was found that both the experimental and control group scored well more than 60% and 50% marks in the value perception of the 'determination'. Further it was found that the mean value perception for the value, of the experimental group was higher than that of control group. From the standard deviations and standard error of means of both the groups, it was also observed that the students of experimental group were more homogeneous in terms of their value perceptions in 'determination' in comparison to their counterpart.

To find whether the difference in the mean value perception of the value 'determination' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$38, **"**There will be no significant difference between mean post- test value perception of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'determination'', Mann- Whitney U- test was used which is given in the table 4.76 followed by analysis.

Table 4.76: Summary of Mann- Whitney U- test for value perception of the value 'Determination' Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1629	443.00	-2.61	0.0045
Control	37	1146			

From the table 4.76 it was observed that the sum of ranks of the experimental and control groups for the value perception of the value 'determination' were 1629 and 1146 respectively with 37 students in both the groups. The value of U and z were found to be 443.00 and -2.61 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -2.61$ and the two tailed probability was found to be 0.0045 which is less than our decided significance level (α) i.e $\alpha = 0.05$. Hence the null hypothesis $H_0$38 is rejected and it can be said that the experimental group and

control group students differ significantly in the terms of their value perception in the value 'determination.' Further referring table 4.75, it was found that the mean scores of experimental group in value perception in the value 'determination' was higher than that of the control group, which may be due to good understanding about the said value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value perception of students in the value 'determination'.

4.3.18 Effectiveness of Value Perception of Experimental and Control Group for the Value 'Common Goal'.

To study the effectiveness of the ViEL in terms of the value perception of the value 'common goal' and to test the hypotheses $H_0$39, the summary of the analyzed data is presented in tables 4.77 and 4.78 along with the interpretation and discussion.

Table 4.77: Mean, S.D and S.E.M Wise Distribution of Value Perception of Standard IX CBSE Students in the Value 'Common Goal'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	16.35	4.66	0.77
Control	37	13.27	6.32	1.04

Following conclusions can be derived from the table 4.77 .Mean value perception of the value 'common goal' of the experimental group and control group were 16.35 and 13.27 respectively out of 25 marks. The standard deviation from the mean scores of value perception for the value in students was found to be 4.66 and 6.32 respectively for the experimental group and control group. The standard error of mean was 0.77 and 1.04 for the respective groups. Observing the mean value perception in 'common goal' it was found that both the experimental and control group scored well more than 60% and 50% marks in the value perception of the 'common goal'. Further it was found that the mean value perception for the value 'common goal' of the experimental group was higher than that of control group. From the standard deviations and standard error of means of both the groups, it was also observed that the students of experimental group were more homogeneous in terms of their value perceptions in 'common goal' in comparison to their counterpart.

To find whether the difference in the mean value perception of the value 'common goal' of the control group and experimental group was significant or by chance and

to test the null hypothesis, $H_0$39, "There will be no significant difference between mean post- test value perception of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'common goal'' Mann- Whitney U- test was used which is given in the table 4.78 followed by analysis.

Table 4.78: Summary of Mann- Whitney U- test for value perception of the value 'Common Goal'. Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1562	510.00	-1.89	0.0294
Control	37	1213			

From the table 4.78 it was observed that the sum of ranks of the experimental and control groups for the value perception of the value 'common goal' were 1562 and 1213 respectively with 37 students in both the groups. The value of U and z were found to be 510.00 and -1.89 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -1.89$ and the two tailed probability was found to be 0.0294 which is less than our decided significance level (α) i.e $\alpha = 0.05$. Hence the null hypothesis $H_0$39, is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value perception in the value 'common goal'. Further referring table 4.77 it was found that the mean scores of experimental group in value perception in the value 'common goal' was higher than that of the control group, which may be due to good understanding about the said value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value perception of students in the value 'common goal'.

4.3.19 Effectiveness of Value Perception of Experimental and Control Group for the Value 'dignity of labour'.

To study the effectiveness of the ViEL in terms of the value perception of the value 'dignity of labour' and to test the hypotheses $H_0$40, the summary of the analyzed data is presented in tables 4.79 and 4.80 along with the interpretation and discussion.

Table 4.79: Mean, S.D And S.E.M Wise Distribution of Value Perception of Standard IX CBSE Students in the Value 'Dignity Of Labour'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	19.84	4.30	0.71
Control	37	15.86	4.53	0.75

From the table 4.79 it was observed that the mean value perception of the value 'dignity of labour' of the experimental group and control group was 19.84 and 15.86 respectively out of 25 marks. The standard deviation from the mean scores of value perception for the value in students was found to be 4.30 and 4.53 respectively for the experimental group and control group. The standard error of mean was 0.71 and 0.75 for the respective groups. Observing the mean value perception in 'dignity of labour' it was found that both the experimental and control group scored well more than 75% and 60% marks in the value perception of the 'dignity of labour'. Further it was found that the mean value perception for the value, of the experimental group was higher than that of control group. From the standard deviations and standard error of means of both the groups, it was also observed that the students of experimental group were more homogeneous in terms of their value perceptions in 'dignity of labour' in comparison to their counterpart.

To find whether the difference in the mean value perception of the value 'dignity of labour' of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$40, **"**There will be no significant difference between mean post- test value perception of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of 'dignity of labour'', Mann- Whitney U- test was used which is given in the table 4.80 followed by analysis.

Table 4.80: Summary of Mann- Whitney U- test for value perception of the value 'Dignity of Labour'. Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1698	374.50	-3.35	0.00023
Control	37	1078			

From the table 4.80 it was observed that the sum of ranks of the experimental and control groups for the value perception of the value 'dignity of labour' were 1698 and 1078 respectively with 37 students in both the groups. The value of U and z were found to be 374.50 and -3.35 respectively. Referring table for normal probability under null hypothesis (H_0) of z ,for $z \leq -3.35$ and the two tailed probability was found to be 0.00023 which is less than our decided significance level (α) i.e $\alpha = 0.05$**.** Hence the null hypothesis $H_0$40 is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value perception in the value 'dignity of labour'. Further referring table 4.79 it was found that the mean scores of experimental group in value perception in the value 'dignity of labour' was quite higher than that of the control group, which may be due to good understanding about the said value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value perception of students in the value 'dignity of labour'.

4.3.20 Effectiveness of Value Perception of Experimental and Control Group for the Value 'Discipline'.

To study the effectiveness of the ViEL in terms of the value perception of the value 'discipline' and to test the hypotheses $H_0$41, the summary of the analyzed data is presented in tables 4.81 and 4.82 along with the interpretation and discussion.

Table 4.81: Mean, S.D And S.E.M Wise Distribution of Value Perception of Standard IX CBSE Students in the Value 'Discipline'.

Groups	N	Mean	S.D	S.E.M
Experimental	37	20.35	4.67	0.77
Control	37	16.46	4.36	0.72

From the table 4.81 it was observed that the mean value perception of the value 'discipline' of the experimental group and control group were 20.35 and 16.46 respectively out of 25 marks. The standard deviation from the mean scores of value perception for the value in students was found to be 4.67 and 4.36 respectively for the experimental group and control group. The standard error of mean was 0.77 and 0.72 for the respective groups. Observing the mean value perception in 'discipline' it was found that both the experimental and control group scored well more than 80% and 60% marks in the value perception of the 'discipline'. Further it was found that the

mean value perception for the value ‘discipline’ of the experimental group was higher than that of control group. From the standard deviations and standard error of means of both the groups, it was also observed that the students of experimental group and control group were equally spreaded in terms of their value perceptions in ‘discipline.

To find whether the difference in the mean value perception of the value ‘discipline’ of the control group and experimental group was significant or by chance and to test the null hypothesis, $H_0$41, **“**There will be no significant difference between mean post- test value perception of the learners taught through value integrated experiential learning approach and learners taught through the traditional teaching approach in the value of ‘discipline’’ Mann- Whitney U- test was used which is given in the table 4.82 followed by analysis.

Table 4.82: Summary of Mann- Whitney U- test for value perception of the value ‘Discipline’. Experimental and Control group students with the number of sample, Sum of Ranks, U-value. z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1692	380.00	-3.29	0.0007
Control	37	1083			

From the table 4.82 it was observed that the sum of ranks of the experimental and control groups for the value perception of the value ‘discipline’ were 1692 and 1083 respectively with 37 students in both the groups. The value of U and z were found to be 380.00 and -3.29 respectively. Referring table for normal probability under null hypothesis (H_0)of z ,for $z \leq -3.29$ and the two tailed probability was found to be 0.0007 which is less than our decided significance level(α) i.e $\alpha = 0.05$. Hence the null hypothesis $H_0$41 is rejected and it can be said that the experimental group and control group students differ significantly in the terms of their value perception in the value ‘discipline’. Further referring table 4.81it was found that the mean scores of experimental group in value perception in the value ‘discipline’ was quite higher than that of the control group, which may be due to good understanding about the said value. Therefore, it can be said that the implemented value integrated experiential learning approach for teaching Science was found significantly effective in terms of enhancing value perception of students in the value ‘discipline’.

4.3.21. Effectiveness of the ViEL in terms of Overall Value Perception.

To study the effectiveness of the ViEL in terms of the overall value perception taking the sum total of all the 20 values and to test the hypothesis $H_0$42, the summary of the analyzed data is presented in tables 4.83 and 4.84 along with the interpretation are discussed.

Table 4.83: Mean, SD, and SEM wise distribution of Overall Value Perception of Standard IX CBSE students.

Groups	N	Mean	S.D	S.E.M
Experimental	37	370.5	40.07	6.59
Control	37	321.0	45.35	7.46

From the table 4.83 it was found that the overall mean scores of value perception of the experimental group and control group were 370.5 and 321.00 respectively out of the total scores 500. The standard deviations from the means for the overall value perception were found to be 40.07 and 45.35 respectively for the experimental and control group students with standard error of means of 6.59 and 7.46 for the respective groups. From the tabled values of mean for overall value perception of students of experimental group it is evident that they scored 74.1% as compared to control group mean scoring rate of 64.2% with aggregate difference in scoring in overall value perception of 9.9%.That means the scoring of experimental group in overall value perception is higher than control group. Further it is also observed from the table 4.83 that standard deviation and standard error of means of both the groups, experimental and control groups were equally scattered in terms of their overall value perception.

To find whether the difference in the overall mean of value perception for the experimental and control group was significant or by chance and to test the null hypotheses, $H_0$42 "There will be no significant difference between mean post-test value perception of learners taught through Value integrated Experiential Learning approach and learners taught through the traditional teaching approach in the twenty selected values", Mann-Whitney U-test was used as the sample was taken purposively. The summary of the Mann-Whitney U-test is given below in table 4.84 followed by analysis.

Table 4.84: Summary of the Mann-Whitney U-test of Value Perception of all the twenty values of Experimental and control group students with the number of Samples, Sum of Ranks, U-Value, z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1782	290.00	-4.26	0.00003
Control	37	993			

From table 4.84 it was observed that the sum of ranks of the experimental group and control group for the overall value perception in twenty selected values were 1782 and 993 respectively with 37 students in both of the groups. The U-value and z- value were found to be 290.00 and -4.26 respectively. Referring table for the normal probability under null hypothesis (H_0) of z<-4.26 the two tailed probability was found to be 0.00003 which is less than our decided significance level(α) i.e α =0.05.Hence the null hypothesis $H_0$42, is rejected. It can be said that the experimental group and the control group students differ significantly in terms of value perception. From table 4.83 it was also found that the mean scores of experimental group in overall value perception was more than that of the control group which may be due to teaching science through value integrated experiential learning (ViEL). Hence it can be said that the implemented ViEL was found to be stochastically effective in terms of enhancing overall value perception of students in twenty selected values.

4.4.0 Overall Mean Post Test Achievement in Science of Experimental and Control Group

To study the effectiveness of the ViEL in terms of the overall mean posttest achievement in Science and to test the hypothesis $H_0$43, the summary of the analyzed data is presented in tables 4.85 and 4.86 along with the interpretation are discussed.

Table 4.85: Mean, Standard Deviation, and Standard Errors of Means Wise Distribution of Achievement in Science of Experimental And Control Group Students

Groups	N	Mean	S.D	SEM
Experimental	37	24.70	8.46	1.39
Control	37	23.35	6.10	1.00

From the table 4.85 it was found that the overall mean scores of achievement in Science of the experimental group and control group were 24.70 and 23.35 respectively out of the total scores 50. The standard deviations from the means for the overall achievement in Science were found to be 8.46 and 6.10 respectively for the experimental and control group students with Standard error of means of 1.39 and 1.00 for the respective groups. Comparing the overall mean achievement scores in Science ,it was found that both the groups did quite well in the overall science achievement and the mean science achievement of experimental group students was slightly higher than that of control group. Further it was also observed that standard deviation and standard error of means of both the groups, experimental and control groups were equally scattered around the mean with more or less similar standard errors in terms of their overall achievement in Science. To find whether the difference in the overall mean of achievement in Science for the experimental and control group was significant or by chance and to test null hypotheses $H_0$43 'There will be no significant difference between mean post-test achievement scores of learners taught through Value integrated Experiential Learning approach and learners taught through the traditional teaching approach",Mann-Whitney U-test was used as the sample was taken purposively. The summary of the Mann-Whitney U-test is given below in table 4.86 followed by analysis.

Table 4.86: Summary of the Mann-Whitney U-test of achievement Scores in Science of Standard IX CBSE students with the number of Samples, Sum of Ranks, U-Value, z-Value and Probability.

Groups	N	Sum of Ranks	U-Value	z-Value	Probability (p)
Experimental	37	1499	573.00	-1.21	0.1131
Control	37	1276			

From table 4.86 it was observed that the sum of ranks of the experimental group and control group for achievement in science were 1499 and 1276 respectively with 37 students in both of the groups. The U-value and z- value were found to be 573.00 and -1.21 respectively. Referring table for the normal probability under null hypothesis(H_0) of z , for $z \leq -1.21$, the two tailed probability was found to be 0.1131which is more than our decided significance level(α) i.e $\alpha = 0.05$. Hence the null hypothesis $H_0$43 is retained. It can be said that the experimental group and the control group students does not differ stochastically in terms of achievement in

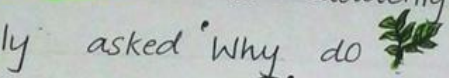
Science. From table 4.85 it was also found that the mean scores of experimental group in achievement in science was little more than that of the control group which may be due to teaching science through ViEL. Hence it can be said that the implemented ViEL was found equally effective like traditional approach of teaching science in terms of enhancing achievement in Science of students of standard IX .

4.5.0 EFFECTIVENESS OF VALUE INTEGRATED EXPERIENTIAL LEARNING IN TERMS OF VALUE PRACTICES/VALUE ACTUALIZATION

Teaching of science through Value integrated Experiential Learning (ViEL) was found to be effective in terms of enhancing value conceptual knowledge, value perception and achievement in Science. To achieve a part of the objective 3, i.e. to see the effectiveness of the ViEL in terms of the value actualization of the students of the experimental group, data were collected through observation of the researchers and the anecdotal record of the students along with their activities. The development of values in terms of value actualization has been observed from the practices of students in different ways. One of the important way of showing the value actualization of the students is done with the help of the observation of the researcher followed by a glimpse of the following activities.

(1)Our story: All students were asked in group to make one story based on twenty values. Each group worked on four values to make one story & all five group made their part and finally they integrated all five part into whole story. During integration all group members were worried about their line. It was really very hard to accommodate all lines of their stories to make final one. There was lot of discussion, reflection and argument –counterarguments by students. At that point of time the researcher felt the objective of value practices by the learner has been achieved and it is reflected in fig.4.1.

OUR STORY

A teacher once in the class was teaching about the ENVIRONMENTAL ETHICS and suddenly a boy stood up and curiously asked 'Why do  give us food and ask 4 nothing in return ?' To this teacher  and answered that V should express our gratitude to plants as they R loyal to their duty. It's duty is 2 grow ⬆ and give whatever is expected from them. The same thing happens with a man throughout his life. He is expected to ⬆ up fully disciplined and B an active citizen of the society. He is also expected 2 perform his work with honesty & simplicity. Teacher was glad to know that her students were  and had a Gr8 spirit of inquiry. Then she announced that they will be going for the  plantation in the backyard of the school but 4 that she also said that she needs co-operation from every 1. When it was the time to dig out the soil, a  said that I won't do that because I am the daughter of MLA of our area and so I will not dirty my  in the soil. To this teacher explained that having high standards doesn't matter but the dignity of labour is what matters. Then everybody was divided into different teams. With this children learnt the importance of team work. She asked the students 2 plant a

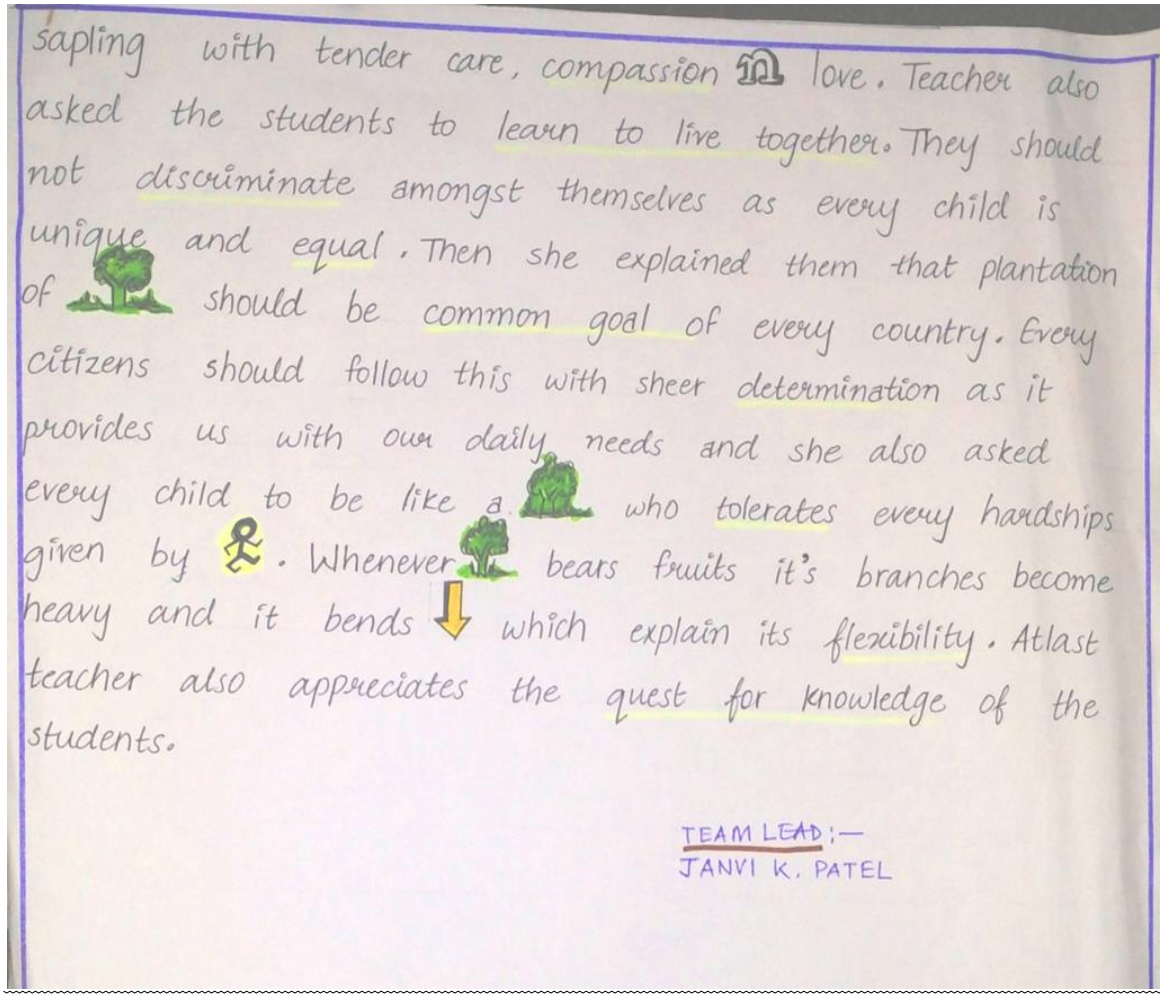


Figure 4.1: Value Story Prepared by students depicting the actualization of different values among students

(2) **Value Puzzle:** Word puzzle grid activity was assigned again in a group where in students were instructed to prepare a grid for word puzzle by using all twenty selected values. The activity was very much interesting as everyone wanted their grid will be selected and it will be rewarded too. Unlike story making, this activity allowed all students to think deeply and come out with the grid which can accommodate twenty values. The striking feature of this activity was lot of work out on grid and finally it was achieved .The major objective the activity was to sharpen their understanding about value crystallization, and to enhance their problem solving skill, team work, make them thoughtful-aggravated when not worked, making correct spelling etc. A sample World Puzzle Grid is given in figure 4.2.

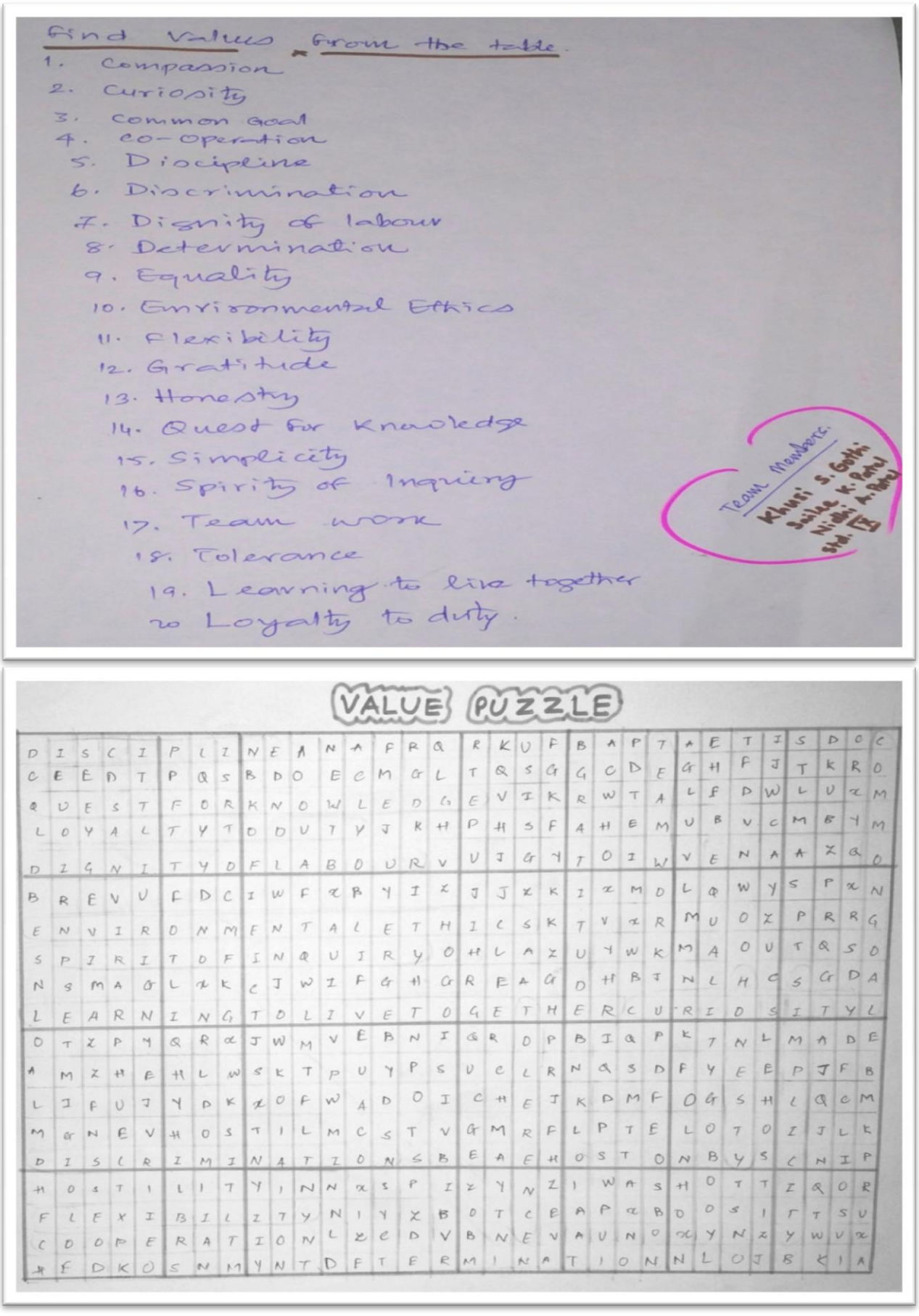


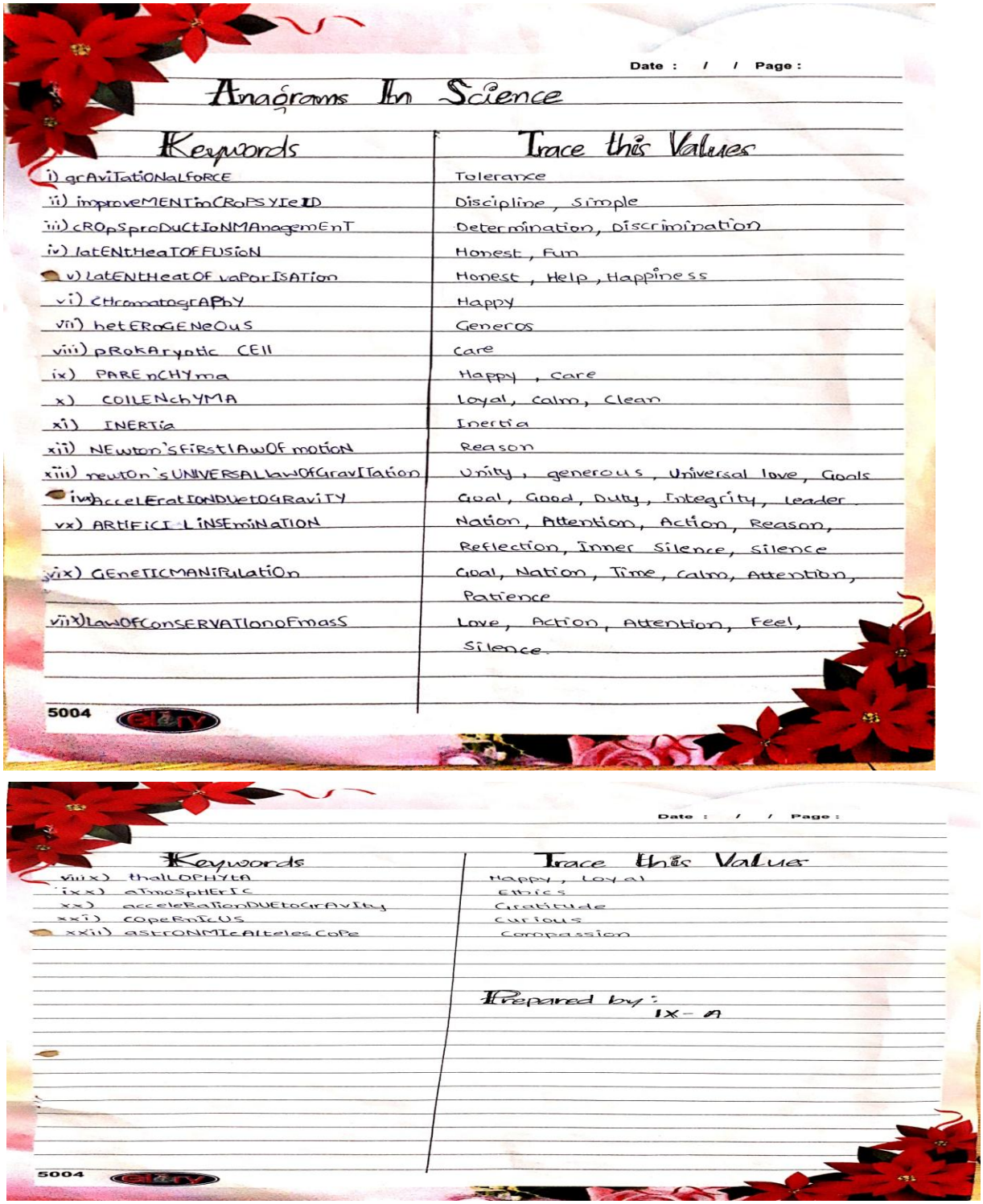
Figure 4.2: Value puzzle Grid prepared by students showing the actualization of different values.

(3)Value Logo Making: Making logo was one of the activity made by the students to show their value actualization. In order to provide an atmosphere of creating, self thinking ability, a logo making activity was organized by students. The idea behind the activity was to generate own understanding and perspective on the topic and integrating the understanding with visual media there by enabling learners to come out with their own logo. It was also a group activity and after activity it was displayed in the exhibition. A sample logo is given in figure 4.3.

Figure 4.3: Value Logo prepared by students to show the actualization of values among students**.**

(4) Anagrams

In std. IX science several associated values were highlighted by using anagrams. Anagrams are the group of words or sentences form which another meaningful words can be formed by manipulating few alphabets. A typical anagram is depicted in the following figure-4.4.



Date : / / Page :

Anagrams In Science

Keywords	Trace this Values
i) grAviTatiONalfORCE	Tolerance
ii) improveMENTinCROPSYIeLD	Discipline, Simple
iii) cROpSproDuCtIoNMAnagemEnT	Determination, Discrimination
iv) latENtHeaTOFFUSioN	Honest, Fun
v) LatENtHeatOf vaPorISATion	Honest, Help, Happiness
vi) CHromatogrAPhY	Happy
vii) hetERoGENeOuS	Generos
viii) pROkAryotic CEll	Care
ix) PARENCHYma	Happy, Care
x) COILENchYMA	Loyal, Calm, Clean
xi) INERTia	Inertia
xii) NEwton'sFiRstlAwOf motion	Reason
xiii) newtOn'sUNIVERSALlawOfGravITation	Unity, generous, Universal love, Goals
iv) AccelERatIONDUetOGRaviTY	Goal, Good, Duty, Integrity, Leader
vx) ARTIFICI LINSEmiNaTION	Nation, Attention, Action, Reason, Reflection, Inner Silence, Silence
vix) GEneTICMANiPulatiOn	Goal, Nation, Time, Calm, Attention, Patience
viix) LawOfconSERVATIonoFmasS	Love, Action, Attention, Feel, Silence.

5004

Date : / / Page :

Keywords	Trace this Values
viiix) thaLOPHYTA	Happy, Loyal
ixx) aTmoSpHERIC	Ethics
xx) acceleRatIonDUEtoGrAVITy	Gratitude
xxi) COpERNICUS	Curious
xxii) aSTRONMIcALtelesCOPe	Compassion

Prepared by:
IX-A

5004

Fig.4.4: Sample anagram

5. Value Keys and Trees

Like tress and keys which play crucial role in every ones life, values also plays pivotal role in our life without which it is difficult to lead a meaningful life. Value trees and Value keys were the activity conducted during the experiential learning where in students related values with keys and trees and understood its correlation with their life. A sample value tree for gratitude and value key for co-operation is depicted in the figure 4.5

Fig.4.5: value Keys and Trees.

4.5.1 Observation and Analysis of Anecdotal Records

Anecdotal record was used as one of the important tool to ascertain value development of students during teaching learning process spanned over whole 17 weeks. Following were the summary of events related to anecdotes of students along with the observations of the researcher.

Many a time students understands the importance of values like learning to live together harmoniously with each other in hostel as the school is residential one. It was

noticed by the researcher that when any Sunday programme or feast or cultural evening or divine darshan progamme happened in hostel, there is was a crave to get the bigger pie out of it but after the ViEL programme there was different picture altogether for those kids as they provided necessary leadership to such programmes, accommodated juniors, made less indiscipline, maintained the hostel garden nicely and appreciated the efforts of in charges (hostel warden) of the programme and it went smoothly. This reflected their environmental ethics, dignity of labour, co-operation and discipline.

In the class IX there were few poor performing students in terms of academic achievements. When the researcher discussed the story of Dasharath Manjhi-(used for inculcating values like: *common goal, discipline, Simplicity, honesty*), all were influenced by such life story and started responding positively to academic challenges which was not interesting to them at all. Even some students sat extra hours with their friends to solve their academic difficulties.

Hard work and team work are the secrets of success for any individual. The story of Jadav Payeng: The 'Forest Man of India (Learning to live together, Dignity of labour, equality, co-operation) inspired students to work in a team and work smartly. The researcher always emphasize values like (i.e personal Honesty-Discipline-Flexibility-Co-operation) makes strong foundation for future success. Few students made groups for preparing national rural IT quiz organized by Tata Consultancy Services and hosted by GUJCOST (Gujarat Council of Science & Technology) every year. Our school team comprised of few students of standard IX was qualified at district level and selected for state competition and they stood in 6^{th} place in the year 2016-17. All the students who attended state level competition solved nearly 3300 questions related to Information Technology with the help of computer faculty. This incident inspired others to follow their footsteps.

Our school organizes state level Hindi poem writing, Doha writing, drawing cum slogan making competitions for students from standard VI to XII. These standard IX students extended their helping hand to the Hindi department in organizing, planning various events like: school level competitions, drafting of letters, planning of poster exhibitions, proof reading of poems for making a compiled volume(latter published as Sai Samskruti), hosting guests and participants from other schools, making

judgment sheets for evaluators etc with the help of teachers. Also the posters of the experiential learning were displayed along with poster exhibition. The whole exhibition was managed by students of the class IX.All the account reflects their discipline, cooperation, common goal and team work.

Few students were in school scouts team and a scout's camp was organized at Dandi on the occasion of republic day. A beach clean drive was organized along with the camp. The scout master pointed out that the students of experimental group extended their utmost cooperation; they were well disciplined, loyal to their duties during the entire camp period which was a great feeling for the researcher.

Some of the students of standard IX were the part of school junior Red Cross (JRC) programe and they participated in district level rally organized by Red cross Society of Navsari on the occasion of world aids day. They displayed the spirit of compassion, equality, no discrimination policy, and team work which helped the school JRC team to be the successful team of the rally. The JRC coordinator expressed deep satisfaction over the helping attitude of the experimental group students.

During national chemistry day celebration (10th December of every year), standard IX students displayed some of their ViEL projects, master web charts that exhibited their curiosity, quest for knowledge and spirit of inquiry. Also one of the student was part of district level Indian children's science congress team, GIDC Degree Engineering science festival (Aviskar-2017) and our school science fair. This account of deep interest for science made their academic result better and they were very happy about it as they got attention from the school principal for their participation in aforesaid activities.

Further the researcher made an attempt to capture feelings, emotions, frustrations, happiness, the wow feelings, aha moment and love for learning through ViEL. Following were the major observations made by the investigator.

The questions in value perception test, achievement test and value knowledge test were too hard for some of the students but after due clarification by the researcher, they felt easy when they read all the questions with interest. Latter on they enjoyed attending all questions.

While answering questions some of them felt as if they have gone through those situations in their life and some questions were as such, they felt that one day surely it would come in their life and some of them expressed at the end of the term that they would face the situation more successfully.

They also learned how to extract values from different the subject science. They were able to learn how to use everything around them for their science learning. Some of them said ViEL deals with lot many logical questions which were good. They also said that in future this kind of class should be organized for them.

The atmosphere of class was pure and positive as a result of which the teaching was positive. It was all about value learning. It gave them the opportunity to know many new things for which they are grateful to the school for such initiatives.

Over all class discipline was good throughout the term as they started involving them in various activities. Also the class improved their image in hostel .Further they participated in school assembly with interest and contributed too.

Some of the prominent reactions of students and regular teacher of the experimental school is depicted in figure 4.6.

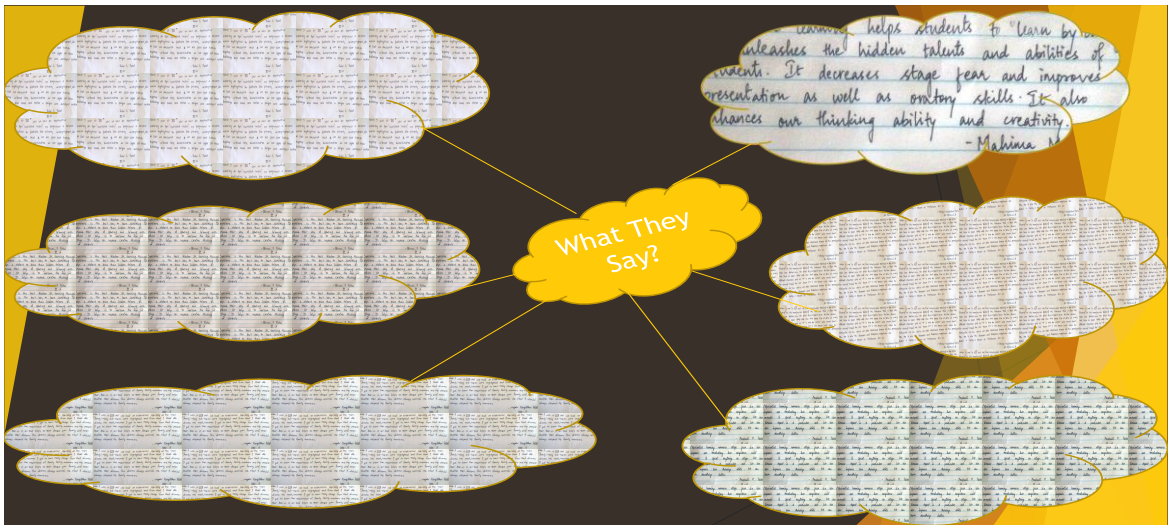


Fig.4.6: Reactions of students and teachers about ViEL)

4.6.0 EFFECTIVENESS OF THE INTERVENTION PROGRAMME IN TERMS OF REACTION OF STUDENTS

In order to achieve the objective IV of the present study data analysis and interpretation is presented as follow through tables 4.87.

Table 4.87: Summary of the reactions of the students towards the statements related to the developed intervention programme in percentage and intensity index (II).

Sl.No	Descriptors	SA in %	A in %	CNS in %	DA in %	SDA in %	Int. Index II
1	Value Integrated Experiential Learning (***ViEL***) was an active way of learning science for me.	91.89	8.11	0	0	0	4.92
2	It helped me to construct my own knowledge and understanding about science.	59.46	37.84	2.70	0.00	0.00	4.57
3	ViEL enabled me to apply my gained knowledge across the disciplinary boundaries.	67.57	27.03	5.41	0.00	0.00	4.62
4	ViEL provided to me ample	70.27	27.03	0.00	2.70	0.00	4.65

	opportunities for self observation, exploration, discovery.						
5	ViEL offered adequate opportunity for the use of reference materials, periodicals, journals, magazines and other printed materials.	72.97	24.32	2.70	0.00	0.00	4.70
6	My Individual interests and needs were taken care of in Experiential learning process.	75.68	24.32	0.00	0.00	0.00	4.76
7	ViEL opened up ways for me to co-operate with my friends.	78.38	10.81	10.81	0.00	0.00	4.68
8	ViEL in Science helped me to improve my relationship with peer group.	67.57	29.73	2.70	0.00	0.00	4.65
9	ViEL helped me to use the available resource materials optimally.	75.68	21.62	2.70	0.00	0.00	4.73
10	ViEL helped me to explore new knowledge in science.	86.49	5.41	8.11	0.00	0.00	4.78
11	ViEL helped me to bring out values inherent in all activities.	64.86	35.14	0.00	0.00	0.00	4.65
12	ViEL connected teachers with students and students with students.	62.16	32.43	5.41	0.00	0.00	4.57
13	ViEL fostered to enhance my skills.	64.86	35.14	0.00	0.00	0.00	4.65
14	It enabled me to think out of box.	78.38	16.22	5.41	0.00	0.00	4.73
15	ViEL helped me to learn	81.08	10.81	5.41	2.70	0.00	4.70

	Science easily.						
16	The activities like storytelling, role playing, Value games etc. of ViEL made me curious.	45.95	16.22	8.11	21.62	8.11	3.70
17	The explanation on values in ViEL were clear.	81.08	18.92	0.00	0.00	0.00	4.81
18	The classroom management during ViEL was good.	75.68	21.62	2.70	0.00	0.00	4.73
19	Multimedia shown during ViEL were attractive.	86.49	10.81	2.70	0.00	0.00	4.84
20	During ViEL, new terminologies were clarified by the teacher.	83.78	10.81	5.41	0.00	0.00	4.78
21	ViEL has helped me in solving day-to-day life problems.	64.86	21.62	8.11	2.70	2.70	4.43
22	I under stood the importance of Values in the life due to ViEL.	70.27	18.92	10.81	0.00	0.00	4.59
23	ViEL helped me for to practice values in my life through self-reflection.	72.97	18.92	5.41	2.70	0.00	4.62
24	I have learned reasoning and thinking rationally though ViEL	83.78	13.51	0.00	2.70	0.00	4.78
25	ViEL helped to improve my concentration and mental peace through Silent sitting.	67.57	32.43	0.00	0.00	0.00	4.68
	Average Intensity Index :						4.65

From the Table 4.87, it was found that, against the statement-01 “Value integrated Experiential Learning (ViEL) was an active way of learning science for me”, 91.89% and 8.11% respondents were Strongly Agree (SA) and Agree (A) respectively. Intensity index of 4.92 showed most of the students were strongly agreed that Value

integrated Experiential Learning (ViEL) was an active way of learning science for them.

In terms of the responses of students for the statement no.2, "It helped me to construct my own knowledge and understanding about science", 59.46%, 37.84% and 2.70% of the respondents reacted Strongly Agree, Agree , Cannot Say (CNS) respectively. The Intensity index of 4.57 showed most of the students were strongly agreed that ViEL helped them to construct their own knowledge and understanding about science.

According to the responses of students for the statement no.3, "ViEL enabled me to apply my gained knowledge across the disciplinary boundaries" 67.57%, 27.03% and 5.41% said Strongly Agree, Agree, and Cannot Say respectively. The Intensity index of 4.62 showed most of the students were strongly agreed that ViEL enabled them to apply gained knowledge across the disciplinary boundaries.

For the statement no. 4 "ViEL provided to me ample opportunities for self-observation, exploration, discovery", the responses of students were 70.27%, 27.03% and 2.70% in favour of Strongly Agree , Agree and Disagree (DA) respectively. The intensity index of 4.65 showed most of the students were strongly agreed that ViEL provided them ample opportunities for self-observation, self-exploration and self-discovery.

According to the reaction of students' for the statement "ViEL offered adequate opportunity for the use of reference materials, periodicals, journals, magazines and other printed materials" the responses were 72.97%, 24.32%, 3.70%, corresponding to Strongly Agree, Agree , Cannot Say respectively . The intensity index of 4.70 showed most of students strongly agreed that ViEL offered them adequate opportunity for the use of reference materials, periodicals, journals, magazines and other printed materials.

The responses of students towards the statement "My Individual interests and needs were taken care of in Experiential learning process" were 75.68% and 24.32% respectively corresponding to Strongly Agree, Agree . Intensity index of 4.76 shows that most of students agreed that their Individual interests and needs were taken care of in Experiential learning process.

In terms of the varying responses of students for the statement 7 "ViEL opened up ways for me to co-operate with my friends." it is 78.38%, 10.81% and

10.81%,respectively corresponding to Strongly Agree , Agree,Cannot Say. The intensity index of 4.68 shows that most of students strongly agreed that ViEL opened up ways for them to co-operate with their friends.

According to the respondents opinion for the statement "ViEL in Science helped me to improve my relationship with peer group" were 67.57%.29.73%, 2.70% corresponding to Strongly Agree, Agree and Cannot Say. The intensity index of 4.65 shows that most of students agreed strongly that ViEL in Science helped them to improve their relationship with peer group.

For the statement 9 "ViEL helped me to use the available resource materials optimally" were75.68%, 21.62%, 2.70% was inconformity to Strongly Agree, Agree, Cannot Say. The intensity index of 4.73 shows that majority of the students agreed that ViEL helped them to use the available resource materials optimally.

The responses of students towards the statement "ViEL helped me to explore new knowledge in science" were 86.49%, 5.41%, 8.11% respectively corresponding to Strongly Agree, Agree, Cannot Say .The intensity index of 4.78 shows that the reactions of student was most favourable.

In terms of the varying responses of students for the statement 11 "ViEL helped me to bring out values inherent in all activities" were 64.86% and 35.14% respectively corresponding to Strongly Agree and Agree. The intensity index of 4.65 shows that majority of students believed that ViEL helped them to bring out values inherent in all activities.

According to the respondents opinion for the statement "ViEL connected teacher with students and students with students" were 62.16%, 32.43%, 5.41%corresponding to Strongly Agree , Agree, Cannot Say .The intensity index of 4.57 shows that most of students agreed that ViEL connected teacher with students and students with students in a more cohesive manner.

For the statement 13 "ViEL fostered to enhance my skills" the responses of learner were 64.86% and 35.14% respectively inconformity to Strongly Agree and Agree. The intensity index of 4.65 shows that the reactions of student were most favourable.

The responses of students towards the statement “It enabled me to think out of box” were 78.38%, 16.22% and 5.41% respectively corresponding to Strongly Agree, Agree, Cannot Say. The intensity index of 4.73 shows that most of students strongly agreed that ViEL enabled them to think out of box.

In terms of the varying responses of students for the statement 15 “ViEL helped me to learn Science easily” were 81.08%, 10.81%, 5.41% and 2.70% respectively corresponding to Strongly Agree, Agree, Cannot Say, and Disagree (DA). The intensity index of 4.70 shows that most of students strongly agreed that ViEL helped them to learn Science easily.

According to the respondents opinion for the statement “The activities like storytelling, role playing, Value games etc. of ViEL made me curious ” were 45.95%,16.22%,8.11%,21.62%, 8.11% respectively corresponding to Strongly Agree, Agree, Cannot Say, Disagree and Strongly Disagree (SDA) respectively . The intensity index of 3.70 shows that half of the students agreed that ViEL activities like storytelling, role playing, Value games etc. of ViEL made them curious.

For the statement 17 “The explanation on values in ViEL were clear.” the responses of learner were 81.08% and 18.92% in conformity to Strongly Agree (SA)and Agree (A). The intensity index of 4.81 shows that most of students agreed on the fact that the explanation on values in ViEL were clear.

The responses of students towards the statement “The classroom management during ViEL was good..” were 75.68%,21.62%and 2.70% respectively corresponding to Strongly Agree , Agree ,Cannot Say . The intensity index of 4.73 shows that majority of students convinced about the fact that the classroom management during ViEL was good.

In terms of the varying responses of students for the statement 19 “Multimedia shown during ViEL was attractive” were 86.49%, 10.81%, 2.70% respectively corresponding to Strongly Agree, Agree, Cannot Say. The intensity index of 4.84 shows that major of leaner opined that Multimedia shown during ViEL was attractive.

According to the respondents opinion for the statement 20 “During ViEL, new terminologies were clarified by the teacher.” were 83.78%,10.81% and 5.41% corresponding to Strongly Agree , Agree ,Cannot Say. The intensity index of 4.78

shows that students were happy to say that during ViEL, new terminologies were clarified by the teacher.

For the statement 21 “ViEL has helped me in solving day-to-day life problems.” the responses of learners were 64.86%.21.62%,8.11%,2.70% and 2.70% respectively in conformity to Strongly Agree, Agree ,Cannot Say, Disagree and Strongly Disagree (SDA) . The intensity index of 4.43 shows that students were convinced about the fact that ViEL helped them in solving their day-to-day life problems.

According to the respondents opinion for the statement 22 “I understood the importance of Values in the life due to ViEL.” were 70.27%, 18.92% and 10.81% corresponding to Strongly Agree , Agree ,Cannot Say. The intensity index of 4.59 shows that students were happy to share that they understood the importance of Values in the life due to ViEL.

For the statement 23 “ViEL helped me for to practice values in my life through self-reflection” the responses of learner were 72.97%, 18.92%,5.41%, and 2.70% respectively in conformity to Strongly Agree , Agree ,Cannot Say, Disagree. The intensity index of 4.62 shows that majority of students agreed on the fact that ViEL helped them to practice values in their life through self-reflection.

According to the respondents opinion for the statement 24 “I have learned reasoning and thinking rationally though ViEL” were 83.78%, 13.51% corresponding to Strongly Agree (SA), Agree (A) and 2.70% Disagreed with it The intensity index of 4.78 shows that majority of students agreed that they learned reasoning and thinking rationally through ViEL.

For the statement 25 “ViEL helped to improve my concentration and mental peace through Silent sitting” the responses of learner were 67.57% and 32.43% in conformity to Strongly Agree , Agree .The intensity index of 4.68 shows that the reactions of student was most favourable.

The average intensity Index of 4.65 showed that most of the students reacted strongly agree for most of the statements related to the ViEL. The high Intensity index against individual components in the ViEL and the average high Intensity index showed that the implemented ViEL was found effective in terms of the reaction of students

4.7.0 MAJOR FINDINGS

Following major findings were derived from the analysis and interpretations of data.

1. The intervention programme on Value Integrated Experiential learning (ViEL) was found to be significantly effective in terms of enhancing value conceptual knowledge of students in all the taken values except the values like: co-operation, simplicity, determination, honesty, common goal, Discrimination, discipline, Flexibility, , loyalty to duty , team work and learning to live together
2. The intervention programme on Value Integrated Experiential learning (ViEL) was found to be significantly effective in terms of enhancing value perception of students in all the values except the values like: tolerance, simplicity and discrimination.
3. The intervention programme on Value Integrated Experiential learning (ViEL) was found to be effective in terms of reactions of students towards the programme as most of the students showed favorable reaction towards most of the components of value integrated experiential learning.
4. The intervention programme on Value Integrated Experiential learning (ViEL) was found to be effective in terms of value actualization of students in all the taken values as these values were reflected in their activities.
5. The Science achievement of the students learned Science through Value Integrated Experiential learning (ViEL) was equal or more in comparison to the achievement the students of the control group in Science. It showed that ViEL had no negative impact on the achievement of students in Science.

4.8.0 DISCUSSION

The value Integrated experiential learning was found effective in developing value conceptual knowledge about nine values like: *Tolerance, Curiosity, Compassion, Environmental ethics, Gratitude, dignity of labour, Spirit of inquiry, equality and Quest for knowledge* in students of standard IX. This is due to ViEL in which students were exposed to various activities conducted in classes for each value such as value songs, storytelling , value quiz, debate on scientists life history, making of value logo, scrap book activity for values etc. These values were properly integrated with the content through suitable story and anecdotes. This finding is supported by Arora (1993) & Kapoor (1995)whose studies were based on ‘ relationship between the

nature of scientific knowledge and values'. However, it was found that the value integrated experiential learning was not found to be effective in inculcating value conceptual knowledge for values like co-operation, simplicity, determination, honesty, common goal, discrimination, discipline, Flexibility, , loyalty to duty , team work and learning to live together . One of the reasons could have been that less time was invested to develop an understanding and clear knowledge about those values as there exists several conflicting situations in our daily life starting from home to school where in child is confused to pick up the right one. For this more activities like value based game could have been conducted to give clarity about those values. Also, ViEL could develop value conceptual knowledge of complex values like: *Tolerance*, *Curiosity*, *Compassion* etc. Common value conceptual knowledge is not only learnt by science but by other subjects also. Most common values like Co-operation, simplicity, determination, honesty, common goal, discrimination, discipline etc exists in society (people) and it must have been developed through social, cultural or any other interactions. In a sense ViEL was unable to accelerate it further. The studies of Banerjee (2015) & Gerstner et al (2010) revealed that value can be taught to students by approaches like-Project work-field visit –debate , Concept map etc and the present study is in this direction to teach Science to std IX students through value integrated experiential learning for the inculcation of value knowledge of twenty selected values. The findings of the present study also confirms that the developed intervention programme i.e Value integrated Experiential learning in Science was found to be effective to traditional approach stochastically in terms of the developing good value conceptual knowledge among experimental group students.

The value Integrated experiential learning was found effective in developing the perception about seventeen values like: equality, co-operation, dignity of labour, determination, honesty, common goal, curiosity, quest for knowledge, discipline, environmental ethics, spirit of inquiry, gratitude, compassion, flexibility, loyalty to duty, team work and learning to live together in students of standard IX. One of reasons could be due to various activities conducted in classes for each value and making of value logo, anagram making, value tree and key making, scrap book activity for values, value story discussion. These values were properly integrated with the content through suitable story and anecdotes about scientists. This finding is supported by Biswal & Srivastava (2006) whose study related to development of

values through CCA programme and intervention curriculum for value development of Bajpai (1990).However the Value integrated experiential learning was not found to be effective in inculcating perception for values like tolerance, simplicity and discrimination, though means for those values for experimental group was higher than control group students**.** One of the reasons could have been that more time may be required to develop perception about these values. More activities like value based game could have been conducted to give clarity about those values .Also it could be due to the lack of practice and absence of role modelling in daily life of the learners. The studies of Joshi(1998), Sharma(1994), Gerstner et al (2010)& Zuway(2010) revealed that value can be taught to students by approaches like-Value Analysis Technique, Value analysis model, concept map, inquiry based science intervention programme etc and the present study is in this direction to teach value to std IX students through value integrated experiential learning in science. The findings of the present study also confirms that the developed intervention programme i.e Value integrated Experiential learning in Science was found to be effective to traditional approach stochastically in terms of the developing good value perception among experimental group students.

One of the striking observation indicates that ViEL did not able to inculcate value knowledge and value perception among experimental group students in the values like simplicity, and discrimination though their mean scores were higher than control groups. The possibilities may be ascribed to changing life styles of people in present society where complexities are more than simplicity and everybody is in hurry to achieve their success quickly without thinking about the pros and cons of the matter. Probably we have lost our divine inner self consciousness about the power of values like: discrimination and simplicity as both these values are eternal and part of our cultural heritage.

Further ViEL was not able to create perception about 'tolerance'. This may be due to fact that in our society there is growing cases of intolerance which is penetrating slowly and everyday there are numbers of incident happening related to it which appears in main stream media(electronic and print)which may have some impact on the Childs mind about it. Without tolerance our society cannot survive. Therefore ways and means for the inculcation of value of tolerance is needed

Any activity that connects Body- Mind – Soul is essentially creates good feeling in heart which results in good experience (Zuway, 2010). Therefore our value integrated science teaching engaged these three faculties fully so that it will last forever .In the study it was observed that the achievement of students of both experimental group and control group did not differ significantly in terms of their achievement in science. However the mean achievement of experimental group in science was found slightly more than that of control group which is by chance. Therefore the implemented value integrated experiential learning in teaching science had no negative impact on the science achievement of the experimental group students.

From the study it was also found that the experimental group students gained a significant amount of curiosity and interest in learning science. This may be due to teaching Science through ViEL. Student's reactions were very high for value integrated experiential learning. This could be possible due to right mixture of activities like storytelling, group activities, value games, silent sitting, role plays and discussion of quotations during the ViEL sessions. This finding is highly supported by Bell et al (2010) & Raval (2012) through their respective studies i.e through collaborative and constructivist learning learner can achieve qualities like: aroused interest and motivation, focused attention, enabled progressive questioning, facilitated causal explanation, suggested a learning pathways, enabled flexible sharing of learning objects, deepen and extend understanding, unbiased communication, structured and reflective knowledge building.

As far as overall effectiveness of ViEL in Science as a whole is concerned the researcher can conclude in following lines **.**Hermann et al (2015) says**,** Experience is seen as a legitimate source of learning. The affective domain is often overlooked aspect of learning. Boud et al. (1993) argued that 'today's learning lays more emphasis "towards the intellect and to the analytical aspects which leads to a lack of emphasis on people as whole persons'.In ViEL process all three domains like cognitive, affective and psychomotor domains were deeply engaged which was reflected from the results obtained in value conceptual knowledge, value Perception and achievement test. Therefore it can be concluded that ViEL in Science strategy as a whole was significant in terms of its objective which is supported strongly by Smith et al(2008) & Danhui et al (2012) in their respective experiential learning studies i.e Integrated Experiential Learning Curriculum (IELC) and integration of SMART

board has shown promise for improving students and teachers' attitudes about teaching science .

Values selected in the study were further supported by the previous research works. Gratitude, indebtedness and ahimsa are vital values in Indian culture (Gupta *et al,* 2017). Integrated approach has been suggested everywhere for peace education via value education (Singh *et al,* 2018). The value analysis technique was found to be effective in terms of developing democratic values (like equality, dignity of labour, Environmental conservation) among students, through teaching of civics (Joshi.1998). Value means concern for poor and under privileged people, conservation of resources, concern for environmental degradation and values are basically related to honesty, integrity, loyalty and commitment (Mittal, 2018**).** The value analysis model is effective for developing competencies in values like :co-operation, dedication to teaching profession, nationalism, perseverance, and scientific temper etc.over traditional method(Sharma,1994).The developed CCA programme was effective in inculcation of values like; tolerance, fellow-feeling, cooperation, democratic leadership, respect for others, sacrifice, social responsibility, friendship, kindness, equality, helpfulness, social service, sympathy, social justice, a sense of living together and social value as a whole (Biswal & Srivastava,2006**).** Social values like love for People (,i.e *Compassion*) and Theoretical value such as belief in discovery of truth(i.e *Quest for knowledge*) was found positive among professional students (Mohanty,2012). In relationship between the nature of scientific knowledge and values, values do affect the understanding of the nature of scientific knowledge (Arora ,1993).

4.9.0 REFERENCE

Arora, R. (1993). *A Study on relationship between the nature of scientific knowledge and values among university teachers and students*. Unpublished doctoral dissertation (Education), Banaras Hindu University, Varanasi, U.P.

Bajpai, A. (1990). *An experimental study of an educational intervention curriculum for value development and its facilitative effect upon the level of moral judgment of children.* Unpublished doctoral dissertation (Education), B.R.D. University, Lucknow, U.P.

Banerjee,N ,Das, A. & Bhattacharyya D.(2015). Environmental Ethics among Higher Secondary Students of Bankura District, *Indian Journal of Educational Research*, vol.IV, pp 93-100.

Bell , T., Urshane, D.& Schanze,S. (2010) .Collaborative Inquiry learning: Models, tools and challenges**.** *International Journal of Science Education*, 32(3), pp349-377.

Bennett,D.(2014). The complete Science Guide for Primary students, New Delhi: Scholastic India Pvt. Ltd.

Biswal, A. & Srivastava, S. (2006). Designing, developing, and trying out of Co-Curricular Activities (CCA) to Inculcate Values and related skills Among B.Ed. Students, Report of Major Research Project, NCERT, New Delhi.

Boud, D., Cohen, R., & Walker, D. (1993). In Beaudin,B.P. and Don Quick(1995) Experiential Learning: Theoretical Underpinnings**,** High Plains Intermountain Center for Agricultural Health and Safety (HI-CAHS) Colorado State University, Colorado.

Gay,L.R.,& Airasian,P.(1976).*Educational Research: Competencies for Analysis and application(6th Ed.)*.New Jersey, Prentice Hall.

Gerstner S. & Bogner F. (2010). Cognitive achievement and motivation in hands on and teacher centered science classes : Does an additional hands on consolidation phase (concept mapping) optimize cognitive learning at work stations ? *International Journal of Science Education*, 32(7), pp849-870.

Gupta, S.& Garg, S.(2017).Science, Values and Ethics, *University News*,55(34), pp14-17.

Herman,L.& Mandell,A. (2015). Experiential Learning Revised, *Journal for learning fordevelopment(JL4D*),Vol.2(1).Retrievedfromhttp://jl4d.org/index.php/ejl4d/article/view/33/83.

Joshi, S. (1998).*Development of democratic values through value analysis technique in civics at secondary stage*. Unpublished doctoral dissertation (Education), Devi Ahilya Vishwavidyalaua, Indore, M.P.

Kapoor, A. (1995). *Value change in secondary school students: an experimental study*. Unpublished doctoral dissertation (Education), B.R. D. University, Lucknow, U.P.

Mittal,S.(2018). Students perception towards values in Education: an empirical study. *University News*, 56 (40).

Mohanty, P.(2012). A Study of Value Pattern among Professional Students, *The Ravenshaw Journal of Educational Studies*, 1 (1).

NCERT (2005). National curriculum frame work,New Delhi: NCERT,

Quisumbing,L.R. (1999) . A Framework for Teacher Education Programmes Towards International Understanding and a Culture of Peace," Kyongju, Korea. Retrieved from http://www.unescobkk.org/fileadmin/user_upload/apeid/ workshops/MTT_09 MT T_Intercultural_Underst anding.pdf.

Siegel,S. (1956). Non Parametric Statistics for the behavioural Sciences. Kogakusha Ltd,Tokyo, McGraw Hill.

Sharma, E. & Tewari,R.(2017).Teaching Sustainability through traditional wisdom: a conceptual framework for business studies, *Current Science*, 113(2), pp236-244.

Singh , A.K.& Nigam, R.(2018). Policy perspectives in peace and Value education in the Indian context.*Edutrack,*17(6),pp23-31.

Smith A. & Pecore J. (2008).Students Experience SMART Board through Constructivist Values. *International Journal of Science Education*, 30(4), pp747-755.

Zuway, Hong. (2010). Effects of a collaborative science intervention on high achieving students' learning anxiety and attitudes toward science. *International Journal of Science Education,* 32(15),pp1971-1988.