

CHAPTER – IV
Analysis and
Interpretation of data

CHAPTER – IV

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Prepared 30 lesson plans in 4 units of X class chemistry using MVDCE model and Traditional method of teaching.

Experimental Group and Control Group were respectively taught 4 units of X class chemistry using the MVDCE model and traditional method of teaching for a period of 80 days. The researcher provided adequate teaching learning material to the students of both EG and CG during teaching.

At the end of the treatment post-test Attitude Scale-II was administered to all the groups.

The results were analyzed.

3.15. Statistical Techniques employed in the study

Various statistical techniques were used to analyze the data. Descriptive statistics was used to summarize the pre-test scores and post-test scores. ANOVA was used to study the impact of MVDCE and Pearson Product moment correlation was employed to test relationship between values. The details and analysis carried out along with the findings and discussions are presented in the following chapter.

CHAPTER - IV

ANALYSIS AND INTERPRETATION OF DATA

4.0. Introduction

The data was dealt under three sections namely, Section-A Preliminary Analysis, Section-B Differential Analysis, and Section-C Co-

relational Analysis. These are discussed section-wise in detail in the following.

Section – A

In section – A, the Preliminary analysis was done to verify the Hypothesis I, “There are values hidden in the chemistry curriculum at secondary school level”, and Hypothesis II, “The developed model MVDCE of chemistry teaching will enhance the values among secondary school students”.

4.1. Preliminary Analysis

The qualitative data collected was quantified in simple analysis using simple statistics for preliminary information. The data was analyzed by using simple analysis, calculations, and preliminary results, statistical methods of but not complicated, sophisticated and complex. In the preliminary analysis, simple calculations namely computing Mean difference of Means, and percentage of Means, component-wise and value-wise stated in the tabular form. For verifying the hypothesis – I the following procedure was adopted.

Hypothesis I :- There are values hidden in the chemistry curriculum at secondary school level.

An Information sheet – I is prepared and administered to subject experts, teacher educators and teachers to write the values developed knowingly and unknowingly through chemistry teaching among secondary school students. Teaching content develops competencies and values among students. The respondents listed the values that could be developed “knowingly” or “unknowingly” in the respondent sheet. The values are implicit

and developed unknowingly are the hidden values of teaching chemistry. So there exist values hidden in chemistry. Hence hypothesis I is verified.

Hypothesis II :-The developed model MVDCE of chemistry teaching will enhance the values among secondary school students.

To verify the Hypothesis II, the simple statistics namely Mean of the scores, difference of Means, and percentage difference of Means, percentages of Means, Valid percentages and cumulative percentages were used. For verifying the hypothesis – II the following procedures were utilized. The combined Means of pre-test, post-test of CGs and EGs for over all values, FNV, HHV, MV, and EV were computed and compared in the following procedure to verify the over all enhancement in the 4 identified major values.

4.1. Table showing the details of mean scores of all the values and each of the values in the pre and post-tests of Total EG and Total CG.

Groups	Mean score of over all values				Mean score of Food and Nutritive Value				Mean score of Health and Hygienic Value				Mean score of Medicinal Value				Mean score of Environmental Value			
	Pre-test	Post-test	D	%D	Pre-test	Post-test	D	%D	Pre-test	Post-test	D	%D	Pre-test	Post-test	D	%D	Pre-test	Post-test	D	%D
EG	113.4	186.6	73.5	64.8	28.4	46.6	18.2	64.1	28.5	46.5	18	63.5	27.8	45.9	18.1	65.1	28.7	47.6	18.1	63.1
CG	113.2	128.2	15	12.3	28.6	32.6	4	13.9	28.4	31.5	3.1	10.9	27.6	30.8	3.2	11.6	28.6	33.3	5.3	18.5

Findings :-

From the above table it is evident that

1. The percentage of difference in the mean scores of Overall value and each of the values FNV, HHV, MV and EV are 64.8%, 64.1%, 63.5%, 65.1%, 65.9% respectively more in the post-test than the mean scores in the pre-test of the EG. From the above findings it is evident that the mean scores of all the values and each of the 4 values obtained by EG are more in the post-test than in the pre-test.

2. The percentage difference of over-all mean scores and each of FNV, HHV, MV and EV in the post and pre-tests obtained by EGs are 64.8; 64.1; 63.5; 65.1; 65.9 where as the CG's are 12.3; 13.9; 10.9; 11.6; 18.5 respectively.

Therefore the difference in mean scores of overall values and each of the four values in the post and pre-tests obtained by EG are more than the difference in the mean scores obtained by the CG. Hence there is an over all enhancement of all the values and each of the four values in the experimental group (s) is higher when compared to control group (s).

4.2. Table showing the details of mean scores of all the values and each of the 4 values in pre and post-tests of rural experimental and control groups.

Groups	Mean score of over all values of Rural				Mean score of Food and Nutritive Value of Rural				Mean score of Health AndHygienic Value of Rural				Mean score of Medicinal Value of Rural				Mean score of Environmental Value of Rural			
	Pre-test	Post-test	D	%D	Pre-test	Post-test	D	%D	Pre-test	Post	D	%D	Pre-test	Post-test	D	%D	Pre-test	Post-test	D	%D
EG	113.3	186.5	73.2	64.6	28.6	46.6	18	62.9	28.3	46.6	18.3	64.7	27.8	45.8	18	64.7	28.5	47.5	19	66.7
CG	113.4	128.2	14.8	13.1	28.4	32.4	4	14	28.5	31.5	3	10.5	27.6	30.5	3.1	11.2	28.4	33.2	5.2	18.3

Findings :-

The above table shows that

1. The percentage difference in the over all mean scores and each of the values FNV, HHV, MV, and EV of rural EG are 64.6%, 62.9%, 64.7%, 64.7%, and 66.7% respectively more in the post-test than in the pre-test. From the above findings it could be inferred that there is enhancement in the over all mean scores, and in each of the 4 values of the rural EG in the post-test than in the pre-test

2. The percentage difference of mean scores of overall value and each of FNV, HHV, MV and EV in the post and pre-tests of rural EG are 64.6; 62.9; 64.7; 64.7 where as the rural CG's are 13.1; 14.1; 10.5; 11.2; 18.3 respectively which are much lower than rural EG.

Hence the difference in the mean scores of over all values, and each of the 4 values in the post-test and pre-test obtained by rural EGs are more than that of rural CGs. Hence there is an over all enhancement of all the values and each of the four values in the rural experimental group when compared to rural control group.

4.3. Table showing the details of mean scores of all the value and each of the four values in the pre and post-tests of urban experimental and control groups.

Groups	Mean score of over all values in urban				Mean score of Food and Nutritive Value of urban				Mean score of Health and Hygienic Value of urban				Mean score of Medicinal Value of urban				Mean score of Environmental Value of urban			
	Pre-test	Post-test	D	%D	Pre-test	Post-test	D	%D	Pre-test	Post	D	%D	Pre-test	Post-test	D	%D	Pre-test	Post-test	D	%D
EG	113.6	186.6	73.3	64.3	28.5	46.5	18	63.2	28.5	46.4	17.9	62.8	27.5	45.9	18.4	66.9	28.5	47.6	19.1	67
CG	113.5	128.3	14.8	13	28.6	32.5	3.9	13.6	28.3	31.6	3.3	11.7	27.7	308.4	2.7	9.7	28.7	33.2	4.5	13.5

Findings :-

The above table indicates that

1. The over all mean scores of urban EG in the post-test are 64.3%; 63.2%; 62.8%; 66.9%; and 67% respectively more than the mean scores i the pre-test.Hence there is an enhancement in the over all mean scores, and each of the 4 values of urban EG in the post-test when compared to the mean scores in the pre-test.

2.The percentage difference of over all mean scores and each of FNV, HHV, MV and EV in the post and pre-tests obtained by urban EGs are 64.3; 63.2; 62.8; 66.9; and 67 where as the urban CG's are 13; 13.6; 11.7; 9.7; and 13.5 reespectively which are very low when compared to urban EG.

Hence the difference in the mean scores of overall values and each of the 4 values in the post and pre-tests obtained by urban EG.are more than that of urban CG. Hence there is enhancement of all the values and each of the four values in the urban EG when compared to urban CG.

4.4. Table showing the comparison of Mean scores of the over all values and in each of the 4 values of Rural and Urban EGs in pre and post-tests.

Particulars	Over all Mean score of EG			Mean score of FNV of EG			Mean score of HHV of EG			Mean score of MV of EG			Mean score of EV of EG		
	rural	urban	D	rural	urban	D	rural	urban	D	rural	urban	D	Rural	urban	D
Pre-Test	113.3	113.6	0.3	28.6	28.5	0.1	28.3	28.5	0.2	27.8	27.5	0.3	28.5	28.5	0
Post-Test	186.5	186.6	0.1	46.6	46.6	0	46.6	46.4	0.2	45.8	45.9	0.1	47.5	47.6	0.1

Findings :-

The above table illustrates that

1. The differences in the over all mean score and in each of the 4 values FNV, HHV, MV and EV of EG in the pre-test are 0.3, 0.1, 0.2, 0.3, 0

respectively, which implies that the initial value levels of rural and urban EGs are almost equal in the pre-test.

2. The difference in over all mean scores and in each of the values of HHV, MV, and EV of EGs of rural and urban is 0.1; 0.2; 0.1; and 0.1 respectively in the post-test which implies the difference is negligible. Therefore the enhancement of overall values and in each of HHV, MV, and EV among rural and urban EGs is equal.

3. There is zero difference in the mean scores of FNV obtained by the rural EG and urban EG in the post-test. It indicates that the enhancement of FNV value of rural and urban EGs in the post-test is equal.

From the above findings, it could be interpreted that there is no difference in the over all mean scores and the mean scores in each of the 4 values obtained by the EGs of rural and urban in the post-test. It means that the MVDCE enhanced all the 4 values and each of them equally among the EGs of rural and urban region.

4.5. Table showing the details of the mean scores of all the values and each of the 4 values obtained by boys EGs and CGs in pre and post-tests.

Group s	Mean of over all values of Boys				Mean of Food and Nutritive Value of Boys				Mean of Health and Hygienic Value of Boys				Mean of Medicinal Value of Boys				Mean of Environmental Value of Boys			
	Pre-test	Post-test	D	%D	Pre-test	Post-test	D	%D	Pre-test	Post	D	%D	Pre-test	Post-test	D	%D	Pre-test	Post-test	D	%D
EG	113.4	186.6	73.2	64.6	28.4	46.6	18.2	64.1	28.5	46.7	18.2	63.9	27.5	46	18.5	67.3	28.7	47.6	18.9	65.9
CG	113.6	128.1	4.5	3.9	28.6	32.5	3.9	13.6	28.7	31.6	2.9	10.1	27.6	31.3	3.7	13.4	28.6	33.3	5.3	18.8

Findings :-

From the above table the following findings are

1.The percentage difference of the mean scores of overall value and each of FNV, HHV, MV and EV of boys EG are 64.6%; 64.1%; 63.9%; 67.3% and 65.9% respectively are more in the post-test than in the pre-test.Hence there is enhancement in the over all mean scores and the mean scores in each of the 4 values of boys EG in the post-test when compared to their mean score in the pre-test.

2.The percentage difference of over-all mean scores and each of the 4 values of boys EG in the post-test are 64.6; 64.1; 63.9; 67.3 and 65.9 where as the boys CGs are 13.9; 13.6; 10.1;13.4 and 18.5 respectively which are very low when compared to EG

The above findings indicate that there is more enhancement in the over all value development and in each of the values among boys EG when compared to the boys CG.

4.6. Table showing the details of the mean scores of all values and each of the 4 values obtained by girls experimental and control groups in the pre and post-tests.

GrGr oups	Mean of over all values of Girls				Mean of Food and Nutritive Value of Girls				Mean of Health and Hygienic Value of Girls				Mean of Medicinal Value of Girls				Mean of Environmental Value of Girls			
	Pre-test	Post-test	D	%D	Pre-test	Post-test	D	%D	Pre-test	Post	D	%D	Pre-test	Post-test	D	%D	Pre-test	Post-test	D	%D
EG	113.2	186.5	74.3	65.6	28.6	46.6	18	62.9	28.5	46.4	18.9	66.3	27.6	45.8	18.2	65.9	28.4	47.6	19.2	67.6
CG	113.3	128.3	15	13.2	28.6	32.3	3.7	12.9	28.3	31.4	3.1	10.9	27.8	31.1	3.3	11.9	28.5	33.4	4.9	17.2

Findings :-

The above table shows that

1. The percentage difference in the mean scores of overall values and each of the four values of girls EG are 65.6%; 62.9%; 66.3%; 65.9% and 67.6% respectively are more in the post-test than in the pre-test. Hence there is enhancement in the overall mean scores and the mean scores in each of the 4 values of girls EG in the post-test when compared to their mean scores in the pre-test.

2. The percentage difference of overall mean scores overall values and each of the four values of girls EG in the post-test are 65.6; 62.9; 66.3; 65.9 and 67.6 where as the girls CGs are 13.2; 12.9; 10.9; 11.9 and 17.2 respectively.

The above findings indicate that there is more enhancement in the overall value development and in each of the values among girls EG when compared to the girls CG.

4.7. Table showing the comparison of mean scores of overall values and each of the 4 values of boys and girls EGs in pre and post-tests.

Particulars	Over all Mean score of EG			Meanscore of FNV of EG			Meanscore of HHV of EG			Mean score of MV of EG			Mean score of EV of EG		
	Boys	Girls	D	Boys	Girls	D	Boys	Girls	D	Boys	Girls	D	Boys	Girls	D
Pre-test	113.4	113.2	0.2	28.4	28.6	0.2	28.5	28.5	0	27.5	27.6	0.1	28.7	28.4	0.3
Post-test	186.6	186.5	0.3	46.6	46.6	0	46.7	46.4	0.3	46	45.8	0.2	47.6	47.6	0

Findings :-

The above table illustrates that

1. The difference in overall mean scores and in each of the 4 values of boys and girls EGs in the pre-test are 0.2, 0.2, 0, 0.1, and 0.3 respectively, which

implies that the initial value levels of boys and girls EGs are almost equal in the pre-test.

2. The difference in over all mean scores and in each of HHV, MV of boys and girls EGs is 0.3, 0.3, 0.2 respectively in the post-test which implies that the difference is negligible. Therefore the enhancement of over all values and in each of HHV, and MV among boys and girls EG are equal.

3. There is no difference in mean scores in each of FNV and EV obtained by the EGs of boys and girls in the post-test. It indicates that the enhancement of all the values and each of the value among boys and girls EG in each of FNV and EV are equal.

From the above findings it could be inferred that there is no difference in the over all enhancement of all values and each of the 4 values acquired by the EGs of boys and girls in the post-test. It means that the MVDCE enhanced all the 4 values and each of them equally among the EGs of boys and girls sample.

4.2. Valid Percentages

4.8. Table showing the valid percentages in FNV componentwise obtained in the post-test by total and region-wise.

S. No.	Components	Valid Percentage of Combined Rural and Urban Experimental Group Sample					Valid Percentage of Rural Experimental Group					Valid Percentage of Urban Experimental Group				
1.	Value of food	63.3	2.5	15	5	13.8	65	2.5	10	5	17.5	62.5	2.5	20	5	10
2.	Identification of food adulteration	63.8	14.3	6.3	8.8	6.8	67.5	12.5	7.5	10	2.5	62	17.5	5	7.5	10
3.	Food spoilage	63.8	5	12.5	11.5		62.5	2.5	17.5	7.5	10	65	7.5	7.5	17.5	12.5
4.	Precautionary measures	56.3	13.8	15	5	10	57.5	10	20	5	7.5	58.5	17.5	10	8.5	12.5
5.	Balanced diet	57.5	7.5	7.5	7.5	12.8	57	2.5	5	12.5	13	60	12.5	10	2.5	12.5

6.	Identifying the alternatives	58.8	7.5	12.5	11.3	13.8	52.5	12.5	5	15	15	57.5	2.5	20	7.5	12.5
7.	Nutritious & instant energy giving foods	55	11.3	6.3	19.8	12.5	60	15	10	25	12.5	60.5	7.5	2.5	14.5	15
8.	Nutritive value of food	63.8	12.8	12.3	10.3	13	62	13	12	10.5	2.5	65.5	12.5	7.5	10	15.5
9.	Food storage	64.8	10.3	6.3	11.3	7.5	65	15	5	10	5	64.5	5.5	7.5	12.5	10
10.	Identifying nutritious food	66	8.3	15	4	6.3	67	7.5	12.5	3	10	65	10	17.5	5	2.5

Findings :-

The valid percentages from table 4.8 imply that

1. The total EG ranked the components of FNV in the post-test 10. "identifying nutritious food (66%)" and 9. "food storage (64.8%)" as I and II; 2 "identification of food adulteration(63.8%); 3 "food spoilage (63.8%); 8 "nutritive value of food (63.8)" as III, 1. "value of food"; 6 "identifying alternatives (58.8%); 5 "balanced diet (57.5%); 4 precautionary measures; (56.3%); 7 "food storage (55%)" as IV to X respectively.

2. In the rural EG ranked the components of FNV in the post-test 2(67.5%) and 10(67%); 1(65%) and 9(65%); 3(62.5); 8(62%); 7(60%); 4(57.5%); 5(57%); 6(52.5%) were ranked from 1 to 9 respectively.

3. In the urban EG ranked the components 8(65.5%); 3(65%) and 10(65%); 9(64.5%); 1(62.5%); 2(62%); 7(60.5%); 5(60%); 4(58.5%); 6(57.5%) were ranked from 1 to 9 respectively.

S.No	Components	Valid Percentage of Combined Rural and Urban Experimental Group Sample					Valid Percentage of Rural Experimental Group					Valid Percentage of Urban Experimental Group				
1.	Identification of health measures	62.5	6.3	13.3	10.3	7	62.5	10	17.5	5	5	63	2.5	10	15.5	9
2.	Hygienic habits	65	8.3	10	7.5	8.3	67.5	7.5	12.5	7.5	5	62.5	10	7.5	7.5	12.5
3.	Malnutrition	57.3	12.5	17.5	5	8.3	57	10	13	5	15	57.5	15	20	5	2.5
4.	Hygienic value	58.5	15	7.5	13.3	5	62.5	12.5	5	17.5	2.5	55	17.5	10	10	7.5

5.	Protection of health measures	61.3	11.3	14.8	6.3	7.5	60	15	17.5	5	2.5	62.5	7.5	10	7.5	12.5
6.	Precautionary health measure	65	5	5	15	10	67.5	2.5	5	15	10	62.5	7.5	5	15	10
7.	Necessary micro-nutrients causes growth	63	7.5	3.5	12.5	13.5	57.5	10	2.5	12.5	17.5	69.5	5	5	12.5	9.5
8.	Identification of harmful elements	56.3	16.3	8.5	12.5	10	57.5	17.5	2.5	12.5	10	57.5	15	15	12.5	10
9.	Measures of health	64.5	9	6.3	8.3	10	60	7.5	7.5	10	15	69.5	10.5	5	10	5
10.	Scientific attitude	57.5	12.5	10	12.5	7.5	60	7.5	7.5	15	10	55	17.5	12.5	10	5

4.9. Table showing the valid percentages in HHV componentwise obtained in the post-test by total and region-wise EGs.

Findings :-

The valid percentages of table 4.9 explains that

1. The total EG ranked the components of HHV in the post-test 2 "hygienic habits (65%)" and 6 "precautionary health measures (65%)" as I and 9 "measures of health (64.5%); 7 "necessary micronutrients causes growth (63%); 1 (identification of health measures (62.5%); 5 "protection of health measures (61.3%); 4 "hygienic habits (58.5%); 3 "malnutrition (57.5%); 10 "scientific attitude (57.5%)" 8 "identification of harmful elements (56.3%)" as I to VIII respectively.

2. In the rural EG ranked the components of HHV in the post-test 2 (67.5%) and 6 (67.5%); 1 (62.5%) and 4 (62.5%); 5 (60%), 9 (60%) and 10 (60%); 7 (57.5%); 8 (57.5%); 3 (57%) were ranked from I to VI respectively.

3. In the urban EG ranked the components 7 (69.5%) and 9 (69.5%); 1 (63%); 2 (62.5%), 5 (62.5%) and 6 (62.5%); 3 (57.5%) and 8 (57.5%); 4 (55%) and 10 (55%) were ranked from I to V respectively.

4. 10. Table showing the valid percentages in MV component-wise obtained in the post-test by total and region-wise EGs.

S.No	Components	Valid Percentage of Combined Rural and Urban Experimental Group Sample					Valid Percentage of Rural Experimental Group					Valid Percentage of Urban Experimental Group				
1.	Medicinal value	59.8	9.8	11.3	8.8	11.5	59.5	7.5	10.5	5	17.5	60	12	10	12.5	5.5
2.	Identification of diseases	60	11.3	8.8	10	12.5	65	10	7.5	12.5	5	55	12.5	10	7.5	20
3.	Alternatives to medicines	61.3	13.3	5	12.5	10	60	12.5	2.5	10	15	62.5	15	7.5	5	10
4.	Preventive measures to diseases	57.3	13.3	8.8	12.5	10	52	10.5	7.5	15	12.5	55	17.5	10	10	7.5
5.	M.V. in fruits and vegetables	66.5	8.8	11.3	6.3	10	62.5	10	12.5	2.5	7.5	62.5	7.5	10	15	12.5
6.	Awareness of M.V.	58.5	11.3	2.5	15	11.5	62.5	7.5	2.5	15	12.5	57	15	2.5	15	10.5
7.	Pollution causes diseases	58.3	15.3	5	13.8	7.3	57.5	20	2.5	15	5	69	10.5	7.5	5.5	7.5
8.	Ailments-ideas of cure	52.3	18.8	11.3	10	6.3	50	17.5	20	10	2.5	57.5	20	2.5	10	10
9.	Food alternative to medicines	55	15	6.3	11.3	7.5	55	17.5	2.5	15	10	55	12.5	10	17.5	5
10.	Identification of medicinal plants	66	10	12.5	8.5	8.6	67.5	10	12.5	5	5	62.5	10	12.5	10	15

Findings :-

The above valid percentages explains that

1.The total EG ranked the components of MV in the post-test 4.”M.V. of fruits and vegetables(66.5%)” and 10.”identification of medicinal plants (66%)” as I and II; 3 “alternatives to medicines (61.3%); 2 ”identification of diseases (60%)”; 1”medicinal value (59.8%); 6 “awareness on M.V. (58.5)” 1.”pollution causes diseases (58.3%); “preventive measures of diseases (57.3%)”; 6 ”food alternaive to medicines (55%); 8 “ailments-ideas of cure (52.3%) as I to X respectively.

2. In the rural EG ranked the components of MV in the post-test 10(67.5%); 2(65%); 5(62.5%) and 6(62.5%); 3(60%); 1(59.5%); 7(57.5%); 9(55%); 4(52%); 8(50%) were ranked from 1 to 9 respectively.

3.In the urban EG ranked the components 1(69%); 3(62.5%), 5(62.5%) and 10(62.5%); 3(60%); 8(57.5%); 6(57%); 2(55%); 4(55%); 9(55%) were ranked from 1 to VI respectively.

4.11. Tables showing the valid percentages in EV componentwise obtained in the post-test by total and region-wise EGs

S.No.	Components	Valid Percentage of Combined Rural and Urban Experimental Group Sample					Valid Percentage of Rural Experimental Group					Valid Percentage of Urban Experimental Group				
1.	Environmental value	64	17.5	2.5	8.8	7.5	62.5	17.5	2.5	7.5	10	65	17.5	2.5	10	5
2.	Identification of environmental pollutants	65	10	12.5	5	7.5	65	15	10	5	5	65	5	15	5	10
3.	Preventive measures of pollution	65	2.5	12.5	7.5	10	67.5	2.5	7.5	7.5	15	62.5	2.5	17.5	7.5	10
4.	Control over the Pollution	64	7.5	3.8	15	10	62.5	7.5	2.5	17.5	10	65	7.5	5	12.5	10
5.	Protection of environment	66.5	8.6	7.5	10	7.5	65.5	12.5	7.5	10	5	67.5	5	7.5	10	10
6.	Precautionary measures	63.5	6.5	7.5	5	6.3	64.5	5.5	5	15	10	62.5	7.5	12.5	7.5	10
7.	Awareness	66.8	8.8	2.5	10	7.5	67.5	7.5	2.5	10	2.5	65	10	2.5	10	12.5
8.	Right of control of wastage	65	8.8	2.5	8.8	10	67.5	5	2.5	10	5	62.5	12.5	2.5	7.5	15
9.	Understanding	65	7.5	6.3	2.8	6.3	60.5	2.5	17	2.5	7.5	69.5	12.5	10	3	5
10.	Reasoning the Superstitions	60.3	9.8	9.8	13.8	10	60	15	5	10	10	60.5	4.5	7.5	17.5	10

Findings :-

The above valid percentage illustrates that

1.The components of EV namely 7 “awareness (66.8%), and 5”protection of environment (66.5%)”, were given I and II ranks,“identification of environmental pollutants” “preventive measures of pollution (65%)”, 8 ‘right of control over wastage (65%),” “understanding the environment (65%)”, “control over pollution (64%)”, environmental value (64%)”, “precautionary measures (63.5%)”, “reasoning to superstitions(60.3%)” were given ranks from III to VI respectively in the combined rural and urban EGs .

2.The urban EG ranked the components of EV in the post-test 3(67.5%); 7(67.5%); 8(67.5%); 5(65.5%); 2(65%); 6(64.5%); 1(62.5%); 4(62.5%); 9(60.5%); 10(60%); were ranked from I to VII respectively.

3.In the urban EG ranked the components 9(69.5%); 5(67.5%), 1(65%) and 2(65%); 4(65%); 7(65%); 3(62.5%); 6(62.5%); 8(62.5%); 10(60.5%) were ranked from 1 to V respectively.

4.12. Table showing the valid percentages in FNV componentwise obtained in the post-test by total and gender-wise EGs

S. No	Components	Combined Valid Percentage of Boys and Girls Experimental Group Sample					Valid Percentage of Boys in Experimental Group					Valid Percentage of Girls in Experimental Group				
1.	Value of food	63.3	111.3	8.8	3.8	12.5	62	10	5	2.5	20.5	65.5	17.5	12.5	5	4.5
2.	Identification of food adulteration	63.8	7.5	10	8.8	6.8	62.5	7.5	10	12.5	7.5	65	7.5	10	5	12.5
3.	Food spoilage	63.8	12	6.3	13.8	4.3	63.5	6.5	10	17.5	2.5	64	17.5	2.5	10	6
4.	Precautionary measures	56.3	6.3	12.5	7.5	17.5	55	5	15	10	15	57.5	7.5	10	5	20
5.	Balanced diet	57.5	15	12.5	10	5	60	12.5	12.5	10	5	55	17.5	12.5	10	5
6.	Identifying the alternatives	58.8	16.3	3.3	11.3	11.3	57.5	20	2.5	7.5	12.5	52.5	12.5	5	15	10
7.	Nutritious & instant energy giving foods	55	15	12.3	2.5	10	60.5	15	14.5	2.5	7.5	60	15	10	2.5	12.5
8.	Nutritive value of food	63.8	8.5	8.8	8.8	10.3	63	7	10	15	5	64.5	10	7.5	2.5	15.5
9.	Food storage	64.8	15.3	10	8.8	6.3	65	15	17.5	10	2.5	64.5	15.5	2.5	7.5	10
10	Identifies nutritious food	66	7.5	8.8	10.3	12.5	65	2.5	10	17.5	15	67	12.5	7.5	3	10

Findings :-

The above valid percentage illustrates that

1. The components of FNV namely “10 identifies nutritious food(60%)” and 9, “food storage” were given ranks I and II “2 identification of food adulteration (63.8%)”; “3 food spoilage (63.8%)”; “8 nutritive value of food (63.8%)”; “1 value of food (63.3%)”; “6 identifying the alternatives (58.8%)”; “5 balanced diet (57.5%)”; “4 precautionary measures (56.3%)”, “7 nutritious and instant energy giving foods (55%)” were given ranks from III to VII respectively in the combined boys and girls EG.

2. In the rural EG the components of FNV in the post-test 9(65%) and 10(65%); 3(63.5%); 8(63%); 2(62.5%); 5(60%); 6(57.5%); 4(55%); were given ranks from I to IX respectively in boys EG.

3. In the urban EG the components 10(67%); 1(65.5%); 3(65%); 8(64.5%); 9(64.5%); (64%); 7(60%); 4(57.5%); 5(55%); 6(52.5%) were given ranks from 1 to 9 respectively in the girls

4.13. Table showing the valid percentages in HHV componentwise obtained in the post-test by total and gender-wise EGs

S.No.	Components	Combined Valid Percentage of Boys and Girls Experimental Group Sample					Valid Percentage of Boys in Experimental Group					Valid Percentage of Girls in Experimental Group				
1.	Identification of health measures	62.5	10.5	4.5	5	17.5	62.5	12.5	10	5	10	63	10	13	10	5
2.	Hygienic habits	65	2.5	17.5	5.5	10	65.5	7.5	17.5	5	4.5	64.5	15.5	2.5	7.5	10
3.	Malnutrition	56.3	12.5	11.3	12	8	56	10	7.5	14	12.5	56.5	15	15	10	3.5
4.	Hygienic value	59.3	10	5	15	10	61	12.5	4	5	17.5	58.5	11.5	22.5	5	2.5
5.	Protection of health measures	61.3	17.5	5	4	12.5	60	17.5	2.5	7.5	2.5	62.5	7.5	10	7.5	12.5
6.	Precautionary health measure	65	5	2.5	10	17.5	65.5	15	4.5	5	10	64.5	2.5	10	5.5	17.5
7.	Necessary micro-nutrients causes growth	63.5	13.5	7.5	10	7.5	67	17.5	2.5	15	8.2	60	10	5	15	10
8.	Identification of harmful elements	57.5	5	12.5	13.3	11.8	57.5	2.5	10	17.5	12.5	57.5	7.5	15	10	10
9.	Measures of health	64.5	10	5.5	17.5	2.5	62	15	7	10	6	67.5	10	12.5	2.5	17.5
10.	Scientific attitude	62.3	6	7	10	15	58	12	7.5	12.5	10	57	12.5	7.5	10	13

Findings :-The above table explains that

1. The component of HHV 2 “hygienic habits (65%); and “precautionary health measures (65%)”; were given I and II; measures of health (64.5%); “7 necessary micronutrients causes growth (62.5%)”; “10 scientific attitude (62.3%); “protection of health measure (61.3%)”; 4, “hygienic value (59.3%)”; “8 identification of harmful elements (57.5%)”; “3 malnutrition (56.3%); were given ranks from III to IX in the combined boys and girls EG in the post-test.
2. The components of HHV in the post-test 7(67%); 2(65.5%); 6(65.5%); 3(62.5%); 4(61%), 5(60%); 10(58%); 8(57.5%); 3(56%); 3(57%) were ranked from I to IX in the boys EG respectively.

3. The components of HHV9(67.5%);2(64.5%); 6(64.5%); 1(63%),
5(62.5%); 7(60%); 4(58.5%); 8(57.5%); 10(57%) and 3(56.5%) were
ranked from I to IX respectively in the girls EG in the post-test.

4.14. Table showing the valid percentages in MV componentwise obtained in
the post-test by total and gender-wise EGs.

S. No	Components	Combined Valid Percentage of Boys and Girls EG Sample					Valid Percentage of Boys in E G					Valid Percentage of Girls in E G				
1.	Medicinal value	59.8	20	5	3.8	11.8	61	17.5	5	4	12.5	58	22.5	5	3.5	11
2.	Identification of diseases	60.5	5	10	16.2	8	63	7	10	15	5	57	3	10	17.5	12.5
3.	Alternatives to medicines	61.25	10	6.3	10	12.5	62.5	5	7.5	10	15	60	15	5	10	10
4.	Preventive measures to diseases	57.25	11.35	11.3	12.3	7.5	53	15	10	12	10	61.5	17.5	12.5	4.5	5
5.	M.V. in fruits and vegetables	66.5	9.3	12	3.8	8.3	64	10	12.5	6	7.5	68.5	7.5	11.5	2.5	10
6.	Awareness of M.V.	58.5	12.3	11.3	12.5	5.5	55	17.5	12.5	10	5	62	7	10	15	6
7.	Pollution causes diseases	58.8	7.8	7.3	17.5	8.7	60.5	12.5	4.5	17.5	5	57	63	10	17.5	12.5
8.	Ailments-ideas of cure	52.25	12.5	16.3	13.8	4	59	10	17.5	12.5	3	53	15	12	15	5
9.	Food alternative to medicines	55	13.3	13.8	7.5	10	54	14	10	12	10	56	12.5	17.5	3	10
10	Identification of medicinal plants	66	9.5	12.5	7.5	4.5	66	15	10	5	4	66	4	15	10	5

Findings :- The above table shows that

1. The components of MV “5 MV of fruits and vegetables (66.5%)”;
“10 identification of medicinal plants (66%)”; “3 alternatives to medicines
(61.25%)”; “2 identification of diseases(60.5%)”; “1 medicinal value(59.8%)”;
“7 pollution causes disease (58.8%)”; “6 awareness of MV (58.5%)”; “4
preventive measures to diseases (57.25%)”; “9 food alternative to medicines
(55%)”; “8 ailments- ideas of cure (52.25%)”; were given I to X ranks
respectively in the combined boys and girls EG.

2. The components 10(66%)”; 5 (64%); 2(63%); 3(62.5%); 1(61%); 6(60.5%);
8(59%); 6(55%); 9(54%)”; 4(53%); were given I to X ranks respectively in the
boys EG.

3.The components 5(68.5%); 2(66%); 6(62%); 4(61.5%); 3(60%); 1(58%); 2 (57%); 7(57%); 9 (56%); 8(53%) were given I to IX ranks respectively in the girls Eg.

4.15. Tables showing the valid percentages in EV componentwise obtained in the post-test by total and gender-wise EGs.

S.N o.	Components	Combined Valid Percentage of Boys and Girls Experimental Group Sample					Valid Percentage of Boys in Experimental Group					Valid Percentage of Girls in Experimental Group				
1.	Envil value	63.8	13.8	5	8.8	8.8	64	15	7.5	10	7.5	63.5	12.5	3.5	7.5	10
2.	Identification of envil pollutants	65	6.3	12.5	7.5	8.8	65	5	12.5	10	7.5	65	7.5	12.5	5	10
3.	Preventive mea-sures of pollution	65	5.3	7.5	7.5	8.8	65.5	5	5	7.5	15	64.5	5.5	10	7.5	2.5
4.	Control over the Pollution	63.8	8.8	7.5	13.8	6.8	62.5	7.5	10	15	5	65	10	5	12.5	7.5
5.	Protection of environment	66.5	9.8	9.8	6.5	7.5	67.5	15	7.5	6	5	65.5	4.5	12.5	7.5	10
6.	Precautionary measures	63.5	10	10.5	11.3	6.3	63.5	7.5	3.5	12.5	10	63.5	12.5	7.5	10	3.5
7.	Awareness	66.3	5	9.3	7.5	12.5	67.5	5	6	7.5	15	65	15	12.5	7.5	10
8.	Right of control over wastage	65	12.5	10	4.3	6.8	66.5	15	7.5	5	6	63.5	10	12.5	3.5	7.5
9.	Understanding	65	7.5	4.8	11.5	8.8	60.5	10	4.5	15	10	69.5	5	10	8	7.5
10.	Reasoning the Superstitions	60.3	11.3	7.5	13.5	7.5	60.5	7.5	10	17	5	60	15	5	10	10

Findings :-

From the above table the following findings were drawn.

1.The components of EV “5 protection of environment (66.5%)”; “7 awareness (66.3%)”; “2 identification of environmental pollutants (65%)”; “3 preventive measures of pollution (65%)”; “8 right of control over wastage (65%)”; “9 understanding environment (65%)”; “1 environmental value (63.8%)”; “4 control over pollution (63.8%)”; “6 precautionary measures (63.5%) and “10 reasoning to superstitions (60.3%) were given ranks from I to VI respectively in the combined boys and girls EG in the post-test.

2.The boys EG the components of EV in the post-test 5(67.5%); 7(67.5%); 8(66.5%); 3(65.5%); 2(65%); 1(64%); 6(63.5%); 4(62.5%); 9(60.5%); 10(60.5%); were given ranks from I to VIII respectively in the post-test.

3.In the girls EG the components of EV 9(69.5%); 5(65.5%), 2(65%); 4(65%); 7(65%); 3(64.5%); 1(63.5%); 6(63.5%); 8(63.5%); 6(60%) were given ranks from 1 to VI respectively in the post-test.

In section – B, differential statistics were used to verify Hypothesis III,“The developed model of chemistry teaching has greater impact on enhancing the values among secondary school students” when compared to traditional teaching.

Section – B

4.3. Differential Analysis

The qualitative data collected are quantified using simple statistics in the previous section A under the heading Preliminary analysis. In the present section B, differential analysis, inferential statistics, namely the standard error, the t-test were used. The verification of hypothesis I and II were discussed in the section A “Preliminary Analysis”. To verify the hypothesis III the following procedure was adopted.

Hypothesis III :- The developed model of chemistry teaching has greater impact on imparting the values among secondary school students.

Hypothesis III is restated in the null form in a number of ways. The statistics namely mean scores, standard deviation, standard error, and critical ratio values were computed. The hypothesis was verified through the sub-hypotheses, with reference to the back-ground variables. The null hypotheses were verified using t-test

4.16. t-table of over allmeanscores of 4 values and each of the 4 values obtained in pre-test by EGs and CGs.

Values	TCGMeanscores	SD	TEGMeanscores	SD	SE	T
Over all	113.3	7.7	113.2	6.5	1.13	0.18@
FNV	28.4	18.4	28.6	12.5	2.37	0.08@
HHV	28.5	9.9	28.3	8.5	1.46	0.14@
MV	27.6	8.2	27.8	7.6	1.25	0.16@
EV	28.5	7.5	28.5	11.2	1.51	0.07@

@ Not significant.

The obtained t - valuesof over all value, FNV, HHV, MV. and EV are 0.18; 0.08; 0.137; 0.16; 0.07 at df.79 are respectively less than the table t–value 1.99 at 0.05 level of significance. Hence the initial levels of over all values and each of the 4 values of CG and EG are equal.

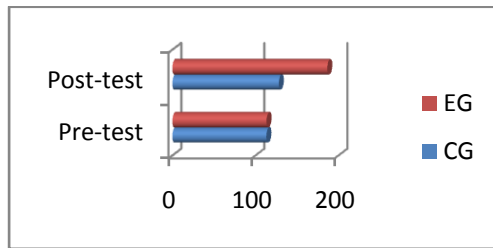
3.1.There is no significant difference between the over allmean scores of 4 values obtained by EGs and CGs in the post-test.

4.17. The table showing the overall mean scores of 4 values obtained by EG and CG in the post-test.

Groups	OverallMean scores	SD	SE	Obtained t- value	Table t- value	Level of Significance
EG	186.9	10.8	10.651	17.487	2.64	0.01 **
CG	128.2	14.7				

The obtained t-value 17.487 at df.79is more than the table t-value 2.64at 0.01 level of significance. Thus the null hypothesis is rejected. Therefore there is a significant difference in the overall mean scores of EG and CG in the post-test. The over allmean scores of EG is greater than CG in the post-test.

4.1. Graph showing mean scores of overall values of 4 values of CG and EG in pre-test and post-test.



The graph shows that the initial levels of overall values in the EG and CG in the pre-test are same where as in the post-test the level of overall values of the EG enhanced significantly.

3.2. There is no significant difference between the mean scores of FNV obtained by EG and CG in the post-test.

4.18. Table showing the mean scores of FNV obtained by EG and CG in the post-test.

Groups	Mean score of FNV	SD	SE	Obtained t- value	Table t- value	Level of Significance
EG	46.6	6.1	1.1629	6.7922	2.64	0.01 **
CG	32.6	11.3				

The obtained t-value 6.7922 at df.79 is superior to the table t-value 2.64 at 0.01 level of significance. So the null hypothesis is rejected. Thus there is a significant difference in the mean scores of FNV obtained by EG and CG in the post-test. The obtained mean scores in FNV of EG is higher than the CGs in the post-test.

3.3. There is no significant difference between the post-test mean scores of HHV obtained by EG and CG.

4.19. Table showing mean scores of HHV obtained by EG and CG in the post-test.

Groups	Mean of HHV in the Post-test	SD	SE	Obtained t- value	Table t- value	Level of Significance
EG	46.5	8.5	2.1282	7.048	2.64	0.01 **
CG	31.5	9.9				

Table 4.19 shows that the obtained t-value 7.048 at df.79 is greater than the table t-value 2.64 at 0.01 level of significance. Therefore the null hypothesis is rejected. Hence there is a significant difference in overall mean scores in HHV of EG and CG. The obtained mean scores of HHV of EG is higher than the CG in the post-test.

3.4 .There is no significant difference between the post-test mean scores of MV obtained by EG and CG.

4.20. Table showing the post-test mean scores of MV obtained by EG and CG.

Groups	Mean in the Post-test	SD	SE	Obtained t- value	Table t- value	Level of Significance
TEG	45.9	6.5	1.1438	13.201	2.64	0.01 **
TCG	30.8	7.9				

The obtained t-value 13.201 at df.79 exceeds the table t-value 2.64 at 0.01 level of significance. So the null hypothesis is rejected. So there is a significant difference in the mean scores of MV of EG and CG. The obtained mean scores of MV by EG is higher than CG.

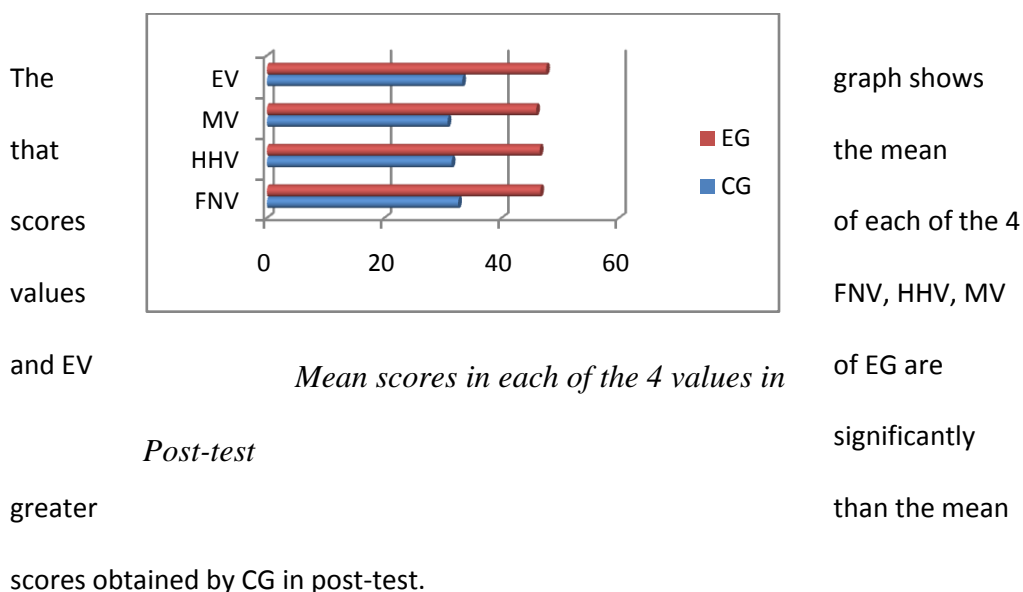
3.5. There is no significant difference between the post-test mean scores of EV obtained by EG and CG.

4.21. Table showing the post-test mean scores of EV obtained by EG and CGs.

Groups	Mean in the Post-test	SD	SE	Obtained t- value	Table t- value	Level of Significance
EG	47.6	4.6	0.7863	18.1864	2.64	0.01 **
CG	33.3	5.3				

The obtained t-value 18.1864 at df.79 is higher than the table t-value 2.64 at 0.01 level of significance, indicates that the null hypothesis is rejected. Therefore there is a significant difference in the mean scores of EG and CG in EV. The obtained mean scores in the post-test by EG is more than CG.

4.2. Graph showing the comparison of value levels in the EG, CGs of each of the four values in the post-test.



- From the above analysis, it could be concluded that the levels of over all values, Food and Nutritive value, Health and Hygienic value, Medicinal value and Environmental value of EG enhanced when compared to the CG due to the intervention of the MVDCE.

4.22. Table showing over all meanscores of 4 values obtained by rural EG and rural CG in pre-test.

Valuesf	RCGMeanscores	SD	REGMeanscores	SD	SE	t
Over all	113.3	7.6	113.4	6.8	1.612	0.062 @
FNV	28.6	9.3	28.4	8.7	1.73	0.115 @
HHV	28.3	12.2	28.5	10.3	6.06	0.33 @
MV	27.8	8.92	27.6	7.2	10.84	0.02 @
EV	28.5	8.4	28.4	6.1	3.094	0.03 @

@ Not significant.

The obtained t-values of over all value, FNV, HHV, MV. And EV are 0.062; 0.115; 0.33; 0.02; 0.03 at df.39 are respectively less than the table t-value 2.02 at 0.05 level of significance. Hence the initial levels of overall values and each of the 4 values of rural EG and CG are equal.

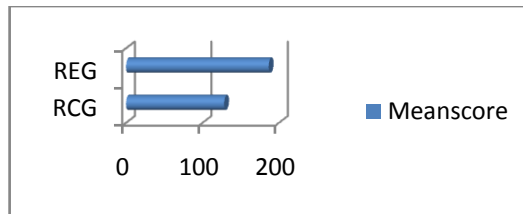
3.6. There is no significant difference between the post-test over all mean scores of 4 values obtained by rural EG and CG.

4.23. Table showing the post-test over all mean scores of 4 values obtained by rural EG and CG.

Groups	Over al Mean	SD	SE	Obtained t- value	Table t- value	Level of Significance
R EG	186.5	6.2	1.6128	9.487	2.71	0.01 **
RCG	128.2	8.1				

The obtained t-value 9.487 df.39 is superior to table t-value 2.71 at 0.01 level of significance concludes the null hypothesis is rejected. So there is a significant difference in the overall mean scores of 4 values obtained in the post-test by rural EG and CGs. The obtained over all mean scores of 4 values in the post-test by rural EG is more than rural CG in the post-test.

4.3. Comparison of overall mean scores of four values obtained by rural EG, CGs in post-test.



Overall Mean scores of 4 values in the

Post-test

The graph shows the overall mean scores of four values obtained by REG is greater than overall mean scores obtained by RCG in the post-test.

3.7 There is no significant difference between the post-test mean scores of FNV obtained by rural EG and CG.

4.24. Table showing the post-test means of FNV obtained by rural EG and CG.

Groups	Mean score in the FNV	SD	SE	Obtained t- value	Table t- value	Level of Significance
REG	46.6	5.9	1.959	7.246	2.71	0.01 **
RCG	32.4	10.9				

The obtained t-value 7.246 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. So the null hypothesis is rejected. Hence there is a significant difference in the mean scores of FNV obtained in the post-test by rural EG and CGs. The obtained mean scores in the post-test by rural EG is greater than the rural CG in FNV.

3.8 There is no significant difference between the post-test Mean scores of HHV obtained by rural EG and rural CG.

4.25. Table showing the mean scores of HHV obtained by rural EG and rural CG in the post-test.

Groups	Mean score in HHV	SD	SE	Obtained t- value	Table t- value	Level of Significance
REG	46.6	7.7	1.9705	7.663	2.71	0.01 **
RCG	31.5	9.8				

The obtained t-value 7.663 at df.39 is superior to table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. So there is a significant difference in the mean scores of HHV obtained in the post-test by rural EG and CGs. The mean scores of HHV of rural EG in the post-test is more than rural CG.

3.9. There is no significant difference between the post-test mean scores of MV obtained by rural EG and CGs.

4.26. Table showing mean scores of MV obtained by rural EG and rural CG in post-test.

Groups	Mean score in MV	SD	SE	Obtained t- value	Table t- value	Level of Significance
REG	45.8	13.5	2.514	6.0859	2.71	0.01 **
RCG	30.5	8.4				

The obtained t-value 6.0859 at df.39 is superior to table t-value 2.71 at 0.01 level of significance, shows the null hypothesis is rejected. Hence there is a significant difference in the mean scores of MV obtained in the post-test by rural EG and rural CG. The obtained mean scores in post-test by rural EG is superior to rural CG in MV.

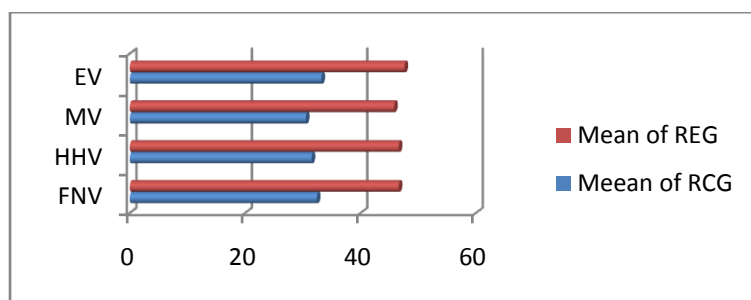
3.10. There is no significant difference between the post-test mean scores of EV obtained by rural EG and CGs.

4.27. Table showing mean scores of EV obtained by rural EG and CGs in the post-test.

Groups	Mean in the Post-test	SD	SE	Obtained t- value	Table t- value	Level of Significance
REG	47.6	3.6	1.6563	8.694	2.71	0.01 **
RCG	33.2	7.3				

The obtained t-value 8.694 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. So the null hypothesis is rejected. Thus there is a significant difference in the mean scores of EV obtained in the post-test by rural EG and CGs. The obtained mean scores in the post-test by rural EG is superior to rural CG.

4.4. Comparison of value levels in the rural EG, CGs of each of the four values in the post-test.



Mean scores in each of the 4 values in the

Post-test.

The graph shows the mean scores of each of the 4 values FNV, HHV, MV and EV obtained by REG are greater than the mean scores obtained by RCG in the post-test.

- From the above analysis, it could be concluded that the value levels were enhanced in over all values, Food and Nutritive value, Health and Hygienic value, Medicinal value and Environmental value in the post-test of rural EG when compared to rural CG due to intervention of MVDCE.

4.28. Table showing over all meanscores of 4 values obtained by urban EG and urban CG in the pre-test.

Values	UCGMeanscores	SD	UEGMeanscores	SD	SE	t
Over all	113.5	6.7	113.6	7.5	1.1266	0.1775 @
FNV	28.6	9.1	28.5	8.2	4.167	0.023 @
HHV	28.3	11.4	28.5	9.5	5.38	0.037 @
MV	27.7	8.9	27.5	7.1	3.632	0.055 @
EV	28.7	8.3	28.5	6.7	3.322	0.06 @

@ Not significant.

The obtained t - values of over all value, FNV, HHV, MV. and EV are 0.1775; 0.023; 0.037; 0.055; 0.06 at df.39 are less than the table t-value 2.02 at 0.05 level of significance. Hence the initial levels of overall values and each of the 4 values of urban EG and urban CG are equal.

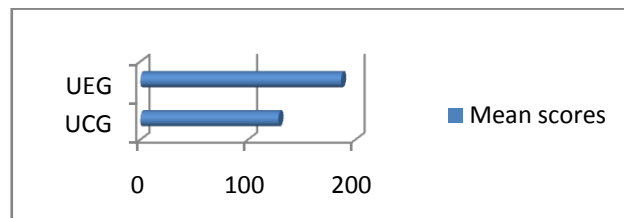
3.11. There is no significant difference between the post-test over all Mean scores of 4 values obtained by urban EG and CGs.

4.29. Table showing the over all mean scores of 4 values obtained by urban EG and CGs in post-test.

Groups	Overall MeanScores	SD	SE	Obtained t- value	Table t- value	Level of Significance
UEG	186.6	13.2	2.457	22.73	2.71	0.01
UCG	128.3	8.2				

The obtained t-value 22.73 at df.39 is superior to table t-value 2.71 at 0.01 level of significance. So the null hypotheses is rejected. It implies that there is a significant difference in the over all means scores of 4 values obtained in the post-test by urban EG and CGs. The obtained over all mean scores in the post-test by urban EG are superior to urban CG.

4.5. Comparison of overall mean scores of four values obtained by urban EG, CGs in post-test.



Overall Mean scores of 4 values in the

The graph *Post-test* shows the overall mean scores of four values obtained by UEG is greater than the mean scores of four values UCG in the post-test.

3.12. There is no significant difference between the post-test mean scores of FNV obtained by urban EG and CGs.

4.30. Table shows the mean scores of FNV obtained by urban EG and CGs in post-test.

Groups	Meanscore in post-test	SD	SE	Obtained t- value	Table t- value	Level of Significance
UEG	46.5	15	2.877	4.866	2.71	0.01
UCG	32.5	10.3				

The obtained t-value 4.866 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected, which implies that there is a significant difference in the mean scores of FNV obtained in the post-test by urban EG and urban CG. The mean scores of urban EG is greater than the urban CG.

3.13. There is no significant difference between the post-test mean scores of HHV obtained by urban EG and CGs.

4.31. Table showing the mean scores of HHV obtained by urban EG and urban CG in the post-test.

Groups	Mean score in post-test	SD	SE	Obtained t- value	Table t-value	Level of Significance
UEG	46.4	7.7	1.9705	7.51	2.71	0.01
UCG	31.6	9.8				

The obtained t-value 7.51 at df.39 exceeds to table t-value 2.71 at 0.01 level of significance, shows the rejection of null hypothesis. It indicates that there is a significant difference in the Mean scores of HHV obtained in the post-test by urban EG and CGs. The obtained over all mean score of HHV in the post-test obtained by urban EG is greater than the urban CG.

3.14. There is no significant difference between the post-test mean scores of MV obtained by urban EG and CGs.

4.32. Table showing the mean scores of MV obtained by urban EG and CGs in the post-test.

Groups	Mean score in post-test	SD	SE	Obtained t- value	Table t- value	Level of Significance
UEG	45.9	13.5	2.4778	6.255	2.71	0.01 **
UCG	30.4	8.4				

The obtained t-value 6.255 at df.39 is superior to table t-value 2.71 at 0.01 level of significance. It illustrates that the null hypotheses is rejected. Hence there is a significant difference in the mean scores of MV obtained in the post-test by urban EG and CGs. The obtained mean scores of MV in the post-test acquired by urban EG is greater than urban CG.

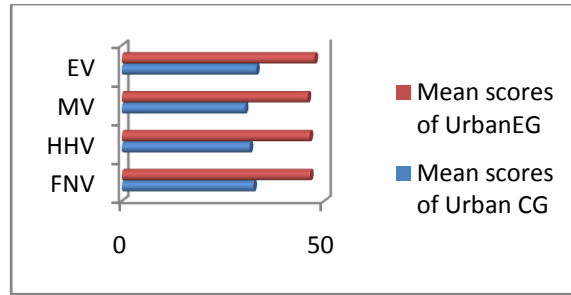
3.15 There is no significant difference between the post-test mean scores of EV obtained by urban EG and CGs.

4.33. Table showing the mean scores of EV obtained by urban EG and urban CG in the post-test.

Groups	Mean score in post-test	SD	SE	Obtained t- value	Table t-value	Level of Significance
UEG	47.6	3.6	1.287	11.188	2.71	0.01 **
UCG	33.2	7.3				

The obtained t-value 11.188 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. This shows that the null hypothesis is rejected. It shows that there is a significant difference in the mean scores of EV obtained in the post-test by urban EG and CGs. The obtained mean scores of EV in the post-test obtained by urban EG is greater than that of urban CG.

4.6. Comparison of value levels in the Urban EG, CGs of each of the four values in the post-test.



The graph shows the mean scores of each of the 4 values FNV, HHV, MV and EV obtained by UEG are greater than the mean scores obtained by UCG in the post-test.

- The results of the above tables illustrate the enhancement in the value levels in over all values and each of the values FNV, HHV, MV, and EV of urban EGs when compared to urban CGs due to the intervention of MVDCE.

4.34. Table showing over all meanscores of 4 values obtained in the pre-test by total boys sample of EG and CG.

Values f	CGboysMeanscores	SD	EGboysMeanscores	S D	SE	t
Over all	113.6	6.59	113.4	4.9	1.587	0.126 @
FNV	28.6	6.8	28.4	5.9	1.88	0.1063 @
HHV	28.7	8.33	28.5	7.4	2.563	0.078 @
MV	27.6	13.5	27.5	7.3	3.357	0.0297 @
EV	28.6	5.3	28.7	3.2	0.015	0.0985 @

@ Not significant.

The obtained t - values of over all value, FNV, HHV, MV. and EV are 0.126; 0.1063; 0.078; 0.0297; 0.0985 at df.79 is less than the table t-value 2.02 at 0.05 level of significance. Hence the initial value levels of

overall value and each of the 4 values of Total boys EGs and Total boys CGs in the pre-test are equal.

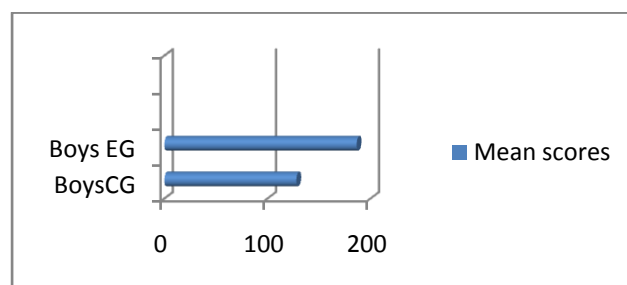
3.16. There is no significant difference between the overall mean scores of 4 values obtained by boys EG and CGs.

4.35. Table showing post-test over all mean scores of 4 values obtained by boys EG and CGs in the post-test.

Groups	Meanscore in post-test	SD	SE	Obtained t- value	Table t-value	Level of Significance
boysEG	186.6	13.2	2.457	9.69	2.71	0.01 **
boysCG	128.1	8.2				

The obtained t-value 9.69 at df.39 is superior to table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. So there is a significant difference in the overall mean scores of 4 values obtained in the post-test by boys EG and CGs. The obtained overall mean scores in the post-test by boys EG is greater than boys CG.

4.7. Comparison of overall mean scores of four values obtained by boys EG, CGs in post-test.



Overall Mean scores of 4 values in the Post-

test

The graph shows the overall mean scores of four values obtained by boys EG is greater than the mean scores obtained by boys CG in the post-test.

3.17. There is no significant difference between the post-test mean scores of FNV obtained by boys EG and CGs.

4.36. Table showing mean scores of FNV obtained by boys EG and CGs in the post-test.

Groups	Meanscore in post-test	SD	SE	Obtained t- value	Table t-value	Level of Significance
boysEG	46.6	6.8	1.64	8.84	2.71	0.01 **
boysCG	32.5	10.3				

The obtained t-value 8.84 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected, implies that there is a significant difference in the mean scores of FNV obtained in the post-test by boys EG and CGs. The obtained over all mean scores of FNV in the post-test of boys EG more than the boys CG.

3.18. There is no significant difference between the post-test mean scores of HHV obtained by boys EG and CGs.

4.37. Table showing the mean scores of HHV obtained by boys EG and CGs in the post-test.

Groups	Meanscore in post-test	SD	SE	Obtained t- value	Table t-value	Level of Significance
boysEG	46.7	7.9	1.755	8.604	2.71	0.01 **
boysCG	31.6	9.8				

The obtained t-value 8.604 at df.39 is greater than table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. Thus there is a significant difference in the mean scores of HHV obtained in the post-test by boys EG and CGs. The over all mean scores of HHV in the post-test of boys EG is greater than boys CG.

3.19. There is no significant difference between the post-test mean scores of MV obtained by boys EG and CGs.

4.38. Table showing mean scores of MV obtained by boys EG and CGs in post-test.

Groups	Meanscore in Post-test	SD	SE	Obtained t- value	Table t-value	Level of Significance
boysEG	46	13.5	2.516	5.843	2.71	0.01 **
boysCG	31.3	8.4				

The obtained t-value 5.843 at df.39 exceeds the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. So there is a significant difference in the mean scores of MV obtained in post-test by boys EG and CGs. The over all mean scores of MV in the post-test obtained by boys EG is more than boys CG.

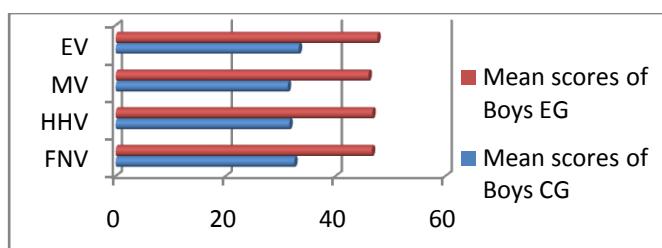
3.20 There is no significant difference between the post-test mean scores of EV obtained by boys EG and CGs.

4.39. Table showing the mean of EV obtained by boys EG and CGs in post-test.

Groups	Meanscore in Post-test	SD	SE	Obtained t- value	Table t-value	Level of Significance
boysEG	47.6	4.8	1.3814	10.352	2.71	0.01
boysCG	33.3	7.3				

The obtained t-value 10.352 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. So the null hypothesis is rejected. Hence there is a significant difference in the mean scores of EV obtained in the post-test by boys EG and CGs. The over all mean scores of boys EG is more than the boys CG in the post-test.

4.8. Comparison of value levels in the boys EG, CGs of each of the four values in the post-test.



The graph shows the mean scores of each of the 4 values FNV, HHV, MV and EV of Boys EG are greater than the mean scores obtained by boys CG in the post-test.

- From the above results it could be interpreted that the greater enhancement in the value levels of over all values and each of the four values FNV, HHV, MV, and EV in the post-test of otal boys EGs when compared to the respective boys CGs due to intervention of MVDCE.

4.40. Table showing over all means of 4 values obtained in pre-test by girls EG and CGs.

Values	TCGgirlsMeanscores	SD	TEG girls Meanscores	SD	SE	t
Over all	113.3	7.8	113.2	8.47	2.774	0.708 @
FNV	28.6	6.1	28.6	5.31	0	0 @
HHV	28.3	4.9	28.5	5.1	1.375	0.145 @
MV	27.8	11.3	27.6	10.5	4.053	0.0493 @
EV	28.5	7.5	28.4	11.2	3.53	0.028 @

@ Not significant.

The obtained t - values of over all value, FNV, HHV, MV. and EV are 0.0708; 0; 0.145; 0.0493; 0.028 at df.79 are less than the table t – value 2.02 at 0.05 level of significance. Hence the initial value levels of overall value and each of the four values girls EGs and CGs are equal.

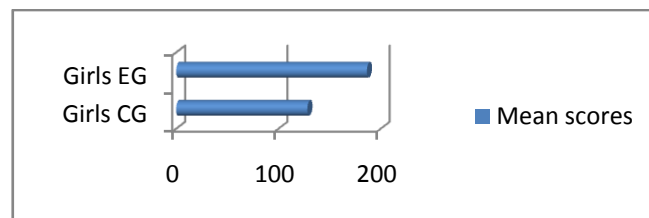
3.21. There is no significant difference between the over all mean scores of 4 values obtained by girls EG and CGs.

4.41. Table showing between the over all mean scores obtained by girls EG and CGs in the post-test.

Groups	Over all Mean	SD	SE	Obtained t- value	Table t- value	Level of Significance
girlsEG	186.5	13.5	2.4802	23.46	2.71	0.01 **
girlsCG	128.3	8.4				

The obtained t-value 23.46 at df.39 is more than the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected, implies that there is a significant difference in the over all mean scores of 4 values obtained by girls EG and girls CG in the post-test. The over all mean scores of girls EG is greater than the girls CG in the post-test.

4.9. Comparison of overall mean scores of four values obtained by girls EG, CGs in post-test.



Overall Mean scores of 4 values in the post-

The graph *test* shows the overall mean scores of four values obtained by Girls EG is greater than Girls CG in the post-test.

3.22. There is no significant difference between the post-test mean scores of FNV obtained by girls EG and CGs.

4.42. Table showing mean scores of FNV obtained by girls of EG and CGs in post-test.

Groups	Mean in the Post-test	SD	SE	Obtained t- value	Table t-value	Level of Significance
girlsEG	46.6	2.95	0.7019	29.02	2.71	0.01 **
girlsCG	32.3	5.7				

The obtained t-value 29.02 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. So there is a significant difference in the mean scores of FNV obtained in the post-test by girls EG and CGs. The obtained over all means of FNV in post-test by girls EG is greater than the girls CG.

3.23. There is no significant difference between the post-test mean scores of HHV obtained by girls EG and CGs.

4.43. Table showing mean scores of HHV obtained by girls of EG and CGs in post-test.

Groups	Mean girls	SD	SE	Obtained t- value	Table t-value	Level of Significance
girlsEG	46.4	2.5	0.9117	16.45	2.71	0.01 **
girlsCG	31.4	5.2				

The obtained t-value 16.45 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. So there is a significant difference in mean scores of HHV obtained in the post-test by girls EG and CGs. The obtained over all the means of HHV in the post-test by girls EG is more than the girls CG.

3.24. There is no significant difference between the post-test mean scores of MV obtained by girls EG and CGs.

4.44. Table showing the post-test mean scores of MV obtained by the girls EG and CGs.

Groups	Mean in the Post-test	SD	SE	Obtained t- value	Table t- value	Level of Significance
TgirlsEG	45.8	6.1	1.6159	9.097	2.71	0.01 @@
TgirlsCG	31.1	8.2				

The obtained t-value 9.097 at df.39 exceeds the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. So there is a significant difference in mean scores of MV obtained in the post-test by girls of EG and CGs. The over all mean scores of MV in the post-test obtained by girls EG is greater than girls CG.

3.25. There is no significant difference between the post-test mean scores of EV obtained by total girls EG and CGs.

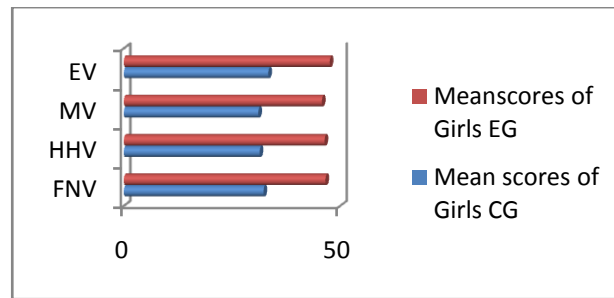
4.45. Table showing the means of EV obtained by girls EG and girls CG in post-test.

Groups	Mean in the Post-test	SD	SE	Obtained t- value	Table t-value	Level of Significance
girlsEG	47.6	3.21				
girlsCG	33.4	8.9	1.4959	9.492	2.71	0.01 **

The obtained t-value 9.492 at df.39 is greater than to the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. So there is a significant difference in the mean scores of EV obtained in the post-test by

girls of EG and CGs. The mean scores of EV obtained in the post-test by girls of EG is greater than the girls CG.

4.10. Comparison of value levels in the girls EG, CGs of each of the four values in the post-test.



Mean scores in each of the 4 values in the

post-test.

The graph shows the mean scores of each of the 4 values FNV, HHV, MV and EV of girls EG are greater than the mean scores of girls CG in the post-test.

- From the above results it could be interpreted that the greater enhancement in the value levels of all values, and each of the values FNV, HHV, MV, and EV of girls EG when compared to the girls CG is due to the intervention of MVDCE.

4.46. Table showing of over all mean scores of 4 values in pre and post-tests of CGs.

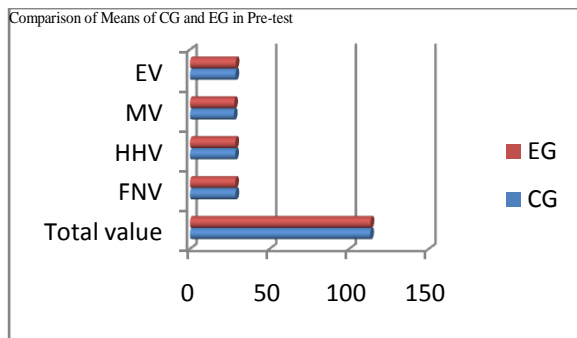
Values	Meanscores in pre-test	SD	Meanscores in post-test	SD	SE	T	Variance	F
Over all	113.4	13.8	128.2	12.7	4.1266	1.6583 @		1.1807
FNV	28.6	9.59	32.6	11.3	4.167	1.4568 @		1.3884
HHV	28.4	11.3	31.5	9.9	5.38	1.8458 @		1.3028
MV	27.6	8.67	30.8	7.9	3.632	1.8424		1.204

						@		
EV	28.6	9.4	33.3	8.3	3.322	1.524	@	1.2826

@ Not significant.

The obtained t - values of over all value and each of FNV, HHV, MV, and EV are 1.6583; 1.4568; 1.8458; 1.8424; 1.524 at df.79 are respectively less than the table t – value 2.64 at 0.01 level of significance. So there is significant difference between EGs and CGs

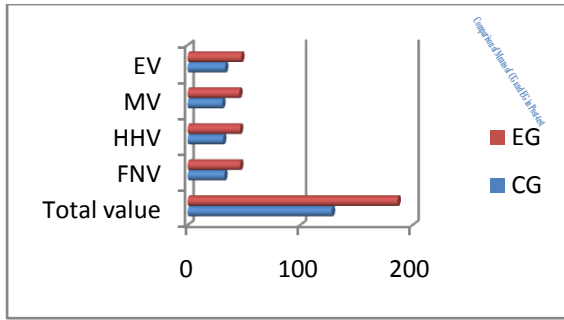
4.11 Graph showing the comparison of mean scores of CG and EG in pre-test.



Comparison of Means of CG and EG in Pre-test

The graph shows the comparison of Mean scores of values of CG and EG in Pre-test and Post-test, shows that the value levels of CG and EG are equal in Pre-test.

4.12 Graph showing the comparison of mean scores of EG and CGs in post-test.



The graph shows the comparison of Mean scores of values of CG and EG in post-test and post-test inferences the impact of the developed model MVDCE to EG.

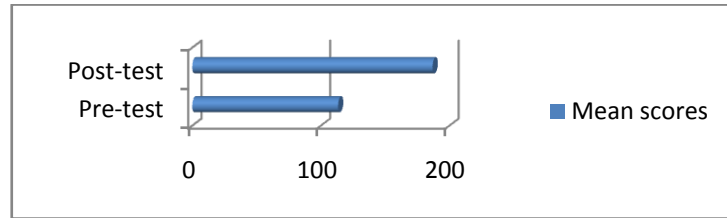
3.26 :- There is no significant difference in the overall means scores of 4 values in post- test and pre-test of EGs.

4.47. Table showing the over all mean scores of FNV in the pre and post-tests of EGs.

Groups	Meanscores of EG in Total value	SD	SE	Obtained t- value	Table t- value	Level of Significance
Pre-test	113.4	12.9	1.0199	22.34	2.64	0.01 **
Post-test	186.9	9.8				

The obtained t-value 22.34 at df.79 is greater than the table t-value 2.64 at 0.01 level of significance. Hence the null hypothesis is rejected. So there is a significant difference in the over all mean scores of FNV obtained by the EGs in the post-test and the pre-test. The over all mean scores of FNV of EGs in post-test are greater than the pre-test.

4.13. Comparison of overall mean scores of four values obtained by EG in post and pre-tests.



Overall mean scores of 4 values in the post-

test.

The graph shows the overall mean scores of four values obtained by EG is enhanced from the post-test to pre-test.

3.27:- There is no significant difference in the FNV/mean scores in the pre and the post-tests of EGs.

4.48. Table showing the mean scores of FNV in post and pre-tests obtained by EGs.

Groups	Mean scores of EG in FNV	SD	SE	Obtained t- value	Table t- value	Level of Significance
Pre-test	28.4	8.9	1.2063	15.087	2.64	0.01 **
Post-test	46.6	6.1				

The obtained t-value 15.087 at df.79 exceeds the table t-value 2.64 at 0.01 level of significance. Hence the null hypothesis is rejected. It implies that there is a significant difference in the mean scores of FNV obtained by the EGs in the post-test and the pre-test. The mean scores of FNV of EGs in the post-test are greater than the pre-test.

3.28 :- There is no significant difference in the HHV means scores in post-test and pre-test of EGs.

4.49. Table showing mean scores of HHV in the post-test and pre-test obtained by EGs.

Groups	MeanscoresofEGin HHV	SD	SE	Obtained t-value	Table t-value	Level of Significance
Pre-test	26.5	10.5	1.4904	12.078	2.64	0.01 **
Post-test	46.5	8.5				

The obtained t-value 12.078 at df.79 superior to the table t-value 2.64 at 0.01 level of significance. So the null hypothesis is rejected. Consequently there is a significant difference in the mean scores of HHV obtained by the EGs in the post-test and pre-test. The mean scores of HHV of EG in the post-test are greater than the pre-test.

3.29:- There is no significant difference in MV means in post-test and pre-test of EGs.

4.50. Table showing the mean scores of MV in pre and post-tests obtained by EGs.

Groups	Meanscores of EG in MV	SD	SE	Obtained t-value	Table t-value	Level of Significance
Pre-test	27.8	7.7				

Post-test	45.9	6.5	2.8323	16.066	2.64	0.01 **
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The obtained t-value 16.066 at df.39 is greater than the table t-value 2.64 at 0.01 level of significance. Hence the null hypothesis is rejected. So there is a significant difference in the mean scores of MV obtained by the EGs in the post-test and pre-test. The mean scores of MV of EGs in the post-test are greater than the pre-test.

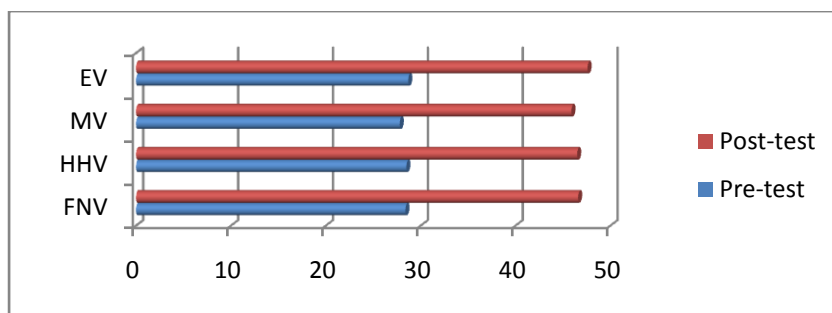
3.30 :- There is no significant difference in EV means in post-test and pre-test of EGs.

4.51. Table showing the mean scores of EV in post-test and pre-test obtained by EGs.

Groups	Mean score of EG in EV	SD	SE	Obtained t-value	Table t-value	Level of Significance
Pre-test	28.7	9.8				
Post-test	47.6	4.6	1.21037	15.615	2.64	0.01 **

The obtained t-value 15.615 at df.79 is greater than to the table t-value 2.64 at 0.01 level of significance. Hence to the null hypothesis is rejected. So there is a significant difference in the mean scores of EV obtained by the EGs in the post-test and pre-test. The mean scores of EV of EGs in the post-test is greater than pre-test.

4.14. Graph showing comparison of Pre-test and Post-test Means of FNV, HHV, MV and EV.



Comparison of Pre-test and Post-test Means of FNV,

HHV, MV and EV.

The graph shows the comparison of Mean scores of values of CG and EG in Pre-test and Post-test indicates the impact of MVDCE model of teaching.

➤ The above table results it could be interpreted that the greater enhancement in value levels of over all of values and each of the 4 values FNV, HHV, MV, and EV of TEGs when compared to the pre-test.

4.52. Table showing over all meanscores of over all values obtained in pre-test by rural CG.

Values	RCGMeanscores	SD	REGMeanscores	SD	SE	T
Over all	113.4	9.3	128.2	8.1	4.56	1.4977
FNV	28.4	12.2	32.4	10.9	2.2655	1.7656 @
HHV	28.5	8.92	31.5	9.83	2.4772	1.211 @
MV	27.6	8.4	30.5	8.5	1.9489	1.5906 @
EV	28.4	9.8	33.2	6.3	2.789	1.5776 @

@ Not significant.

The obtained t - values of over all value, FNV, HHV, MV. And EV are 1.4977; 1.7656; 1.211; 1.5906; 1.5776; at df.39 are respectively less than the table t-value 1.99 at 0.05 level of significance. So there is no significant difference in rural EG and CGs in each of the 4 values in the pre-test. The mean scores of

overall value of rural EG is more than the mean score of rural CGs in the pre-test.

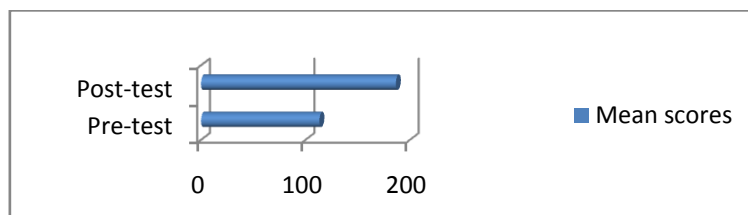
3.31 :- There is no significant difference in overall means scores of 4 values in post and pre-tests of rural EG.

4.53. Table of between over all means of 4 values in post and pre-tests of rural EG.

Groups	Overall Mean score of EG	SD	SE	Obtained t- value	Table t-value	Level of Significance
Pre-test	113.3	9.5	2.54	24.15	2.71	0.01 **
Post-test	186.5	8.1				

The obtained t-value 24.15 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. So there is a significant difference in the over all mean scores of 4 values obtained by the rural EG in the pre and post-test. The over all mean scores of 4 values of rural EG in the post-test greater than pre-test.

4.15. Comparison of overall mean scores of four values obtained by Rural EG in pre and post-tests.



Overall mean scores of 4 values REG

The graph shows the overall mean scores of four values obtained by Rural EG in the post-test is greater than the mean scores obtained in the pre-test.

3.32 :- There is no significant difference in the FNV/means scores in post and pre-tests of rural EG.

4.54. Table showing the means of FNV in post and pre-tests obtained by rural EG.

Groups	Meanscore of EG of FNV	SD	SE	Obtained t- value	Table t- value	Level of Significance
Pre-test	28.6	8.7	1.662	10.83	2.71	0.01 **
Post-test	46.6	5.9				

The obtained t-value 10.83 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. It follows that there is a significant difference in the mean scores of FNV obtained by the rural EG in the post and pre-tests. The mean scores of FNV of rural EG in the post-test is greater than pre-test.

3.33 :- There is no significant difference in HHV meanscores in post and pre-tests of rural EG.

4.55. Table showing the means of HHV in post and pre-tests obtained by rural EG.

Groups	Meanscore of EG in HHV	SD	SE	Obtained t- value	Table t- value	Level of Significance
Pre-test	28.3	10.3	2.033	9.001	2.71	0.01 **
Post-test	46.6	7.7				

The obtained t-value 9.001 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. So there is a significant difference in the mean score of HHV obtained by the rural EG in

the post and pre-tests. The mean scores of HHV of rural EG in post-test is greater than the pre-test.

3.34:- There is no significant difference in the MVmeans scores in post and pre-tests of rural EG.

4.56. Table showing the means of MV in post and pre-tests obtained by rural EG.

Groups	Meanscoreof EG in MV	SD	SE	Obtained t- value	Table t- value	Level of Significance
Pre-test	27.8	7.2	2.419	7.441	2.71	0.01 **
Post-test	45.8	13.5				

The obtained t-value 7.441 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance shows that the null hypothesis is rejected. So there is a significant difference in the mean scores of MV obtained by the rural EG in the post and pre-tests. The mean scores of mV of rural EG in the post-test is greater than the pre-test.

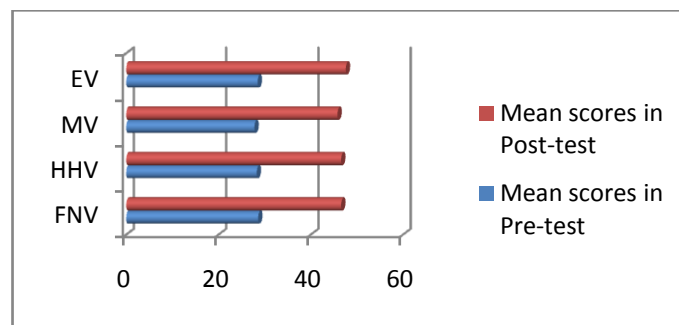
3.35 :- There is no significant difference in the EVmeans scores in post-test and pre-test of rural EG.

4.57. Table showing the means of EV in post-test and pre-test obtained by rural EG.

Groups	Meanscoreof EG in EV	SD	SE	Obtained t- value	Table t- value	Level of Significance
Pre-test	28.5	6.1	1.1101	17.193	2.71	0.01 **
Post-test	47.6	3.6				

The obtained t-value 17.193 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. So there is a significant difference in the mean scores of EV obtained by the rural EG in the post and pre-tests. The mean score of EV of rural EGs in the post-test is greater than pre-test.

4.16. Comparison of value levels in the Pre & Post-tests of Rural EG in each of the four values.



Mean scores in 4 values of REG

The graph shows the mean scores of each of the 4 values FNV, HHV, MV and EV of rural EG in the post-test are greater than mean scores in the pre-test.

- From the above findings it could be inferred that the levels of over all values and each of the 4 values namely FNV, HHV, MV, and EV are enhanced in the post-test when compared to the pre-test due to the intervention of MVDCE.

4.58. Table showing over all meanscores of over all value obtained in pre and post-tests by urban CG.

Values	Meanscore in pre-test	SD	Meanscore in post-test	SD	SE	t
Over all	113.5	18.9	128.3	12.8	3.609	1.510 @
FNV	28.6	9.1	32.5	10.4	2.185	1.784 @
HHV	28.3	11.4	31.6	9.5	2.3463	1.406 @
MV	27.7	8.9	30.4	8.9	2.99	0.9030 @
EV	28.7	8.3	33.2	8.5	3.95	1.1278 @

@ Not significant.

The obtained t - values of over all value, FNV, HHV, MV. And EV are 1.510; 1.784; 1.406; 0.9040; 1.1278 at df.39 is less than the table t-value 2.02 at 0.05 level of significance. There is significant difference in post and pre-tests in urban CG. The mean scores in post-test are higher than the mean scores of urban CG in the pre-test.

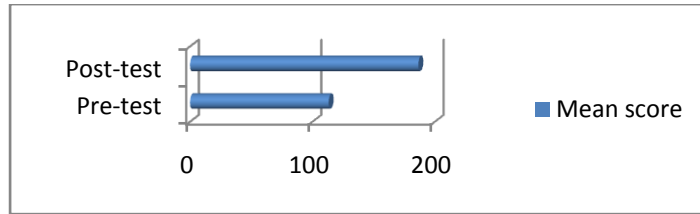
3.36 :- There is no significant difference in the overall means scores of 4 values in post and pre-tests of urban EG.

4.59. Table showing the overall mean scores of 4 values in post and pre-tests of urban EG.

Groups	Overall Mean scores in EG	SD	SE	Obtained t- value	Table t- value	Level of Significance
Pre-test	113.6	18.93	3.6489	20.06	2.71	0.01 **
Post-test	186.6	13.2				

The obtained t-value 20.06 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. It shows that there is a significant difference in over all means of 4 values obtained by urban EG in post and pre-tests. The over all means of 4 values of urban EG in the post-test is greater than the pre-test.

4.17. Comparison of overall mean scores of four values obtained by Urban EG in pre & post-test.



Overall mean scores of 4 values UEG.

The graph shows the overall mean scores of four values obtained by Urban EG in the post-test are greater than the mean scores obtained in the pre-test.

3.37 :- There is no significant difference in the FNV means scores in post and pre-tests of urban EG.

4.60. Table showing means of FNV in post and pre-tests obtained by urban EG.

Groups	Meanscore of EG in FNV	SD	SE	Obtained t- value	Table t- value	Level of Significance
Pre-test	28.5	8.2	1.6944	10.62	2.71	0.01 **
Post-test	46.5	6.9				

The obtained t-value 10.62 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. So there is a significant difference in the mean scores of FNV obtained by the urban EGs in the post and pre-tests. The mean scores of FNV of urban EGs in the post-test is greater than pre-test.

3.38 :- There is no significant difference in HHV means scores in post and pre-tests of urban EG.

4.61. Table showing means of HHV in post-test and pre-test obtained by urban EG.

Groups	Meanscore of EG in HHV	SD	SE	Obtained t- value	Table t- value	Level of Significance
Pre-test	28.5	5.3	2.1845	8.285	2.71	0.01 **
Post-test	46.4	7.7				

The obtained t-value 8.285 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. It shows that there is a significant difference in the mean scores of HHV obtained by the urban EG in the post and pre-tests. The mean scores of HHV of urban EG in the post-test is greater than pre-test.

3.39 :- There is no significant difference in the MV means scores in pre and post-tests of urban EG.

4.62. Table showing the means of MV in post-test and pre-test obtained by urban EG.

Tests	Meanscore of EG in EV	SD	SE	Obtained t- value	Table t- value	Level of Significance
Pre-test	27.5	7.1	1.5665	11.745	2.71	0.01 **
Post-test	45.9	3.5				

The obtained t-value 11.745 at df.39 is superior to the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. It follows that there is a significant difference in the all mean scores of MV obtained by the urban EG in the post and pre-tests. The mean scores of MV of urban EG in the post-test is greater than the pre-test.

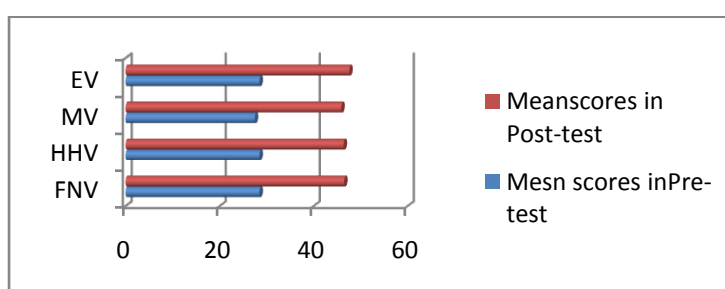
3.40 :- There is no significant difference in the EVmeans scores in the post and pre-tests ofurban EG.

4.63. Table showing the means of EVin the post-testand the pre-test obtained by urban EG.

Tests	Meanscoresof EG in EV	SD	SE	Obtained t- value	Table t- value	Level of Significance
Pre-test	28.5	6.7	2.8906	6.607	2.71	0.01 **
Post-test	47.6	3.6				

The obtained t-value 6.607 at df.39 is higher than the table t-value 2.71at 0.01 level of significance. Hence the null hypothesis is rejected. It shows that there is a significant difference in the mean scores of EV obtained by the urban EG in the post and pre-tests. The mean scores of EV of urban EG in the post-test is greater than the pre-test.

4.18. Comparison of value levels in the pre and post-tests of Urban EG in each of the four values.



Mean scores of 4 values of UEG in pre and post-tests.

The graph shows the mean scores of each of the 4 values FNV, HHV, MV and EV of Urban EG in the post-test are more than the overall mean scores in the pre-test.

➤ The above table inferences could conclude that the value levels of over all values and the 4 values Food and Nutritive, Health and Hygiene,

Medicinal, and Environmental values of urban EG enhanced in post-test when compared to the value levels in the pre-test due to the intervention of MVDCE.

4.64. Table showing over all means of 4 values obtained in the pre-test by boys CGs.

Values	Meanscores in pre-test	SD	Meanscores in post-test	SD	SE	t
Over all	113.5	6.7	128.1	8.2	1.789	1.659 @
FNV	28.6	9.1	32.5	10.32	1.499	1.63 @
HHV	28.3	11.4	31.6	9.8	1.71	1.695 @
MV	27.7	8.9	31.3	8.4	2.5	1.55 @
EV	28.7	8.3	33.3	7.3	1.811	1.687 @

@ Not significant.

The obtained t - values of over all value, FNV, HHV, MV. And EV are 0.659; 1.63; 1.695; 1.55; 1.687 at df.79 is less than the table t-value 1.99 at 0.05 level of significance. So there is no significant difference between EGs and CGs in the pre-test. The mean scores of EGs are more than the mean scores of CGs in the pre-test over all values, FNV, HHV, MV and EV.

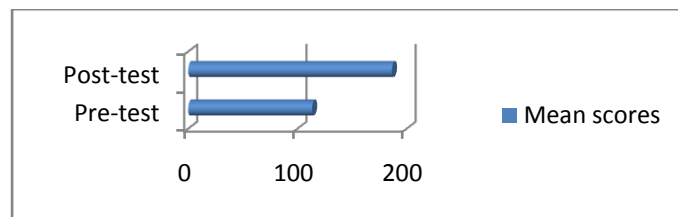
3.41 :- There is no significant difference in the overall means scores of 4 values obtained by boys EG in the pre and post-tests.

4.65. Table showing the over all mean scores of 4 values obtained by boys EG in the pre and post-tests.

Tests	Overall Mean score of EG	SD	SE	Obtained t- value	Table t- value	Level of Significance
Pre-test	113.4	8.47	2.4798	29.39	2.71	0.01 **
Post-test	186.3	13.2				

The obtained t-value 29.39 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. So the null hypothesis is rejected. It shows that there is a significant difference in the over all mean scores of 4 values obtained by the boys EGs in the pre and post-tests. The over all mean scores of 4 values of boys EGs in the post-test greater than pre-test.

4.19. Comparison of overall mean scores of four values obtained by boys EG in pre & post-tests.



Overall mean scores of 4 values of boys

EG.

The graph shows the overall mean scores of four values obtained by boys EG in the post-test are than the mean scores in the pre-test.

3.42 :- There is no significant difference in the FNV means scores obtained by boys EG in the pre and post-tests.

4.66. Table showing mean scores of FNV obtained by boys EG in the pre and post-tests.

Tests of boys EG	Meanscore of EG in FNV	SD	SE	Obtained t- value	Table t- value	Level of Significance
Pre-test	28.4	5.9	1.4234	12.786	2.71	0.01 **
Post-test	46.6	6.8				

The obtained t-value 12.786 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. So there is a significant difference in the mean scores FNV obtained by the boys EGs in the pre and post-tests. The mean scores of FNV of boys EGs in the post-test are greater than the pre-test.

3.43:-There is no significant difference in HHVmeanscores obtained boys EG in the pre and post-tests.

4.67. Table showing means of HHV obtained by boys EG in the pre-test and post-tests.

Tests of boys EG	Meanscore of EG in HHV	SD	SE	Obtained t- value	Table t- value	Level of Significance
Pre-test	28.5	7.4	1.7115	10.6339	2.71	0.01 **
Post-test	46.7	7.9				

The obtained t-value 10.6339 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. So there is a significant difference in the mean scores of HHV obtained by the boys EGs in the pre and post-tests. The mean scores of HHV of boys EGs in the post-test are greater than the pre-test.

3.44 :- There is no significant difference in the MVmeans scores obtained by boys EG in the pre and post-tests.

4.68. Table showing means of MV obtained by the boys EG in the pre-test and the post-test.

Tests	Meanscore of EG in MV	SD	SE	Obtained t- value	Table t- value	Level of Significance
Pre-test	27.5	7.3	1.0398	17.407	2.71	0.01 **
Post-test	46	16.5				

The obtained t-value 17.407 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. So there is a significant difference in the over all mean scores of MV obtained by the boys EG in the pre and the post-tests. The mean scores of MV of boys EG obtained in the post-test are greater than the mean scores obtained in the pre-test.

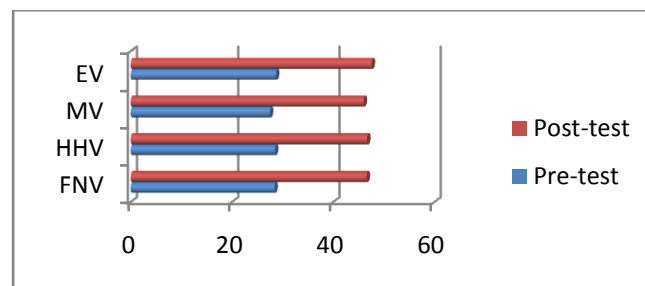
3.45 :- There is no significant difference in the EVmean scores obtained by boys EG in the pre and post-tests.

4.69. Table showing mean scores of EV obtained by boys EG in the pre and post-tests.

Tests of boys EG	Meanscore of EG in EV	SD	SE	Obtained t- value	Table t- value	Level of Significance
Pre-test	28.7	8.2	1.5023	13.1797	2.71	0.01 **
Post-test	47.6	4.86				

The obtained t-value 13.1797 at df.39 is more than the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. So there is a significant difference in the mean scores of EV obtained by the boys EG in the pre and post-tests. The mean scores of EV of boys EG obtained in the post-test are greater than the pre-test.

4.20. Comparison of value levels in the pre and post-tests of boys EG in each of the four values.



The graph shows the mean scores of each of the 4 values FNV, HHV, MV and EV of boys EG in the post-test are greater than the mean scores obtained in the pre-test.

- From the above findings it could be concluded that the greater enhancement in the value levels of overall values and in FNV, HHV, MV, and EV of boys EG in the post-test when compared to the pre-test is due to the intervention of the MVDCE.

4.70. Table showing over all meanscores of 4 values obtained in the pre and the post-tests by girlsCGs.

Values	Meanscore in pre-test	SD	Meanscore in post-test	SD	SE	t
Over all	113.3	17.7	128.1	8.4	1.1266	1.175 @
FNV	28.6	6.1	32.3	8.21	2.367	1.203 @
HHV	28.4	4.9	31.4	9.52	2.38	1.137 @
MV	27.8	11.3	31.1	7.1	3.632	1.165 @
EV	28.5	8.31	33.4	6.7	3.322	1.678 @

@ Not significant.

The obtained t - values of over all value, FNV, HHV, MV. And EV are 1.175; 1.203; 1.137; 1.165; 1.678 at df.39 are less than the table t-value 1.99 at 0.05 level of significance. Hence there is no significant difference in the overall mean scores obtained by girls CGs in the pre and post-tests. The mean scores of girls CG in overall mean scores and each of the four values obtained in the pre-test are almost equal little more than the mean scores in the pre-test.

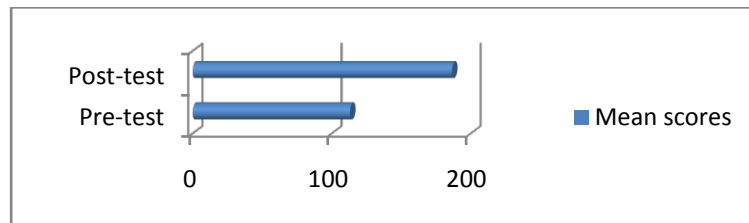
3.46 :- There is no significant difference in the overall means scores of 4 values in the pre and the post-tests of girls EG.

4.71. Table showing the overall mean scores of 4 values obtained by girls EG in the pre-test and post-tests.

Tests	overall Mean scores of EG	SD	SE	Obtained t- value	Table t- value	Level of Significance
Pre-test	113.2	19.93	3.8061	19.258	2.71	0.01**
Post-test	186.5	13.5				

The obtained t-value 19.258 at df.79 is greater than the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. So there is a significant difference in the over all mean scores of 4 values obtained by the Tgirls of EGs in the pre and post-tests. The over all mean scores of 4 values of girls EGs in the post-test are greater than the pre-test.

4.21. Comparison of overall mean scores of four values obtained by girls EG in pre and post-test.



Overall mean scores of 4 values of girls

EG.

The graph shows the overall mean scores of four values obtained by girls EG in the post-test are greater than the mean scores in the to pre-test.

3.47 :- There is no significant difference in the FNV/means scores obtained by girls EG in the pre and post-tests.

4.71. Table showing means of FNV obtained by girls EG in the pre and post-tests.

Tests	Mean scores of EG in FNV	SD	SE	Obtained t- value	Table t- value	Level of Significance
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Pre-test	28.6	5.31	0.96	18.75	2.71	0.01 **
Post-test	46.6	2.95				

The obtained t-value 18.75 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. So there is a significant difference in the mean scores of FNV obtained by the girls of EGs in the pre and post-tests. The mean scores of FNV of girls in the post-test are greater than the pre-test.

3.48 :- There is no significant difference in the HHV mean scores obtained by girls EG in the pre and the post-tests.

4.72. Table showing mean scores of HHV obtained by girls EG in the pre and post-tests.

Tests	Mean scores of EG in HHV	SD	SE	Obtained t- value	Table t- value	Level of Significance
Pre-test	28.5	5.1	0.898	19.93	2.71	0.01 **
Post-test	46.4	2.5				

The obtained t-value 19.93 at df.39 is more than the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. It shows that there is a significant difference in the mean scores of HHV obtained by the girls of EGs in the pre and the post-tests. The overall mean scores of HHV of Tgirls in the post-test are greater than the pre-test.

3.49 :- There is no significant difference in the MV mean scores obtained by girls EG in the pre and the post-tests.

4.73. Table showing means of MV in the pre and post-tests obtained by girls of EGs.

Tests of girls EG	MeanscoreofE in MV	SD	SE	Obtained t- value	Table t- value	Level of Significance
Pre-test	27.6	10.5	1.1506	15.817	2.71	0.01 **
Post-test	45.8	6.1				

The obtained t-value 15.817 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. So there is a significant difference in the mean scores of MV obtained by the girls of EG in the pre and post-tests. The mean scores of MV of girls EG in the post-test is greater than the mean scores in the pre-test.

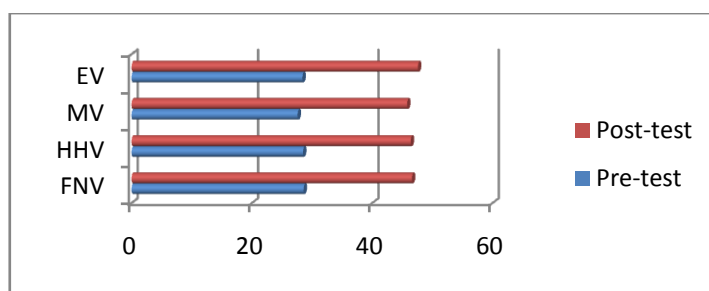
3.50 :- There is no significant difference in the EV mean scores obtained by the girls EG in the pre and post-tests.

4.74. Table showing means of EV in pre and post-tests obtained by girls of EGs.

Tests	Meanscoreof EG in EV	SD	SE	Obtained t- value	Table t- value	Level of Significance
Pre-test	28.4	4.16	0.63	23.11	2.71	0.01 **
Post-test	47.6	3.21				

The obtained t-value 23.11 at df.39 is greater than the table t-value 2.71 at 0.01 level of significance. Hence the null hypothesis is rejected. It shows that there is a significant difference in the mean scores of EV obtained by the girls EGs in the pre and the post-tests. The mean scores of EV of girls EGs obtained in the post-test are greater than the mean scores obtained in the pre-test.

4.22. Comparison of value levels in the pre and post-tests of girls EG in each of the four values.



Mean scores of 4 values of girls EG.

The graph shows the mean scores of each of the 4 values FNV, HHV, MV and EV of girls EG in the post-test are greater than the mean scores in the pre-test.

- The above results could be interpreted as the enhancement in the value levels, over all values, FNV, HHV, MV, and EV of girls EGs in post-test when compared to the value levels in the pre-test.

The above tables also indicates the enhancement in the over all values and each of the 4 values of EGs and also with the background variables, region and gender-wise when compared to respective control groups in the post-test. This indicates that the enhancement in the overall value level and in each of the 4 value levels in the experimental groups with all the background variables is due to the intervention of the MVDCE.

The above inferences indicate that the over all mean scores of 4 values FNV, HHV, MV, and EV of EGs in the post-test exceed the pre-test mean scores obtained by all the experimental groups with different background variables in the post-test are greater than the mean scores obtained by all the control groups with the same background variables in the post-test. So the developed model MVDCE enhanced the levels of over all values of 4 values and each of the food and nutritive value, health and hygienic value, medicinal value and environmental value among the students of rural and urban, boys and girls

experimental groups. So the developed model MVDCE is valid with respect to all the background variables. Hence the developed Model MVDCE of teaching chemistry showing high impact in enhancing the overall value and each of the 4 values FNV, HHV, MV, and EV among the students of rural and urban, boys and girls.

4.4. ANOVA

ANOVA, the most useful technique in the field of statistical inference is also used. This is a particular form of statistical hypotheses testing heavily used in the analysis of experimental data to verify Hypothesis. The influence of background variables region, gender and dependent variables on the enhancement of value levels of overall values and each of the four values of the X class chemistry students when they were taught chemistry using MVDCE are tested by ANOVA. It was also used in comparing the improvement which is statistically significant within the groups, with respect to the background variables.

4.75. Table shows the ANOVA of Rural Control Group

Values & Groups	Sum of Squares	Df	F	Sig.
FOODNUTRI Between Groups	4.225	1		
Within Groups	626.750	38		
Total	630.975	39	.256	.616
FOODNUTRI Between Groups	14.400	1		
Within Groups	704.000	38		
Total	718.400	39	.777	.384
FOODNUTRI Between Groups	.900	1		
Within Groups	849.000	38		
Total	849.000	39	.040	.842
FOODNUTRI Between Groups	5.626	1		
Within Groups	624.150	38		
Total	629.775	39	.342	.562

The above ANOVA table shows that there is no significant difference between boys and girls as the significant value of ANOVA at df(19,19) at 0.05 level of significance.

- (0.616) of FNV, (0.384) of HHV, (0.842) of MF, and (0.342) at df.19 of EV each of them are more than the table value significant at 0.05 level of significance. Implies there is difference in the responses between boys and girls in the FNF, HHF, MV and EV of rural CG. Though there is significant difference in the enhancement of boys and girls in each of the four values, the overall enhancement of boys and girls is almost equal.

4.76. Table shows the ANOVA of Rural Experimental Group

Values & Groups	Sum of Squares	Df	F	Sig.
FOODNUTRI Between Groups	18.225	1		
Within Groups	1060.750	38		
Total	1078.975	39	.653	.424
FOODNUTRI Between Groups	3.025	1		
Within Groups	911.350	38		
Total	949.375	39	.203	.655
FOODNUTRI Between Groups	22.500	1		
Within Groups	661.900	38		
Total	684.400	39	1.586	.216
FOODNUTRI Between Groups	5.626	1		
Within Groups	624.150	38		
Total	629.775	39	1.292	.263

With respect to ANOVA table rural EG we found that there is no significant difference between boy child and girl child as the significant value of ANOVA

- (0.653) of FNV, (0.203) of HHV, (1.586) of MV, (1.292) at df.19 of EV each of them are more than the table value significant at 0.05 level. Implies there is difference in the responses between boys and girls in the FNF, HHF, MF, and EF of rural EG. Though there is significant difference in the enhancement of boys and girls in each

of the four values, the overall enhancement of boys and girls is almost equal.

4.77. Table shows the ANOVA of Urban Control Group

Values & Groups	Sum of Squares	Df	F	Sig.
FOODNUTRI Between Groups	144.400	1		
Within Groups	798.000	38		
Total	942.400	39	6.876	0.062
FOODNUTRI Between Groups	0.225	1		
Within Groups	394.550	38		
Total	394.775	39	0.022	0.884
FOODNUTRI Between Groups	27.225	1		
Within Groups	738.550	38		
Total	765.775	39	1.401	0.244
FOODNUTRI Between Groups	24.025	1		
Within Groups	721.750	38		
Total	745.775	39	1.265	0.268

ANOVA table of urban CG shows that there is no significant difference between boys and girls as the significant value of ANOVA

- (0.062) of FNV, (0.884) of HHV, (0.244) of MV, and (0.268) at df. 19 of EV are more than the table value significant at 0.05level. Implies there is difference in the responses between boys and girls in the HHF, MF and EF of urban CG. Though there is significant difference in the enhancement of boys and girls in each of the four values, the overall enhancement of boys and girls is almost equal.

4.78. Table shows the ANOVA of Urban Experimental Group

Values & Groups	Sum of	Df	F	Sig.
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	Squares			
FOODNUTRI Between Groups	99.225	1		
Within Groups	899.750	38		
Total	998.975	39	4.191	0.048
FOODNUTRI Between Groups	96.100	1		
Within Groups	594.300	38		
Total	690.400	39	6.145	0.018
FOODNUTRI Between Groups	10.000	1		
Within Groups	755.500	38		
Total	765.500	39	0.503	0.483
FOODNUTRI Between Groups	57.600	1		
Within Groups	778.800	38		
Total	836.400	39	2.810	0.102

ANOVA table explains that the urbanEG there is no significant difference between boys and girls as the significant value of ANOVA

- (0.048) of FNV and (0.018) of HHV are less than level of significance at 0.05 level of significance. Implies there is no difference in the responses between boys and girls in the FNF and HHF of urbanEG. Though there is significant difference in the enhancement of boys and girls in each of the four values, the overall enhancement of boys and girls is almost equal.
- (0.483) of MV and (0.102) at df.19 of EV are more than the table value significant at 0.05 level of significance. Implies there is difference in responses between boys and girls in MF and EF of urban EG. Though there is significant difference in the enhancement of boys and girls in each of the four values, the overall enhancement of boys and girls is almost equal.

Section - C

Co-relational Analysis

In this section C "Co-relational Analysis" to verify the hypothesis III "The developed model MVDCE of chemistry teaching has greater impact on

imparting the values among secondary school students”, the Pearson co-efficient of co-relation was used.

In the co-relational analysis inferential statistics namely the Pearson Co-efficient of co-relation was computed between the groups and region.

4.5. Correlations within the 4 values FNV, HHV, MV, and EV of RCG, REG, UCG and UEG.

4.79. Table showing correlations within FNV, HHV, MV, and EV of Rural control group (RCG), rural experimental group (REG), Urban control group (UCG), and Urban experimental group (UEG).

Between Values		RCG	REG	UCG	UEG
FNV	HHV	0.081	0.156	0.094	0.301
	MV	0.051	0.117	0.152	0.128
HHV	MV	0.505	0.225	0.5009	0.051
	EV	0.112	0.110	0.110	0.174
MV	EV	0.203	0.061	0.106	0.26
EV	FNV	0.258	0.242	0.081	0.263

1. Within RCG there exists a significant positive correlation between the health and hygienic factor (HHF) medicinal factors (MF) among the boys and girls. The value 0.505 indicates a moderate positive correlation between the health and medicinal factors. It shows the HHF and MF are dependent. There exists a low positive correlation in the other factors. So all the other factors are independent in RCG.
2. There exists a low positive correlation within all the 4 factors FNF, HHF, MF and EF in REG. So all these 4 factors are independent in REG.
3. There exists low positive correlations within all the 4 factors FNF, HHF, MF and EF in UCG. So all these 4 factors are independent in UCG.