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CHAPTER IV

DATA ANALYSIS, MAJOR FINDINGS, DISCUSSION AND CONCLUSION

4.1.0 INTRODUCTION

The present chapter deals with the analysis and interpretation of collected data. Any raw data does not provide any answer. It has to be analyzed first and then interpreted. For this, identification of appropriate analysis techniques is extremely important. An analysis helps the data to be reduced in understandable and interpretable form. Its basic purpose is to summarize the complete observations in such a manner that they yield answers to the research problems and the purpose of interpretation is to search for broader meaning of these answers. Thus, data analysis and interpretation become an important aspect of research.

As it is a Quasi experimental study, the data analysis for the present study was done both quantitatively and qualitatively. The quantitative analysis was done with the help of both descriptive statistics and non-parametric statistics. The descriptive statistical techniques like, mean, standard deviation, standard error of mean, Intensity Index and for the non-parametric statistics, Mann-Whitney U-test were used during the process of the data analysis. The researcher preferred to use Mann-Whitney U-test as the sample was taken purposively and the assumptions of parametric statistics did not match for the present data.

4.2.0 ACHIEVEMENT IN ART EDUCATION OF EXPERIMENTAL AND CONTROL GROUP

To achieve objective III of the present study i.e. “To study the effectiveness of computer based Art education package on Std. IX CBSE students in terms of students’ overall achievement in comparison to traditional approach of teaching Art education.” and to test the null hypothesis of the present study, data were analyzed

using Mean, Standard Deviation and Mann-Whitney U-test which is given and discussed in tables from table no 4.1 to table 4.12.

Achievement of students in art education is measured through the achievement in different components of visual art education like, drawing, still life, painting, poster and composition. Hence, the analysis related to the achievement of students of experimental and control group in art education is done component wise and as a whole.

4.2.1 Achievement in Drawing of Experimental and Control Group

To achieve a part of the objective III of the present study and to test the null hypothesis of the present study $H_0$1: "There will be no significant difference between the mean post-test achievement scores of standard IX students studying Drawing through computer based art education package and those studying through traditional method" data were analyzed using Mean, Standard Deviation and Mann-Whitney U-test which is given in table 4.1 and table 4.2 and discussed thereafter.

Table 4.1: Mean, Standard Deviation and Standard Error of Mean wise distribution of Achievement in Drawing of Experimental and control group Students

Group	N	Mean	Standard Deviation	Standard Error of Mean
Control Group	30	25.72	6.16	1.12
Experimental Group	30	30.9	5.16	0.94

From the table 4.1, it was found that the mean drawing achievement score of control group and the experimental group were 25.72 and 30.9 respectively out of 20. The standard deviations from the means for the Drawing achievement score were found to be 6.16 and 5.16 respectively for the control group and the experimental group students with Standard Error of Means of 1.12 and 0.94 for the respective groups. Comparing the mean achievement scores in Drawing, it was found that the Mean

achievement score of the experimental group was higher than that of the Control Group. From the Standard Deviations and Standard Error of Means of both the groups, it was also observed that the students of the Experimental Group were more homogeneous in terms of their achievement score in comparison to the students of the Control Group. To find whether the difference in the mean achievement in drawing was significant or by chance and to test the null hypothesis, Mann-Whitney U-test was used as the sample was taken purposively. The summary of the Mann-Whitney U-test is given in table 4.2 followed by analysis.

Table 4.2: Summary of Mann-Whitney U-test for Drawing Achievement of Experimental and Control group students with the Number of sample, Sum of Ranks, U-value, z-value and Probability

Group	N	Sum of Ranks	U-value	z-value	Probability (p)
Control Group	30	706.00	241.000	3.098	.001
Experimental Group	30	1124.00			

From table 4.2, it was observed that the Sum of Ranks of the control group and the experimental group were 706.00 and 1124.00 respectively with 30 students in both the groups. The U-value and z-value were found to be 241.000 and 3.098 respectively. Referring Table for normal probability (Table A of Siegel, 1956) under null hypothesis (H_o) of z, for z < 3.098, the two tailed probability was found to be 0.001 which is greater than our decided significance level (α) i.e. 0.01. Hence the null hypothesis i.e. 'There will be no significant difference between the mean post-test achievement scores of standard IX students studying Drawing through computer based art education package and those studying through traditional method' is rejected and it can be said that experimental group and control group students differ stochastically in terms of their achievement in Drawing. From table 4.1 it was also found that the mean achievement of experimental group in Drawing is more than the mean achievement of control group in Drawing which is due to teaching Drawing using Computer Based Art Education package. Hence, it showed that the developed computer based art education package for teaching Drawing is effective in enhancing

achievement of students in drawing in comparison to traditional approach. So it can be concluded that the developed computer based art education package was found to be stochastically (significantly) effective in terms of enhancing students' achievement in Drawing in comparison to the traditional approach.

4.2.2 Achievement in Still-life of Experimental and Control Group

To achieve a part of the objective III of the present study and to test the null hypothesis of the present study $H_0$2: "There will be no significant difference between the mean post-test achievement scores of standard IX students studying Still-life through computer based art education package and those studying through traditional method" data were analyzed using Mean, Standard Deviation and Mann-Whitney U-test which is given in table 4.3 and table 4.4 and discussed thereafter.

Table 4.3: Mean, Standard Deviation and Standard Error of Mean wise distribution of Achievement in Still-life of Experimental and control group Students

Group	N	Mean	Standard Deviation	Standard Error of Mean
Control Group	30	20.2	6.64	1.2
Experimental Group	30	27.3	4.76	0.86

From the table 4.3, it was found that the mean Still-life achievement score of control group and the experimental group were 20.2 and 27.3 respectively. The standard deviations from the means for the Still-life achievement score were found to be 6.64 and 4.76 respectively for the control group and the experimental group students with Standard Error of Means of 1.2 and 0.86 for the respective groups. Comparing the mean achievement scores in Still-life it was found that the Mean of the Experimental Group was higher than that of the Control Group. From the Standard Deviations and Standard Error of Means of both the groups, it was also observed that the students of the Experimental Group were more homogeneous in terms of their achievement score in Still-life in comparison to the students of the Control Group. To find whether the difference in the mean achievement in Still-life was significant or by chance and to

test the null hypothesis, Mann-Whitney U-test was used as the sample was taken purposively. The summary of the Mann-Whitney U-test is given in table 4.4 followed by analysis.

Table 4.4: Summary of Mann-Whitney U-test for Still-life Achievement of Experimental and Control group students with the Number of sample, Sum of Ranks, U-value, z-value and Probability

Group	N	Sum of Ranks	U-value	z-value	Probability (p)
Control Group	30	638.00	173.000	4.108	>.00003
Experimental Group	30	1192.00			

From table 4.4, it was observed that the Sum of Ranks of the control group and the experimental group were 638.00 and 1192.00 respectively with 30 students in both the groups. The U-value and z-value were found to be 173.000 and 4.108 respectively. Referring Table for normal probability (Table A of Siegel, 1956) under null hypothesis (H_o) of z, for z < 4.108, the two tailed probability was found to be >0.00003 which is greater than our decided significance level (α) i.e. 0.01. Hence the null hypothesis i.e. 'There will be no significant difference between the mean post-test achievement scores of standard IX students studying Still-life through computer based art education package and those studying through traditional method' is rejected and it can be said that experimental group and control group students differ stochastically in terms of their achievement in Still-life. From table 4.3 it was also found that the mean achievement of experimental group in Still-life is more than the mean achievement of control group in Still-life which is due to teaching Still-life using computer based art education. Hence it showed that the developed computer based art education package for teaching Still-life is effective in enhancing achievement of students in Still-life in comparison to traditional approach. So it can be concluded that the developed computer based art education package was found to be stochastically (significantly) effective in terms of enhancing students' achievement in Still-life in comparison to the traditional approach.

4.2.3 Achievement in Painting of Experimental and Control Group

To achieve a part of the objective III of the present study and to test the null hypothesis of the present study $H_0$3: "There will be no significant difference between the mean post-test achievement scores of standard IX students studying Painting through computer based art education package and those studying through traditional method" data were analyzed using Mean, Standard Deviation and Mann-Whitney U-test which is given in table 4.5 and table 4.6 and discussed thereafter.

Table 4.5: Mean, Standard Deviation and Standard Error of Mean wise distribution of Achievement in Painting of Experimental and control group Students

Group	N	Mean	Standard Deviation	Standard Error of Mean
Control Group	30	16.72	6.96	1.26
Experimental Group	30	25.52	4.9	0.88

From the table 4.5, it was found that the mean Painting achievement score of control group and the experimental group were 16.72 and 25.52 respectively. The standard deviations from the means for the Painting achievement score were found to be 6.96 and 4.9 respectively for the control group and the experimental group students with Standard Error of Means of 1.26 and 0.88 for the respective groups. Comparing the mean achievement scores in Painting it was found that the Mean of the Experimental Group in Painting was higher than that of the Control Group. From the Standard Deviations and Standard Error of Means of both the groups, it was also observed that the students of the Experimental Group were more homogeneous in terms of their achievement score in Painting in comparison to the students of the Control Group. To find whether the difference in the mean achievement in Painting was significant or by chance and to test the null hypothesis, Mann-Whitney U-test was used as the sample was taken purposively. The summary of the Mann-Whitney U-test is given in table 4.6 followed by analysis.

Table 4.6: Summary of Mann-Whitney U-test for Painting Achievement of Experimental and Control group students with the Number of sample, Sum of Ranks, U-value, z-value and Probability

Group	N	Sum of Ranks	U-value	z-value	Probability (p)
Control Group	30	607.00	143.000	4.568	>.00003
Experimental Group	30	1223.00			

From table 4.6, it was observed that the Sum of Ranks of the control group and the experimental group were 607.00 and 1223.00 respectively with 30 students in both the groups. The U-value and z-value were found to be 143.000 and 4.568 respectively. Referring Table for normal probability (Table A of Siegel, 1956) under null hypothesis (H_o) of z, for z < 4.568, the two tailed probability was found to be >0.00003 which is greater than our decided significance level (α) i.e. 0.01. Hence the null hypothesis i.e. 'There will be no significant difference between the mean post-test achievement scores of standard IX students studying Painting through computer based art education package and those studying through traditional method' is rejected and it can be said that experimental group and control group students differ stochastically in terms of their achievement in Painting. From table 4.5 it was also found that the mean achievement of experimental group in Painting is more than the mean achievement of control group in Painting which is due to teaching Painting using computer based art education package. Hence, it showed that the developed computer based art education package for teaching Painting is effective in enhancing achievement of students in comparison to traditional approach. So it can be concluded that the developed computer based art education package was found to be stochastically (significantly) effective in terms of enhancing students' achievement in Painting in comparison to the traditional approach.

4.2.4 Achievement in Poster of Experimental and Control Group

To achieve a part of the objective III of the present study and to test the null hypothesis of the present study $H_0$4: "There will be no significant difference between the mean post-test achievement scores of standard IX students studying Poster through computer based art education package and those studying through traditional method" data were analyzed using Mean, Standard Deviation and Mann-Whitney U-test which is given in table 4.7 and table 4.8 and discussed thereafter.

Table 4.7: Mean, Standard Deviation and Standard Error of Mean wise distribution of Achievement of Experimental and control group Students in the components of Poster.

Group	N	Mean	Standard Deviation	Standard Error of Mean
Control Group	30	21.86	6.74	1.22
Experimental Group	30	27.26	5.46	0.98

From the table 4.7, it was found that the mean achievement score of control group and the experimental group in the component of poster were 21.86 and 27.26 respectively. The standard deviations from the means achievement score in the component of poster were found to be 6.74 and 5.46 respectively for the control group and the experimental group students with Standard Error of Means of 1.22 and 0.98 for the respective groups. Comparing the mean achievement scores in the component of poster, it was found that the Mean of the Experimental Group was higher than that of the Control Group. From the Standard Deviations and Standard Error of Means of both the groups, it was also observed that the students of the Experimental Group were more homogeneous in terms of their achievement score in comparison to the students of the Control Group in the component of poster. To find whether the difference in the mean achievement was significant or by chance and to test the null hypothesis, Mann-Whitney U-test was used as the sample was taken purposively. The summary of the Mann-Whitney U-test is given in table 4.8 followed by analysis.

Table 4.8: Summary of Mann-Whitney U-test for Achievement of Experimental and Control group students in the component of poster with the Number of sample, Sum of Ranks, U-value, z-value and Probability

Group	N	Sum of Ranks	U-value	z-value	Probability (p)
Control Group	30	711.00	246.000	3.025	.0013
Experimental Group	30	1119.00			

From table 4.8, it was observed that the Sum of Ranks of the control group and the experimental group were 711.00 and 1119.00 respectively with 30 students in both the groups. The U-value and z-value were found to be 246.000 and 3.025 respectively. Referring Table for normal probability (Table A of Siegel, 1956) under null hypothesis (H_o) of z, for z < 3.025, the two tailed probability was found to be 0.0013 which is greater than our decided significance level (α) i.e. 0.01. Hence the null hypothesis i.e. 'There will be no significant difference between the mean post-test achievement scores of standard IX students studying Poster through computer based art education package and those studying through traditional method' is rejected and it can be said that experimental group and control group students differ stochastically in terms of their achievement in the component of poster. From table 4.7 it was also found that the mean achievement of experimental group in the component of poster is more than the mean achievement of control group which is due to teaching Poster using computer based art education package. Hence, it showed that the developed computer based art education package for teaching Poster is effective in enhancing achievement of students in the component of poster in comparison to traditional approach. So it can be concluded that the developed computer based art education package was found to be stochastically (significantly) effective in terms of enhancing students' achievement in Poster in comparison to the traditional approach.

4.2.5 Achievement in Composition of Experimental and Control Group

To achieve a part of the objective III of the present study and to test the null hypothesis of the present study $H_0$5: "There will be no significant difference between the mean post-test achievement scores of standard IX students studying Composition through computer based art education package and those studying through traditional method" data were analyzed using Mean, Standard Deviation and Mann-Whitney U-test which is given in table 4.9 and table 4.10 and discussed thereafter.

Table 4.9: Mean, Standard Deviation and Standard Error of Mean wise distribution of Achievement in Composition of Experimental and control group Students

Group	N	Mean	Standard Deviation	Standard Error of Mean
Control Group	30	18.72	7.04	1.28
Experimental Group	30	25.42	6.1	1.1

From the table 4.9, it was found that the mean achievement score of control group and the experimental group in composition were 18.72 and 25.42 respectively. The standard deviations from the means for the Composition achievement score were found to be 7.04 and 6.1 respectively for the control group and the experimental group students with Standard Error of Means of 1.28 and 1.1 for the respective groups. Comparing the mean achievement scores in Composition it was found that the Mean of the Experimental Group was higher than that of the Control Group in Composition. From the Standard Deviations and Standard Error of Means of both the groups, it was also observed that the students of the Experimental Group were more homogeneous in terms of their achievement score in comparison to the students of the Control Group in Composition. To find whether the difference in the mean achievement was significant or by chance and to test the null hypothesis, Mann-Whitney U-test was used as the sample was taken purposively. The summary of the Mann-Whitney U-test is given in table 4.10 followed by analysis.

Table 4.10: Summary of Mann-Whitney U-test for Achievement of Experimental and Control group students in Composition with the Number of sample, Sum of Ranks, U-value, z-value and Probability

Group	N	Sum of Ranks	U-value	z-value	Probability (p)
Control Group	30	675.50	210.000	3.554	>0.00023
Experimental Group	30	1154.50			

From table 4.10, it was observed that the Sum of Ranks of the control group and the experimental group were 675.50 and 1154.50 respectively with 30 students in both the groups. The U-value and z-value were found to be 210.000 and 3.554 respectively. Referring Table for normal probability (Table A of Siegel, 1956) under null hypothesis (H_o) of z, for z < 3.554, the two tailed probability was found to be > 0.00023 which is greater than our decided significance level (α) i.e. 0.01. Hence the null hypothesis i.e. 'There will be no significant difference between the mean post-test achievement scores of standard IX students studying Composition through computer based art education package and those studying through traditional method' is rejected and it can be said that experimental group and control group students differ stochastically in terms of their achievement in Composition. From table 4.9 it was also found that the mean achievement of experimental group in Composition is more than the mean achievement of control group in Composition which is due to teaching Composition using computer based art education package. Hence, it showed that the developed computer based art education package for teaching Composition is effective in enhancing achievement of students in comparison to traditional approach. So it can be concluded that the developed computer based art education package was found to be stochastically (significantly) effective in terms of enhancing students' achievement in Composition in comparison to the traditional approach.

4.2.6 Overall Achievement of Experimental and Control Group in Art Education

To achieve a part of the objective III of the present study and to test the null hypothesis of the present study $H_0$6: "There will be no significant difference between the mean post-test overall achievement scores of standard IX students studying Art

Education through computer based art education package and those studying through traditional method" data were analyzed using Mean, Standard Deviation and Mann-Whitney U-test which is given in table 4.11 and table 4.12 and discussed thereafter.

Table 4.11: Mean, Standard Deviation and Standard Error of Overall Mean wise distribution of Achievement in Art Education of Experimental and control group Students

Group	N	Mean	Standard Deviation	Standard Error of Mean
Control Group	30	105.26	27.32	4.98
Experimental Group	30	136.52	22	4

From the table 4.11, it was found that the overall mean Art Education achievement score of control group and the experimental group were 105.26 and 136.52 respectively. The standard deviations from the means for the overall Art Education achievement score were found to be 27.32 and 22 respectively for the control group and the experimental group students with Standard Error of Means of 4.98 and 4 for the respective groups. Comparing the overall mean achievement scores in Art Education it was found that the Mean of the Experimental Group was higher than that of the Control Group. From the Standard Deviations and Standard Error of Means of both the groups, it was also observed that the students of the Experimental Group were more homogeneous in terms of their achievement score in comparison to the students of the Control Group. To find whether the difference in the mean achievement was significant or by chance and to test the null hypothesis, Mann-Whitney U-test was used as the sample was taken purposively. The summary of the Mann-Whitney U-test is given in table 4.12 followed by analysis.

Table 4.12: Summary of Mann-Whitney U-test for Overall Achievement of Experimental and Control group students in Art Education with the Number of sample, Sum of Ranks, U-value, z-value and Probability

Group	N	Sum of Ranks	U-value	z-value	Probability (p)
Control Group	30	605.00	140.000	4.586	>0.00003
Experimental Group	30	1225.00			

From table 4.12, it was observed that the Sum of Ranks of the control group and the experimental group were 605.00 and 1225.00 respectively with 30 students in both the groups. The U-value and z-value were found to be 140.000 and 4.586 respectively. Referring Table for normal probability (Table A of Siegel, 1956) under null hypothesis (H_o) of z, for z < 4.586, the two tailed probability was found to be >0.00003 which is greater than our decided significance level (α) i.e. 0.01. Hence, the null hypothesis i.e. 'There will be no significant difference between the overall mean post-test achievement scores of standard IX students studying Art Education through computer based art education package and those studying through traditional method' is rejected and it can be said that experimental group and control group students differ stochastically in terms of their achievement in Art Education. From table 4.11 it was also found that the mean achievement of experimental group in Art Education is more than the mean achievement of control group in Art Education which is due to teaching Art Education using computer. Hence, it showed that the developed computer based art education package is effective in enhancing achievement of students in comparison to traditional approach. So it can be concluded that the developed computer based art education package was found to be stochastically (significantly) effective in terms of enhancing students' achievement in Art education in comparison to the traditional approach.

4.3.0 EFFECTIVENESS OF THE DEVELOPED COMPUTER BASED ART EDUCATION PACKAGE IN TERMS OF STUDENTS' REACTIONS

To achieve objective IV of the present study i.e. `To study the effectiveness of the developed computer based art education package in terms of students' reaction towards developed package' a reaction scale was developed with 35 statements those representing different components like, development and implementation of the package. The data related to the reaction scale presented in the table 4.13, and analyzed in terms of percentage of reaction for different degree along with the intensity index which is given in table 4.13 and followed by discussion.

Table 4.13: Summary of the reactions of the students towards the statements related to the developed CBAE in Percentage and Intensity Index

Sr. No	Statements	SA	A	UD	D	SD	II
1	I like the art education package presented through the computer.	16	7	5	0	2	4.16
2	The way the content presented was interesting.	8	17	3	2	0	4.03
3	The instruction given for each content was clear and easy to understand.	7	14	4	2	2	3.75
4	The language used in the package was easy to understand.	12	13	2	1	1	4.17
5	The testing and subsequent feedback was useful.	7	12	8	0	0	3.96
6	Each topic became easier while learning through the package.	12	12	4	0	0	4.28
7	Combination of test and graphics made our learning interesting for each topic.	14	12	2	1	1	4.23
8	The use of paint brush, photo shop, coral draw, flash, power point, photography, scanner, electronic slate, Internet was appropriate.	13	12	5	0	0	4.26
9	The use of paint brush, photo shop, coral draw, flash, power point, photography, scanner, electronic slate, Internet made our learning interesting on each topic.	14	11	4	1	0	4.26
10	The use of paint brush, photo shop, coral draw, flash, power point, photography, scanner, electronic slate, Internet made out learning understandable.	13	14	3	0	0	4.33
11	The package is user friendly.	7	16	4	2	1	3.90
12	Contents are logically sequenced.	6	16	6	0	1	3.89

Sr. No	Statements	SA	A	UD	D	SD	II
13	Content covered in each unit of the package is sufficient.	4	10	7	7	0	3.39
14	The package material prepared helped me in self study.	4	10	12	3	1	3.43
15	Feedback provided helped in understanding the visual arts.	6	13	7	1	1	3.78
16	Examples given in the package helped in understanding the concepts.	10	14	3	2	1	4.00
17	Materials covered in the package are adequate to the package purpose.	7	12	8	2	1	3.73
18	We can now apply paint brush, photo shop, coral draw, flash, power point, photography, scanner, electronic slate, Internet in creating arts.	14	13	3	0	0	4.36
19	Other topics should also be taught by the packages.	7	10	9	0	3	3.62
20	Use of 2D, 3D images made our learning interesting for visual arts related topics.	14	12	3	0	1	4.26
21	Use of new technologies helped us to communicate ideas.	17	6	4	1	1	4.27
22	Use of technology such as the Internet, blogs and social networking increased our ability to experience different cultures and stories.	20	4	4	1	1	4.36
23	Use of digital software made us able to identify characteristics and expressive features of art.	14	11	2	0	2	4.20
24	Visual art allowed us to compare and contrast the style, design characteristics, and expressive features of historical and cultural works of art through traditional and mass media.	14	14	1	0	0	4.44
25	Visual art embodies the inner quest for self-knowledge and reflects relationships between humans and nature.	7	12	7	3	0	3.79

Sr. No	Statements	SA	A	UD	D	SD	II
26	Digital media can communicate various ideas through art.	10	14	3	0	1	4.14
27	The developed package allowed us for the development of skills to work within the commercial art environment.	8	16	4	0	0	4.14
28	Through the use of new technologies in developed package, studio skills have evolved beyond the traditional skills, and yet can still rely on the foundational structures to create new skills.	12	12	4	0	1	4.17
29	The developed package enabled the purpose of art to expand.	9	10	4	1	2	3.79
30	Use of photography, neon lights, paint, and computer and digitally generated art given us more opportunities to preserve and capture aspects of present-day art.	20	6	1	1	1	4.48
31	Technology can be a tool in creating two- or three-dimensional art and provide infinite possibilities to manipulate characteristics and expressive features in works of art.	16	10	2	1	0	4.41
32	Technology and the World Wide Web facilitate the research of cultures.	17	7	3	1	1	4.31
33	Digital media and computer technology can help to identify components in art.	14	12	1	1	1	4.27
34	The developed package showed the connection between storytelling with words and with images.	7	14	7	1	0	3.93
35	Computer package used to explore works of art by providing opportunities to experience a myriad of diverse works of art as well as information on the artists.	12	12	3	1	1	4.13
Over all Reaction		**11.2**	**11.7**	**4.34**	**1.02**	**0.8**	**3.95**

In terms of the reaction of the students towards the statement no 1 `I like the art education package presented through the computer', 16, 7, and 5 of them reacted strongly agree, agree, and undecided respectively. The intensity index of 4.16 showed favorable reaction of students towards the developed computer based art education package.

For the statement no 2 'The way the content presented was interesting', 8, 17 And 3 students gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 4.03 showed favorable reaction of students towards the presentation of the content through developed CBAE package in interesting way.

For the statement no 3 'The introduction given for each content was clear and easy to understand', 7, 14 and 4 students gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 3.75 showed favorable reaction of students towards the introduction of the content in the developed CBAE package.

In terms of the reaction of the students towards the statement no 4 'The language used in the package was easy to understand', 12, 13, and 2 students gave their reaction in strongly agree, agree and undecided respectively. The intensity index 4.17 showed favorable reactions of them for the language used in the package.

For the statement no 5 'The testing and subsequent feedback was useful', 7, 12, and 8 students gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 3.96 showed that the students were favorable with the testing and feedback provided during the teaching-learning through CBAE package.

In terms of the reaction of the students towards the statement no 6 'Each topic became easier while learning through the package', 12, 12 and 4 of them gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 4.28 showed favorable reactions of students for the statement.

In terms of the reaction of the students towards the statement no 7 'Combination of text and graphics made our learning interesting for each topic', 14, 12 and 2 of them gave their reaction in strongly agree, agree and undecided respectively. The intensity

index of 4.23 showed favorable reactions of students for the interesting learning through the combination of text and graphic.

For the statement no 8 ‘The use of paint brush, photo shop, coral draw, flash, power point, photography, scanner, electronic slate, internet was appropriate’, 13, 12 and 5 students gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 4.26 showed favorable reactions of students for the statement which means that the use of paint brush, photo shop, coral draw, flash, power point, photography, scanner, electronic slate and internet was appropriate.

In terms of the reaction of the students towards the statement no 9 ‘The use of paint brush, photo shop, coral draw, flash, power point, photography, scanner, electronic slate and internet made our learning interesting on each topic’, 14, 11 and 4 of them gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 4.26 showed favorable reactions of students which means that the use of paint brush, photoshop, coral draw, flash, power point, photography, scanner, electronic slate, Internet made their learning interesting.

For the statement no 10 ‘The use of paint brush, photo shop, coral draw, flash, power point, photography, scanner, electronic slate and internet made out learning understandable’, 13, 14 and 3 students gave their reaction in strongly agree and undecided respectively. The intensity index of 4.33 showed highly favorable responses to the statement which showed that the use of paint brush, photo shop, coral draw, flash, power point, photography, scanner, electronic slate, internet made their learning understandable.

In terms of the reaction of the students towards the statement no 11 ‘The package was user friendly’, 7, 16 and 4 of them gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 3.90 showed that they were agreed to the statement, which means the developed package was user friendly.

For the statement no 12 ‘Contents are logically sequenced’, 6, 16 and 6 students gave their reaction in strongly agree, agree and undecided respectively. The intensity index

of 3.89 showed favorable reactions of the students towards the logically sequencing of content in the package.

For the statement no 13 ‘Content covered in each unit of the package is sufficient’, 4, 10 and 7 students gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 3.39 showed that they were undecided to the statement.

In terms of the reaction of the students towards the statement no 14 ‘The package material prepared helped me in self study’, 4, 10 and 12 of them gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 3.14 showed the undecided reaction of the students to the statement.

In terms of the reaction of the students towards the statement no 15 ‘Feedback provided helped in understanding the visual art’, 6, 13 and 7 of them gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 3.78 showed that they gave favorable reactions to it and the feedback provided helped them in understanding the visual art.

For the statement no 16 ‘Examples given in the package helped in understanding the concepts’, 10, 14 and 3 students gave their reactions in strongly agree, agree and undecided respectively. The intensity index of 4.00 showed their favorable reactions towards examples given in the package helped in understanding the concepts.

In terms of the reaction of the students towards the statement no 17 ‘Materials covered in the package are adequate to the package purpose’, 7, 12 and 8 of them gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 3.73 showed that they were agreed to the statement which showed the materials covered in the package are adequate.

In terms of the reaction of the students towards the statement no 18 ‘We can now apply paint brush, photo shop, coral draw, flash, power point, photography, scanner, electronic slate, internet in creating art’, 14, 13 and 3 students gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 4.36 showed

their highly favorable reactions for the statement which showed that they can apply paint brush, photo shop, coral draw, flash, power point, photography, scanner, electronic slate, internet in creating art.

For the statement no 19 ‘Other topics should also be taught by the packages’, 7, 10 and 9 students gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 3.62 showed the favorable reactions for the statement which showed they also expect other topics be taught by the help of similar packages.

In terms of the reaction of the students towards the statement no 20 ‘Use of 2D, 3D images made our learning interesting for visual art related topics’, 14, 12 and 3 of them gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 4.26 showed their favorable reactions for the statement which showed that the use of 2D and 3D images made their learning interesting for visual art related topics.

In terms of the reaction of the students towards the statement no 21 ‘Use of new technologies helped us to communicate ideas’, 17, 6 and 4 of them gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 4.27 showed their favorable reactions for the statement which showed that use of new technologies helped them to communicate ideas.

In terms of the reaction of the students towards the statement no 22 ‘Use of technology such as the Internet, blogs and social networking increased our ability to experience different cultures and stories’, 20, 4 and 4 of them gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 4.36 showed their highly favorable reactions for the statement which showed that the use of internet, blogs and social networking increased their ability to experience different cultures and stories.

For the statement no 23 ‘Use of digital software made us to identify characteristics and expressive features of art’, 14, 11 and 2 students gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 4.20 showed agreed responses about the statement.

In terms of the reaction of the students towards the statement no 24 ‘Visual art allowed us to compare and contrast the style, design characteristics, and expressive features of historical and cultural works of art through traditional and mass media’, 14, 14 and 1 of them gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 4.44 showed their highly favorable reactions to the statement.

For the statement no 25 ‘Visual art embodies the inner quest for self-knowledge and reflects relationships between humans and nature’, 7, 12 and 7 students gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 3.79 showed favorable reactions of the students towards the statement.

For the statement no 26 ‘Digital media can communicate various ideas through art’, 10, 14 and 3 students gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 4.14 showed that they agreed to it.

In terms of the reaction of the students towards the statement no 27 ‘The developed package allowed us for the development of skills to work within the commercial art environment’, 8, 16 and 4 of them gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 4.14 showed the favorable reaction of the students to it. It showed that they developed the skills to work within the commercial art environment.

In terms of the reaction of the students towards the statement no 28 ‘Through the use of new technologies in developed package, studio skills have evolved beyond the traditional skills, and yet can still rely on the foundational structures to create new skills’, 12, 12, and 4 of them gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 4.17 showed that they gave favorable reactions to it.

For the statement no 29 ‘The developed package enabled the purpose of art to expand’, 9, 10 and 7 students gave their reactions in strongly agree, agree and

undecided respectively. The intensity index of 3.79 showed their favorable reactions towards the package enabled the purpose of art to expand.

In terms of the reaction of the students towards the statement no 30 ‘Use of photography, neon lights, paint, and computer and digitally generated art given us more opportunities to preserve and capture aspects of present-day art’, 20, 6 and 1 of them gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 4.48 showed that they were highly favorable reactions towards the statement.

In terms of the reaction of the students towards the statement no 31 ‘Technology can be a tool in creating two- or three-dimensional art and provide infinite possibilities to manipulate characteristics and expressive features in works of art’, 16, 10 and 2 students gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 4.41 showed their highly favorable reactions for the statement.

For the statement no 32 ‘Technology and the World Wide Web facilitate the research of cultures’, 17, 7 and 3 students gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 4.31 showed highly favorable reactions of them for the statement that technology and the WWW facilitate research of cultures.

In terms of the reaction of the students towards the statement no 33 ‘Digital media and computer technology can help to identify components in art’, 14, 12 and 1 of them gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 4.27 showed their favorable reactions for the statement about help of digital media and computer technology in identifying components in art.

In terms of the reaction of the students towards the statement no 34 ‘The developed package showed the connection between storytelling with words and with images’, 7, 14 and 7 of them gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 3.93 showed their favorable reactions for the statement which means that the developed package were showed connection between work and images.

In terms of the reaction of the students towards the statement no 35 ‘Computer package used to explore works of art by providing opportunities to experience a myriad of diverse works of art as well as information on the artists’, 12, 12 and 3 of them gave their reaction in strongly agree, agree and undecided respectively. The intensity index of 4.13 showed their highly favorable reactions for the statement.

In terms of the overall reaction of the students towards the developed CBAE package an average of 11.2, 11.7, 4.34, 1.02 and 0.8 of them gave their reaction in strongly agree, agree, undecided, disagree and strongly disagree respectively. The intensity index of 3.95 showed their favorable reactions towards the teaching and learning Art Education through CBAE package. Thus CBAE package was found effective in terms of the reactions of the students.

Out of 35 statements in the reaction scale that describes different aspects of the developed CBAE package, students have favourable reaction for 33 statements, and undecided reaction towards two statements. The overall reaction of the students towards the CBAE package was also found to be favourable. Hence it can be concluded that students have favourable reaction towards the developed package through which they learned art education. So it can be observed that the CBAE package to teach art education was found to be effective in terms of the reaction of students towards the package.

4.4.0 OBSERVATIONS DURING THE EXPERIMENT

During the experiment, the researcher keenly observed the behaviour of students related to the learning of Art Education with the help of the developed CBAE package. Some of the main observations were as follows.

- Students were very active in learning with CBAE package. This indicates that they liked to learn Art Education with computer.
- Students were eager to know more about the CBAE package which showed their interest in learning Art Education with computer.

- During the experiment it was also found that students were helping each other while interacting with the CBAE package. The researcher noticed that the students were discussing their problems and ideas with their peers and trying to understand the concept by themselves. They were found working in small groups. It indicates that learning with CBAE package inspired the students to work in group and to have cooperative learning.
- It was also noticed that most of the students went through the package several times. This showed that the developed package inspired the students to revise the points properly.
- Most of the students were found interested in pictures, materials and different exercises given in the CBAE package. With the help of pictures, they tried to link their theory knowledge with the practical.
- It was noticed that the students were using CBAE package and practicing on it in their convenient time and whenever they were found themselves free. In this way, the students got the advantages of using CBAE package as a self learning tool.
- The students were found approaching the teacher (researcher) while learning with the CBAE package. They also showed the teachers the way they had completed the exercises and expressed their feelings about the contents. They also expressed their positive feelings about the extra reading material related to the reference book to learn Art Education.
- It was also found that the students were practicing with the help of CBAE package after the school at home.
- The students were preparing Drawings, Still-life, Paintings, Posters and Composition with the help of computer. They were also found very much eager to know their result. In case of poor result, they were found repeating again and again to learn more related to the contents Art Education.
- The overall observation of the researcher shows that the students were enjoying the learning with the developed CBAE package.

4.5.0 MAJOR FINDINGS OF THE STUDY

Following Major findings were drawn for the present study on the basis of analysis and interpretation of the data.

1. The developed CBAE package was found to be stochastically (significantly) effective in terms of enhancing students' achievement in Art Education (in all the five components like, Drawings, Still-life, Paintings, Posters and Composition separately and over all art education) in comparison to the traditional approach.
2. The achievement of the students in Art Education taught through CBAE package was found significantly higher than that of the students taught through traditional method (in all the five components like, Drawings, Still-life, Paintings, Posters and Composition separately and over all art education). Hence it can be said that teaching Art Education through computer is comparatively better than traditional method in terms of the achievement of the students.
3. The developed CBAE package to teach Art Education was also found to be effective in terms of the reaction of students towards the package. As most of the students showed favorable reaction towards most of the components of CBAE and CBAE package as a whole.
4. The developed CBAE package was found to make the students interested in learning Art Education, having cooperative learning among students and considering the package as a self-learning tool.

4.6.0 DISCUSSION

Only reference material and teaching of the teacher is not enough to satisfy the needs of the present day students. They need some technology enable supportive material for better understanding their content due to one or other reason. It is again more difficult for the students to understand art related concepts introduced in the CBSE schools as it is more related to affective domain of the students. The condition of teaching learning of art education in CBSE secondary schools is good. However, considering the need of students in this technology based era of instruction and considering the emerging demand of art education the researcher developed a CBAE

package for the standard IX students of CBSE school and tried to measure the effectiveness of the developed package for teaching-learning process and for enhancing achievement in art education. The researcher developed the package by selecting five concepts viz. Drawing, Still-life, Painting, Poster and Composition of CBSE secondary level art education syllabus. Content analysis and systematisation of the materials were done and the package was developed using the scientific principles of package development. The present study focused on the enhancement of students' achievement in art education. It also focused on the effectiveness of the developed package in terms of the students' achievement in the five selected concepts of art education. While reviewing the available literature, the researcher did not come across many studies which dealt with the art education through the computer based teaching-learning except the studies of Chumely (1987), Robkin (1987), Reeve (1988) and Allister (1990). However, these studies are conducted on the primary school students while researcher could not locate any such study on secondary school students. Many studies were reviewed which dealt with the art education and others dealt with the effect of CAI on different subjects but there was no study found that deals with computer based art education. Therefore, the present study has its own significance in the present time.

The studies conducted by Gupta (1987), Prabhakar (1989), HSu (1994), Das (1998), Khirwadkar (1998), Nimtrakul (1999), Robkob (1999), Suwanma (1999), Vaisopha (1999), Wanna (1999), Zyud (1999), Yadav (2000) and Dalwadi (2001) revealed that most of the studies used computer either in the form of CAI or CAL to teach different school subjects and in all the studies the packages were found to be significant in terms of enhancing students achievement. In all those studies, it was found out that the learning with CAI was found better than learning with traditional method in terms of enhancing the achievement of students. The present study is an attempt in this direction to teach art education through CBAE package. The Major findings of the present study state that the developed CBAE package was found to be stochastically (significantly) effective in terms of enhancing students' achievement in art education in comparison to the traditional approach and the developed CBAE package to teach art education was also found to be effective in terms of the reaction of students. Studies conducted by Gabrielle (2003), Zyoud (1999) supports the findings of the present study and shows that systematically designed instructional strategies can

positively affect motivation performance, and self directed learning of the students. Floyed (2006) also shows the findings in line with the present study as it shows that the use of technology has positive effect on students' achievement as it increases students' achievements. Besides the said studies which support the findings of the present study, there are studies which contrast the findings of the present study. Those studies were conducted by Sabharwal (1978) and Charsky (2004). Both the studies aimed to check the effectiveness of programmed auto learning with reference to other methods, and it was found that the traditional methods were more effective than the programme learning mainly in the teaching of English language. This could be a fact due to the type of programme learning materials prepared in the past as it was quite difficult on the part of researchers to prepare packages on the stand alone machines. Now it is the time for network technology and user friendly technology. The type of teaching learning material which is prepared in present time include the need based learning material which is quite suitable for the students working in the areas of art education using internet and user end packages meant for different functions of art education. The package also includes the role and instruction of the teacher/ instructor that makes the use of technology more effective in comparison to a traditional environment. These components of the package may be the causes of better result of experimental group in the present study in comparison to the control group.

The findings of the present study showed that the developed CBAE package was more effective than the traditional method of teaching in terms of achievement of students in art education component wise and as a whole. It may be due to the fact that the teaching through traditional method does not take care of needed foundation of students in art education and the required context needed for better understanding of art education by the students and students are only the passive listeners and followers in the traditional classroom teaching. Other reason can be that the students have to learn whatever the teacher teaches to them in the class, though they are interested or not but here the developed CBAE has many features like paint brush, photo shop, coral draw, flash, power point, photography, scanner, electronic slate, internet in creating art that tempt students to use these applications. The students might have made use of their understanding as well as their imagination, experiences through the coordination of the learnt things with different contexts by the use of these applications. The other benefit was that the students could learn the topic of

their own interest taking the package as the self learning tool which might have helped for better learning. Thus the overall effect of the CBAE package in comparison to traditional method was found to be more effective. The result also indicated that there were fewer roles of individual differences in learning with the package as the deviation in the experimental group was found less in comparison to the control group. Hence, the package can be used by all type and level of students as far as the art education is concerned.

The reactions of the students were found favourable towards the developed CBAE package. This may be due to the fact that the package allowed the students a lot of freedom to learn and experiment with the package with adequate involvement of the teacher. The students themselves revealed that the package was a new experience for them and it was the first time that they learned art education through this new medium of instruction. This result is supported by the findings reported by Mathis et al. (1970), Stevens (1991) and Zyoud (1999). Mathis et al. (1970) found that the students were generally positive towards CAI. Stevens (1991) also found that the students had enjoyed using computers in their study. Zyoud (1999) found that the students' ability to use computers was improved their attitudes. The reasons behind that may also be the difference in teaching-learning process itself, use of interactive technology in computer, relevance of the package with their learning needs, usability of the learnt topics in life through the computer, freedom of learning, drill and practice as per their convenient time, and clarity of explanation presented in the package. Even the students of this level like the wholistic nature of the content which might have developed their liking for the developed CBAE package.

4.7.0 IMPLICATIONS OF THE PRESENT STUDY

The teacher and teaching should be changed as per the context and with the passage of time. Presently if one notices the use of technology, then one may find the students much more advanced than the teachers in its use. The technology has shown its great effect on the mind of the students, so the present study is an effort to make use of computer in teaching of Art Education and to have an effect of that on the learning of the students. It was just an attempt to find out an innovative way of teaching Art

Education and to check the effectiveness. The following are some of the suggested implications of the present study on the basis of the major findings.

- To increase the effectiveness of teaching of Art Education the teachers should make use of computer or other technology so that the students get interest in learning. More interactive technology like internet could be used more and more for enhancing the imagination and thinking of the students by understanding different culture and environment.
- Not only the topics which were taught through the developed CBAE package by the researcher but other topics of art education also should be taught with the help of this kind of package.
- The teaching through this kind of CBAE package effects more senses of the students and they make use of the learnt concepts in their real life.
- As CBAE package shows the innovative way and making teaching learning more fruitful and interesting, other packages of innovative nature considering the nature of art education and the interest of the students could be developed to provide more and more exposure to the students.
- Using only CBAE package for teaching learning has showed effective result as well as positive reaction of the students in the past and also in the present study. This type of packages could be used with teacher's activity and with small group discussion for better involvement and understanding of the students in art education as CBAE packages could be helpful to reduce the burden of the student as well as the teachers by increasing the capacity of both of them.

4.8.0 CONCLUSION

The developed CBAE package to teach Art Education to standard IX students of CBSE was found to be effective in enhancing achievement of students in Art Education in comparison to the traditional method of teaching. The developed package was also found effective in terms of the liking of students towards the package that was revealed form of technology for the teaching of Art Education. The computer has huge potential today as the CBSE schools use technology enabled teaching-learning process and all the schools are provided with high end technologies

like computer hardware and software. Computer based packages are also useful for the students in self-learning as per their convenient time and this minimizes the burdens of teachers as the teachers cannot give individual attention to all students due to the scarcity of time and also due to individual differences among the students. With the increasing use of networking and social networking applications, the globe has shrinked to a small community and there is a need to have better understanding and education among the members of this net community. Teaching of art education using such developed packages, is an attempt in this direction to understanding of students in the line of secularism, global citizenship and universal brotherhoodness along with better achievement. Now there is a need to prepare such type of packages or programmes in different areas of Art Education and also in different subjects to cater the needs of the students studying in different schools of different boards. While preparing this type of packages, there is a need to consider the level of the students, their environment and their likeness. According to the learning style of the learners, different packages could be available to these learners for excelling in Art Education as well as in different subjects. This technology blended learning will see the better future of students by the way of providing technology enabled teaching.