

CHAPTER IV

DATA ANALYSIS, INTERPRETATION AND DISCUSSION

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CHAPTER IV

DATA ANALYSIS, INTERPRETATION AND DISCUSSION

4.0.0 INTRODUCTION

Rational decision to a problem is the outcome of systematic analysis and interpretation of the data under study. This chapter deals with the analysis and interpretation of data collected through the tools viz. achievement test and reaction scale under the experiment conducted. Any unprocessed data to be substantial information has to undergo analysis, followed by its meaningful interpretation. The analyst can resort to different alternative analysis tools and techniques that are accessible for processing the data at its edge. Essential is the identification of suitable and appropriate analysis techniques by the analyst. Analysis assists in the build-up of the relationship between the data and subsequently aids to reduce the values to a solitary meaningful value that is comparable, understandable and further interpretable too. The undertaken experiment and its observations are condensed through analysis in a way that elucidates solution to the research problems. Interpretation further aims to investigate extensive meaning of these solutions. The central idea of analysis and interpretation is to assess and determine the extent of attainment of objectives of the laid task. Analysis of the research data also directs the researcher to either accept or reject a hypothesis underlying the research. The process makes conclusion and decision, the easy tasks for the researcher leading him on the road to formulation of a theory. Any research study cannot be completed barring this and the importance of data analysis and interpretation therefore cannot be undermined.

The present study is an experimental study with quasi experimental research design. The data were collected by the researcher by administering achievement test in two phases viz. pre-test & post-test on both control group and experimental group. The pre-test achievement score was used to make control group and experimental group equivalent. After making the group equivalent there were 30 students in both experimental and control group. Though the post testing was done on all the students of experimental and control group, only the data of both the equivalent groups with 30

students in each group were analysed to achieve the objectives of present study. As the nature of data was quantitative, the quantitative statistical techniques were adopted for analysis of data. The statistical techniques like Mean, Standard Deviation (SD), Standard Error of Mean (SE), Mann–Whitney U-test and Intensity Index (II) were used to attain different objectives of the present study.

Under mentioned formula was employed for deriving the Non–parametric statistics, Mann–Whitney U-test.

$$U = n_1 n_2 + \frac{n_1(n_1+1)}{2} - \sum R_1$$

Where,

n_1 = number in one group

$\sum R_1$ = sum of ranks in one group

n_2 = number in second group

To calculate and determine the z-value, the researcher used the following formula.

$$Z = \frac{U - \frac{n_1 n_2}{2}}{\sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}}}$$

The selection of the sample was purposive and the assumptions of parametric statistics did not match for the present data, hence it became the cause for the researcher to favour the use of Mann–Whitney U-test. Exhaustive analysis of data is presented as follow.

4.1.0 ACHIEVEMENT OF EXPERIMENTAL AND CONTROL GROUPS IN GEOGRAPHY

To attain the objective 3 of the present study viz. “To study the effectiveness of the developed multimedia package in terms of achievement of students in Geography” and to test the null hypothesis that “There will be no significant difference in the

mean achievement score of Geography of control group students and experimental group students”, the analysis of data was done using statistical techniques viz. Mean, Standard Deviation and Mann-Whitney U-test. The detailed analysis is given in table 4.1 and table 4.2.

Table 4.1: Mean, Standard Deviation and Standard Error of Mean Wise Distribution of Achievement of Students of Experimental and Control Groups in Geography

Achievement in Geography	N	Mean	Standard Deviation	Standard Error of Mean
Experimental Group	30	82.13	6.78	1.24
Control Group	30	70.33	6.34	1.16

From the table 4.1 it is found that the mean achievement of experimental and control group students in Geography were 82.13 and 70.33 respectively out of total score of 100. The standard deviation from the mean for the achievement in Geography were found to be 6.78 and 6.34 respectively for experimental group and control group students with standard error of mean of 1.24 and 1.16 for achievement in Geography for the experimental and control group respectively. Considering the mean achievement of both the experimental and control group, it can be said that both the groups did very good in Geography with more or less similar standard deviation and equally low level of standard error of mean. Further, comparing the mean achievement in Geography, it was found that the mean achievement of experimental group students in Geography was higher than that of the control group students. From the standard deviations and standard error of mean of both the groups it was also observed that in terms of homogeneity in the achievement, both the experimental group and control groups were found very equally homogeneous. The standard errors of mean for both the groups were found to be almost similar. The higher mean achievement score of experimental group in Geography in comparison to the control group may be due to the effect of the developed multimedia package. To find whether the difference in the mean was significant or by chance and to test the null hypothesis i.e. H_0 , “There will be no significant difference in the mean achievement score of Geography of control group and experimental group students”, 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, which is followed by analysis.

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

Students	N	Sum of Ranks	U-value	z-value	Probability (p)
Experimental Group	30	1275	90	5.322	0.00003
Control Group	30	555			

From table 4.2 it was observed that the sum of ranks of experimental group and control group students in Geography achievement were 1275 and 555 respectively with 30 students in each group. The U-value and z-value were found to be 90 and 5.32 respectively. Referring the table for normal probability (Table A of Siegel, 1956) under null hypothesis (H_0) of z, for $z \leq 5.32$, the two tailed probability was found to be 0.00003 which was lesser than our decided significance level (α) i.e. 0.01. Hence the null hypothesis i.e. "There will be no significant difference in the mean achievement score of Geography of control group students and experimental group students," was rejected and it could be believed that experimental group and control group students differ stochastically (significantly) in terms of their achievement in Geography. From table 4.1 it was also established that the mean achievement of experimental group when calculated from post achievement test in Geography was more than the mean achievement of control group in Geography that could be attributed to teaching Geography through the use of multimedia package. Hence it indicates that the developed multimedia package in teaching Geography was effective in enhancing student's achievement in comparison to traditional approach. Thus it can be concluded that the developed multimedia package was found to be significantly effective in terms of enhancing students' achievement in Geography in comparison to the traditional approach.

4.2.0 REACTION OF STUDENTS TOWARDS DEVELOPED MULTIMEDIA PACKAGE

Students of standard IX (experimental group in specific) were the ultimate recipient and the user of the developed multimedia package. Hence, it was very important to know the reaction of these students who were exposed to developed multimedia package. It would lead to find and determine the utility of the package for the students of standard IX in general. With this aspect in mind objective 4 of the present study i.e. “To study the effectiveness of multimedia package in terms of reaction of students towards the developed multimedia package.” was set. To know the extent of realisation of the said objective the data was analyzed using percentage and Intensity Index (II), mentioned with its analysis in table 4.3. on the next page.

Table 4.3: Summary of the reaction of the students towards the statements related to the developed multimedia package in percentage and Intensity Index (II)

Sr. No	Statements	SA %	A %	CS %	DA %	SDA %	II
1.	I liked multimedia package through which I studied Geography.	40.00	56.67	3.33	0.00	0.00	4.37
2.	Appropriate content coverage was done in multimedia for different chapters of Geography.	26.67	43.33	13.33	16.67	0.00	3.80
3.	Content presented in multimedia package was organized properly.	53.33	30.00	10.00	6.67	0.00	4.30
4.	The content presentation was interesting in multimedia package.	43.33	43.33	6.67	3.33	3.33	4.20
5.	The language used in the multimedia package was easy to understand.	36.67	36.67	20.00	3.33	3.33	4.00
6.	The introduction for each topic was appropriate in the multimedia package	33.33	43.33	10.00	10.00	3.33	3.93
7.	The explanation given for each topic in the multimedia package lead to better understanding.	40.00	43.33	13.33	3.33	0.00	4.20
8.	The different slides giving example on each topic and concept shown were appropriate.	43.33	36.67	16.67	3.33	0.00	4.20
9.	The picture and the text presented for each topic and concept on a slide was appropriate.	53.33	43.33	0.00	3.33	0.00	4.47
10.	Pictures in multimedia package were clear in learning different topics	43.33	43.33	13.33	0.00	0.00	4.30
11.	The colored and animated pictures helped to develop interest in learning Geography.	50.00	36.67	13.33	0.00	0.00	4.37
12.	The back ground colour used in the slides was pleasant.	20.00	30.00	36.67	13.33	0.00	3.57
13.	The sound in multimedia package was clear and audible.	20.00	43.33	23.33	10.00	3.33	3.67
14.	Proper representation of image, maps, diagrams, graphs, and tables were there in multimedia package.	63.33	33.33	0.00	3.33	0.00	4.57
15.	Proper inclusion of animated maps, images and diagrams in multimedia package that were useful in representing phenomena over time.	46.67	36.67	16.67	0.00	0.00	4.30

Sr. No	Statements	SA %	A %	CS %	DA %	SDA %	II
16.	Adequate or appropriate material was there in the developed multimedia package.	33.33	36.67	16.67	13.33	0.00	3.90
17.	Time allotted to learn through multimedia package was sufficient.	3.33	33.33	20.00	30.00	13.33	2.83
18.	Each abstract (imaginary) topic became easier while learning through multimedia package.	46.67	40.00	10.00	0.00	3.33	4.27
19.	Combination of text, graphics and sound made our learning interesting for each topic.	33.33	53.33	6.67	6.67	0.00	4.13
20.	The participation of students in the classes was more due to multimedia package.	23.33	50.00	20.00	3.33	3.33	3.87
21.	Multimedia package helped to meet my needs as a learner.	33.33	46.67	20.00	0.00	0.00	4.13
22.	We are able to apply the learnt knowledge in other situations due to learning through multimedia.	26.67	36.67	33.33	3.33	0.00	3.87
23.	The multimedia package helped us to explore ourselves.	36.67	40.00	16.67	6.67	0.00	4.07
24.	This multimedia package helped me to develop positive attitude towards learning Geography.	46.67	30.00	16.67	6.67	0.00	4.17
25.	The multimedia package allowed me to be creative in my thinking	46.67	33.33	13.33	6.67	0.00	4.20
26.	This multimedia package allowed me to think critically about the topics of Geography.	23.33	46.67	30.00	0.00	0.00	3.93
27.	I felt very motivated learning Geography through multimedia package.	20.00	60.00	16.67	3.33	0.00	3.97
28.	The multimedia package enhanced my overall understanding of the subject Geography.	20.00	63.33	10.00	6.67	0.00	3.97
29.	I would like to learn other topics of Social Science also with this kind of package.	76.67	16.67	6.67	0.00	0.00	4.70
30.	Teachers of other subjects should also use such multimedia package while teaching.	73.33	10.00	16.67	0.00	0.00	4.57
	Over all Reaction						4.09

In terms of the reaction of the students towards the statement 1 i.e. "I liked multimedia package through which I studied Geography." 40.00 %, 56.67% and 3.33% of them reacted strongly agree, agree and can't say respectively. The intensity index of 4.37 shows favourable reaction of students towards their liking for the developed multimedia package.

For the statement 2 i.e. "Appropriate content coverage was done in multimedia for different chapters of Geography." 26.67%, 43.33%, 13.33%, and 16.67% of the students gave their reaction in strongly agree, agree, can't say, disagree respectively. The intensity index of 3.80 shows favourable reaction of students towards the appropriate coverage of content done in multimedia developed for different chapters of Geography.

For statement 3 i.e. "Content presented in multimedia package was organized properly." in the multimedia, 53.33 %, 30.00 %, 10.00 % and 6.67 % of the students gave their reaction in strongly agree, agree, can't say and disagree respectively. The intensity index of 4.30 shows favourable reaction of students towards the proper organization of introduction of the content presented in multimedia package.

In terms of the reaction of the students towards the statement 4 i.e. "The content presentation was interesting in multimedia package." 43.33%, 43.33%, 6.67%, 3.33% and 3.33% of them gave their reaction in strongly agree, agree, can't say, disagree and strongly disagree respectively. The intensity index of 4.20 shows favourable reaction that stated the content presentation to be interesting in multimedia package.

For the statement 5 i.e. "The language used in the multimedia package was easy to understand." 36.67%, 36.67%, 20.00%, 3.33% and 3.33% of the students gave their reaction in strongly agree, agree, can't say, disagree and strongly disagree respectively. The intensity index of 4.00 shows favourable feedback on the part of students towards the language used for delivering content being found easy.

In terms of the reaction of the students towards the statement 6 i.e. "The introduction for each topic was appropriate in the multimedia package." 33.33%, 43.33%, 10.00%, 10.00% and 3.33% of them gave their reaction in strongly agree, agree, can't say,

disagree and strongly disagree respectively. The intensity index of 3.93 shows favourable reaction of students stating the appropriate introduction given for each topic in the package.

In terms of the reaction of the students towards the statement 7 i.e. "The explanation given for each topic in the multimedia package leads to better understanding." 40.00%, 43.33%, 13.33% and 3.33% of them gave their reaction in strongly agree, agree, can't say and disagree respectively. The intensity index of 4.20 shows the favourable reaction of students towards the explanation given for each topic in the multimedia package lead to better understanding.

In terms of the reaction of the students towards the statement 8 i.e. "The different slides giving example on each topic and concept shown were appropriate." 43.33%, 36.67%, 16.67%, and 3.33% of them gave their reaction in strongly agree, agree, can't say, and disagree respectively. The intensity index of 4.20 shows the favourable reaction of students for the appropriateness of different slides giving example on each topic and concept presented through the developed multimedia package.

For the statement 9 i.e. "The picture and the text presented for each topic and concept on a slide was appropriate." 53.33%, 43.33%, 3.33%, of the students gave their reaction in strongly agree, can't say, and disagree respectively. The intensity index of 4.47 shows their favourable reaction towards the appropriateness of the picture and the text presentation for each topic and concept on a slide in the multimedia package.

In terms of the reaction of the students towards the statement 10 i.e. "Pictures in multimedia package were clear in learning different topics." 43.33%, 43.33% and 13.33% of them gave their reaction in strongly agree, agree, and can't say respectively. The intensity index of 4.30 shows their favourable reaction towards the clarity of pictures used in the multimedia package.

For the statement 11 i.e. "The colored and animated pictures helped to develop interest in learning Geography." 50.00%, 36.67%, 13.33% of the students gave their reaction in strongly agree, agree, can't say respectively. The intensity index of 4.37 shows the favourable reaction of the students towards the development of interest in

learning Geography through the colored and animated pictures incorporated in developed multimedia package.

For the statement 12 i.e. "The back ground colour used in the slides was pleasant." 20.00%, 30.00%, 36.67%, 13.33% of the students gave their reaction in strongly agree, agree, can't say, and disagree respectively. The intensity index of 3.57 shows the favourable reaction of the students on the usage of the back ground colour in the slides being pleasant.

In terms of the reaction of the students towards the statement 13 i.e. "The sound in multimedia package was clear and audible." 20.00%, 43.33%, 23.33%, 10.00% and 3.33% of them gave their reaction in strongly agree, agree, can't say, disagree and strongly disagree respectively. The intensity index of 3.67 shows the favourable reaction of the students towards the sound finding it to be clear and audible in multimedia package.

In terms of the reaction of the students towards the statement 14 i.e. "Proper representation of image, maps, diagrams, graphs, and tables were there in multimedia package." 63.33%, 33.33%, and 3.33% of them gave their reaction in strongly agree, agree and disagree respectively. The intensity index of 4.57 shows that they gave favourable reaction to it and they found the proper representation of image, maps, diagrams, graphs, and tables in the multimedia package

In terms of the reaction of the students towards the statement 15 i.e. "Proper inclusion of animated maps, images and diagrams in multimedia package, that were useful in representing phenomena over time." 46.67 %, 36.67%, 16.67% of them gave their reaction in strongly agree, agree, can't say, respectively. The intensity index of 4.30 shows the favourable reaction of the students towards proper inclusion of animated maps, images and diagrams in multimedia package that were helpful and useful in representing phenomena over time.

In terms of the reaction of the students towards the statement 16 i.e. "Adequate or appropriate material was there in the developed multimedia package." 33.33%, 36.67%, 16.67% and 13.33% of them gave their reaction in strongly agree, agree,

can't say and disagree respectively. The intensity index of 3.90 shows the student's favourable reaction towards the adequateness or appropriateness of the used material in the developed multimedia package.

In terms of the reaction of the students towards the statement 17 i.e. "Time allotted to learn through multimedia package was sufficient." 3.33%, 33.33%, 20.00%, 30.00% and 13.33% of the students gave their reaction in strongly agree, agree, can't say, disagree and strongly disagree respectively. The intensity index of 2.83 shows their undecided reaction for the above statement which shows that students found the time allotted to learn through multimedia package was neither sufficient nor insufficient.

For the statement 18 i.e. "Each abstract (imaginary) topic became easier while learning through multimedia package." 46.67%, 40.00%, 10.00%, and 3.33% of the students gave their reaction in strongly agree, agree, can't say, and strongly disagree respectively. The intensity index of 4.27 shows the favourable reaction of students for the statement which shows that through the usage of this kind of multimedia package abstract (imaginary) topic can become easy to learn.

In terms of the reaction of the students towards the statement 19 i.e. "Combination of text, graphics and sound made our learning interesting for each topic." 33.33%, 53.33%, 6.67%, and 6.67% of them gave their reaction in strongly agree, agree, can't say and disagree respectively. The intensity index of 4.13 shows their favourable reaction for the statement. It shows that the kind of combination of text, graphics and sound in developed multimedia package made students learning interesting for each topic.

In terms of the reaction of the students towards the statement 20 i.e. "The participation of students in the classes was more due to multimedia package." 3.33%, 50.00%, 20.00%, 3.33% and 3.33% of them gave their reaction in strongly agree, agree can't say, disagree and strongly disagree respectively. The intensity index of 3.87 shows their favourable reaction for the statement which shows that this kind of multimedia package results in more participation of students in the classes.

For the statement 21 i.e. "Multimedia package helped to meet my needs as a learner." 33.33%, 46.67%, 20.00%, of the students gave their reaction in strongly agree, agree, and can't say respectively. The Intensity Index of 4.13 shows their favourable reaction for the statement which shows that this kind of multimedia package helps to meet the needs of a learner.

For the Statement 22 i.e. "We are able to apply the learnt knowledge in other situations due to learning through multimedia." 26.67%, 36.67%, 33.33%, 33.33% of them gave their reaction in strongly agree, agree, can't say and disagree respectively. The intensity index of 3.87 shows their favourable reaction for the statement which shows that this kind of multimedia package is helpful to apply the learnt knowledge in other situations. Students are able to make use of the learnt knowledge in life like situation. It shows the application aspect of this package and higher level of learning developed on usage of this kind of multimedia package

For the Statement 23 i.e. "The multimedia package helped us to explore ourselves." 36.67%, 40.00%, 16.67%, 6.67% of them gave their reaction in strongly agree, agree, can't say and disagree respectively. The intensity index of 4.07 shows their favourable reaction for the statement which shows that this kind of multimedia package is helpful in self-exploration.

For the Statement 24 i.e. "This multimedia package helped me to develop positive attitude towards learning Geography." 46.67%, 30.00%, 16.67%, 6.67% of them gave their reaction in strongly agree, agree, can't say and disagree respectively. The intensity index of 4.17 shows their favourable reaction for the statement which shows that this kind of multimedia package is helpful to develop positive attitude towards learning Geography.

For the Statement 25 i.e. "The multimedia package allowed me to be creative in my thinking." 46.67%, 33.33%, 13.33%, 6.67% of them gave their reaction in strongly agree, agree, can't say and disagree respectively. The intensity index of 4.20 shows their favourable reaction for the statement which shows that this kind of multimedia package is helpful to a child to be creative in thinking.

For the Statement 26 i.e. "This multimedia package allowed me to think critically about the topics of Geography." 23.33%, 46.67%, 30.00%, of them gave their reaction in strongly agree, agree and can't say respectively. The intensity index of 3.93 shows their favourable reaction for the statement which shows that this kind of multimedia package is helpful to children, think critically.

For the Statement 27 i.e. "I felt very motivated learning Geography through multimedia package." 20.00%, 60.00%, 16.67%, and 3.33% of them gave their reaction in strongly agree, agree, can't say and disagree respectively. The intensity index of 3.97 shows their favourable reaction for the statement which shows that this kind of multimedia package can motivate the child learning Geography.

For the Statement 28 i.e. "The multimedia package enhanced my overall understanding of the subject Geography." 20.00%, 63.33%, 10.00%, and 6.67% of them gave their reaction in strongly agree, agree, can't say and disagree respectively. The intensity index of 3.97 shows their favourable reaction for the statement which shows enhancement of overall understanding of the subject Geography through the use of multimedia package.

For the Statement 29 i.e. "I would like to learn other topics of Social Science also with this kind of package." 76.67%, 16.67%, 6.67% of them gave their reaction in strongly agree, agree and can't say respectively. The intensity index of 4.70 shows their favourable reaction for the statement. Majority would like to learn other topics of Social Science also with this kind of package. Students expect other subject teachers to make use of this kind of multimedia package for teaching other subjects.

For the Statement 30 i.e. "Teachers of other subjects should also use such multimedia package while teaching." 73.33%, 10.00%, 16.67% of them gave their reaction in strongly agree, agree and can't say respectively. The intensity index of 4.57 shows their favourable reaction for the statement propounding the usage of the kind of multimedia package for other subjects.

In terms of the overall reaction of the students towards the multimedia package the average intensity index was found to be 4.09 which indicate the overall favourable reaction of the students towards the multimedia package that was used for their Geography learning. Out of 30 statements revealed to the students in the reaction scale that describes different aspects of the developed multimedia package, students have shown highly favourable reaction for three statements, favourable reaction for twenty six statements and neutral reaction towards one statement. Correspondingly, the overall reaction of the students towards the developed multimedia package was found to be favorable. Hence it could be concluded that students have favourable reaction towards the multimedia package through which they learned the Geography. Consequently it can be perceived that the multimedia package to teach Geography was found to be effective in terms of the reaction of students.

4.3.0 MAJOR FINDINGS OF THE STUDY

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

1. The developed multimedia package was found to be significantly effective in terms of enhancing students' achievement in Geography in comparison to the traditional approach.
2. The developed multimedia package to teach Geography was also found to be effective in terms of the reaction of students towards the package.

Apart from the said major findings, followings are few observations that strengthen the acceptability of students to learn through multimedia package.

- Students were quite active in learning through multimedia package.
- Students were eager to know about the next fact while learning through the multimedia package.
- Students were found helping each other in solving problems while learning through multimedia package.
- Students were found happy while working in the groups during the teaching through multimedia.

- Students were found quite interested in the pictures for understanding various phenomenon.
- Students were found interested to see the multimedia package repeatedly.
- Students demanded the copy of multimedia package to be installed in Geography Laboratory of the school for their further reference.
- The students were found very quickly completing the exercise given in the text book while learning through multimedia package.
- The students were found interested in knowing the technical aspects of the multimedia package like how it was developed, how the maps were prepared, which package was used to develop this, etc.

4.4.0 DISCUSSION

Impact and influence of technology in most of the fields of the society cannot be undermined and education is wrapped within it. People in the areas of education have become conscious to integrate technology, exploit its usefulness and avail the benefits of same. Integration of computers and computer allied activities in education and in specific in the classrooms have transformed the present day's classrooms scenario. Computer is little less to replace the human teacher an unbeatable fact, but sure it can assist both teachers and students to an enormous level and bring them in a comfort zone. So it has evolved and emerged as a present trend to use the multimedia for teaching different subjects in the area of computer application in the classrooms. Multimedia when developed with appropriate infusion of technology, following the principles of multimedia and learning and when incorporated in the class with proper facilities can make the class dynamic, energetic, joyful and further can articulate the process of enhancing achievement. The present study was an effort in this direction that focused to teach Geography through multimedia package.

The major findings of the present study states that the developed multimedia package was found to be significantly effective in terms of enhancing students' achievement in Geography in comparison to the traditional approach and the developed multimedia package to teach Geography was also found to be effective in terms of the reaction of students towards the package.

Findings of the study conducted by Hickey and Bein (1996) supports the findings of the present study that states visualizing physical aspects of Geography through multimedia can enhance the learning experiences of the students. Study conducted by Gabrielle (2003) too supports the findings of the present study and shows that systematically designed technology-mediated instructional strategies can positively affect performance and learning of the students. Study conducted by Floyed (2006) also shows the findings in line with the present study as it shows that the use of technology has positive effect on student's achievement as it increases student's achievements. Findings of the study conducted by Rosales (2005) supports the findings of the present study and shows that technology has positive effect on student's achievement. Besides the above studies which support the findings of the current study, there are studies that contradict the findings of the present study the study conducted by Proctor and Richardson (1997) that focused on evaluating the effectiveness of multimedia computer modules on introductory Human Geography stated that quantitative evaluation of effectiveness of multimedia in itself is ineffective. Charsky (2004) study aimed to check the effectiveness of Programmed Auto Learning vis-à-vis other methods, stated other methods to be more effective than the programmed learning. Reason that could be associated is to the type of programmed learning materials developed in the past. The nature of learning materials developed in the existing days in the form of multimedia packages incorporates much more advanced aspects and features and so is the developed multimedia package used in the present study that takes care of extending more sensory activities to the students with advanced forms of animation and simulation. Findings of the study conducted by Spradlin (2010) supports the fact that mere presence of computers does not improves students learning and that quality is essential in any mode of instruction. The comparative better result in the Geography achievement of experimental group in the present study shows the quality of both the multimedia package and the way it was implemented.

The findings of the present study show that the developed multimedia package was more effective than the traditional method of teaching in terms of achievement of students in Geography. Reasons can be associated to some of the common known facts that the teaching through traditional method adopted in a classroom teaching

does makes the student more a passive learner and does not take care of inclusion of more sensory activities of the students in comparison to that of multimedia package. The students are compelled to be the recipients of whatever the teacher teaches to them in the class, notwithstanding their interest as against the developed multimedia package that has images and structures representations that can be associated to life like situations. Moreover, the student's experiences, imagination strength and understanding level might have assisted in relating the learnt things with diverse situation. Multimedia package allowed the students to be recipient of the information of their interest and at their pace that might have assisted in better learning. Thus the overall effect of multimedia package in comparison to traditional method was found to be more effective.

As far as the reactions of the students were concerned they were too found favourable towards the multimedia package. Change is the spice of life and so one of the reasons behind favourable reaction may be the change adopted in teaching – learning process itself, and the additive reasons may be the incorporation of color mix in the images and structures, animation effects to pictures, the background of the slides, the clarity of explanation, the relevance and importance of the exposed images and content through multimedia package in their lives, utility of the learnt topics in life, freedom of learning through the multimedia package. The researcher opines that the students of this level like the animation, pictures which might have developed their liking for the developed multimedia package.

4.5.0 SUGGESTIONS FOR THE FURTHER RESEARCH

In view of the fact that the present study was limited to the chapters of Social Science Contemporary India-I Text Book in Geography for class IX prepared by NCERT, New Delhi prescribed by Central Board of Secondary Education and to the students of P.P. Savani Chaitanya Vidya Sankul, Surat and to the development of multimedia package for teaching-learning Geography, the researcher would like to suggest some more areas and issues for the further research.

- Similar studies could be conducted taking the sample randomly for more generalisation.

- Experiment on similar multimedia packages could be done in other standards with different boards of affiliation.
- An advanced multimedia package incorporating more of 3D and digital aspect, and an interactive one can be developed for teaching same or alike topics of Geography for future research.
- Such multimedia packages can be developed for the whole Social Science and be experimented.
- Longitudinal studies could be conducted to see the effectiveness of multimedia package over a longer period of time in different subjects.