CHAPTER IV

ANALYSIS AND INTERPRETATION OF THE DATA

Analysis and Interpretation of the Data is done by use of statistics. It is impossible to complete scientific analysis without some form of statistical techniques. The raw data collected by the researcher is meaningless unless certain statistical treatment is given to them. To make a scientific and valid interpretation and to draw some results from the data, proper statistical treatment is useful.

In this research, the data collected is of qualitative and quantitative types. This chapter include descriptive analysis and inferential statistics.

Descriptive analysis was used to analyze the identified problems in learning, aspects concern with Chemistry by students and to analyze the identified problems in teaching components regarding Chemistry by Science teachers.

The inferential statistical analysis was used to analyze the data of experimentation and to views of students regarding developed software. The parametric statistics that is ‘t’ test was used to study effectiveness of two treatment that is traditional method of teaching, learning with text-based on Complete Multimedia Software Package.

The interpretation of data analyzed and presented objectivewise and hypothesiswise.
**Objective No. 1**

To analyze the textbooks of standard VI, VII and VIII of Science and identify the topics of Chemistry on the basis of conceptual themes.

The content analysis of the Science text-books of standard VI, VII and VIII was done and identified the topics / lessons dealing with Chemistry aspects are presented in Table 4.1

<table>
<thead>
<tr>
<th>Sr.no</th>
<th>Standard</th>
<th>Lesson No.</th>
<th>Name of the lesson</th>
<th>Identified topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VI</td>
<td>10</td>
<td>Methods of separating substance</td>
<td>Threshing, Winnowing, Sifting, Picking, Setting, Filtration, Sublimation, Using the magnetic property</td>
</tr>
<tr>
<td>2</td>
<td>VII</td>
<td>9</td>
<td>Classification of substances</td>
<td>States of substances, Elements, Compounds, Mixtures, Symbols of elements, Formula of the molecule of compound, Test substances by Indicators, Two groups of elements (by the reactions), Neutralization, Classification of Salts, Neutral, Acidic, Basic</td>
</tr>
<tr>
<td>3</td>
<td>VIII</td>
<td>6</td>
<td>Chemical reactions and their types</td>
<td>Types of chemical reactions, Combination reaction, Decomposition reaction, Displacement reaction, Oxidation and reduction, Role of catalysts</td>
</tr>
<tr>
<td>12</td>
<td>VIII</td>
<td>12</td>
<td>Properties of substances</td>
<td>Distillation, Fractional distillation</td>
</tr>
<tr>
<td>14</td>
<td>VIII</td>
<td>14</td>
<td>Carbon and carbon compounds</td>
<td>Carbon, Properties of carbon, Allotropes, Diamonds, araphite, fullerene, Solubility of carbon, Physical and chemical properties of Co₂, Methane - Properties</td>
</tr>
</tbody>
</table>

Table 4.1

Identified Topics / Lessons Dealing With Chemistry Components / Aspects In Upper Primary Science Text-Book.
Observation and Interpretation

The data from Table 4.1 shows the topics identified which were related to Chemistry. From the Science text-books of standard VI, VII and VIII prescribed by the Maharashtra State Bureau of Text-book Production and Curriculum Research, Pune. A total lessons in the Science text-book of standard VI, VII and VIII were identified related to Chemistry. Other lessons are not a part of this study since they were related to Zoology, Botany and Physics.

All the topics mentioned in Table 4.1 were selected with the help of subject experts.

Objective No. 2

To find out the problems of learning Science and Chemistry components / aspects in particular of students at the Upper Primary School Level.

Students of the Upper Primary School Level were interviewed and the identified problems of learning Science and Chemistry components / aspects in particular is presented in Table 4.2
Table 4.2

Problems of The Upper Primary School Level Students Have In Learning Science

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Language used by Teachers and Text-books may confuse some students</td>
</tr>
<tr>
<td>2</td>
<td>Immediate introductions of scientific definitions and formulas without sufficient experience with the ideas first.</td>
</tr>
<tr>
<td>3</td>
<td>Ideas are obtained imposed on students rather than allowing them to have the opportunity to make sense of something by exploring and developing ideas / models over time.</td>
</tr>
<tr>
<td>4</td>
<td>Contradiction between beliefs resulting from personal experience, intuition and common sense of students and what they read in their text-book and are told by their teachers.</td>
</tr>
<tr>
<td>5</td>
<td>Instruction, which face to identify and what students initial ideas are.</td>
</tr>
<tr>
<td>6</td>
<td>Teachers and schools (even tests) obtained erroneously assume that students understand concept based on the words students use when describing something.</td>
</tr>
<tr>
<td>7</td>
<td>Demonstrations used by the Teachers are obtained passive where students sit back and observe without manipulating materials or experiencing the phenomenon individually or in small groups.</td>
</tr>
<tr>
<td>8</td>
<td>Pictures, diagrams and 2 dimensional models in text-books and other instructional materials can be misleading, and results in misconceptions.</td>
</tr>
<tr>
<td>9</td>
<td>Some common analogies used to explain ideas can cause difficulty because the similarity is not complete.</td>
</tr>
<tr>
<td>10</td>
<td>Everyday use of certain terms, obtained used in non scientific context, contributes to students confusion.</td>
</tr>
<tr>
<td>11</td>
<td>Some ideas are just too abstract and difficult for many students who are still at concrete learning stage.</td>
</tr>
<tr>
<td>12</td>
<td>Memorization of ideas can cause more difficulty, particularly for “academically good students.”</td>
</tr>
<tr>
<td>13</td>
<td>Some common mistakes done by the students due to improper understanding like balancing of equation, confusion in reaction.</td>
</tr>
</tbody>
</table>

Observation and Interpretation

The Table 4.2 Shows the problems of Upper Primary School Level school students have in learning Chemistry in particular. By interview technique, all the problems were identified by the students. It was found that the methodology used in teaching some aspects of Chemistry was not satisfactory. Science text-book also fails to explain concepts by diagrams and other instructional materials.

Objective No. 3
To find out from the teachers the problems they face while teaching Science and Chemistry in particular to Upper Primary Level School students.

The related problems of teaching of Chemistry aspects were collected from Science teachers by interview technique and by group discussion. The data is presented in Table 4.3

Table 4.3
Problems of Science Teachers While Teaching Chemistry Components

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Graduates from several departments they felt insufficient about other subjects except their own subject matter, they could not make connection between cause and effect of Science concept and topics.</td>
</tr>
<tr>
<td>2</td>
<td>As graduating in a special subject haven’t interest in teaching other subjects in Science.</td>
</tr>
<tr>
<td>3</td>
<td>As a result, some teachers said that they graduated from the department of physics education, so they had difficulties in teaching Chemistry and biology topics.</td>
</tr>
<tr>
<td>4</td>
<td>It is time consuming to prepare detailed lesson plan.</td>
</tr>
<tr>
<td>5</td>
<td>The sequence of the topic is not proper.</td>
</tr>
<tr>
<td>6</td>
<td>Unnecessary information should be removed.</td>
</tr>
<tr>
<td>7</td>
<td>Curriculum was very intensive and required to be completed observation forms, to be done experiments, and to be made collaborative learning.</td>
</tr>
<tr>
<td>8</td>
<td>Science teachers reported that they had difficulties in implementing Science curriculum.</td>
</tr>
<tr>
<td>9</td>
<td>They had difficulties in providing course materials for effective Science teaching.</td>
</tr>
<tr>
<td>10</td>
<td>When visual materials were used in Science teaching, effective learning was done. However, we could not provide visual materials and I did not think that better learning and understanding could not be done.</td>
</tr>
<tr>
<td>11</td>
<td>All Science teachers highlighted that Science courses should be taught in laboratories for helping students have better understanding of Science concepts. Laboratories are not fully equipped and not well organised for teaching Science and they did experiments in the classroom. It caused Science ineffectively.</td>
</tr>
</tbody>
</table>

Observation and Interpretation

The data from Table 4.3 shows the problems of Science Teachers faced while teaching Chemistry in particular. Science teacher mentioned
that they had some difficulty in explaining topics other than their principle subject. Teachers also highlighted the lack of facility in the school. Teachers also reported that they had difficulty in providing course materials for effective Science teaching.

**Objective No. 4**

To develop Computer Multimedia Software for Chemistry in the Science text books of standards VI, VII and VIII

To attend above objective researcher found the problem Pertaining to topics related to Chemistry in the standard VI text-book which demands the use of Computer Multimedia Software.

Table 4.4
Problems Pertaining to Topics Related To Chemistry in The Standard VI Text-Book Which Demands The Use of Computer Multimedia Software Package

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Lesson No.</th>
<th>Name of the lesson</th>
<th>Identified topics</th>
<th>Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>Methods of separating substance</td>
<td>Threshing, Winnowing</td>
<td>Content / concept are mainly related to village activities and can’t be easily comprehended by city students.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sifting, Picking, Setting, Filteration, Sublimation, Using the magnetic property</td>
<td>Demonstration of these activities is important. Proper link to previous knowledge is missing.</td>
</tr>
</tbody>
</table>

**Observation and Interpretation**

The data from the Table 4.4 shows the problems pertaining to topics related to Chemistry in the standard VI textbook which demands the use of computer multimedia. Only one topic was identified from the standard VI text-book which demands the use of Computer Multimedia.

These identified problems, pertaining topics and information regarding general problems of Science teachers faced while teaching Chemistry content were considered as inputs while developing Computer Software for the fulfillment of objective No. 4

Table 4.5

Problems Pertaining to Topics Related to Chemistry in the Standard VII Text-Book Which Demands The Use of Computer Multimedia Software Package
<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Lesson No.</th>
<th>Name of the lesson</th>
<th>Identified topics</th>
<th>Problems</th>
</tr>
</thead>
</table>
| 2      | 9         | Classification of substances | States of substances  
Elements  
Compounds  
Mixtures  
Symbols of elements  
Formula of the molecule of compound | 1. Pictures are needed  
2. Difficult term to understand                                                                 |
| 17     | Acids, Bases and Salts | Test substances by Indicators  
Two groups of elements (by the reactions)  
Neutralization  
Classification of Salts  
Neutral  
Acidic  
Basic | 1. Scope of this lesson is vast  
2. Abstract ideas difficult to understand  
3. Demonstration is needed.  
4. Difficult concepts to understand. |
| 18     | Properties of the water | Water as a compound  
Expt.-relation between volume and mass  
The anomalous expansion of water | 1. This lesson is loaded with information  
2. Abstract idea difficult to understand – water molecule |

**Observation and Interpretation**

The data from the Table 4.5 shows the problems pertaining to topics related to Chemistry in the standard VII textbook which demands the use of Computer Multimedia. Three topics were identified from the standard VII textbook which demands the use of Computer Multimedia.

**Table 4.6**

**Problems Pertaining to Topics Related to Chemistry in The Standard VIII Text-Book Which Demands The Use of Computer Multimedia**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Lesson No.</th>
<th>Name of the lesson</th>
<th>Identified topics</th>
<th>Problems</th>
</tr>
</thead>
</table>
| 3       | 6          | Chemical reactions and | Types of chemical reactions  
Combination reaction | Difficult concepts balancing and reactions. |
| their types | Decomposition reaction | Displacement reaction | Oxidation and reduction | Role of catalysts | Properties of substances | Distillation | Fractional distillation | Need animation difficult concept - distillation | 12 |
| Carbon and carbon compounds | Carbon | Properties of carbon | Allotropes, Diamonds, graphite, fullerene | Solubility of carbon | Physical and chemical properties of \( \text{CO}_2 \) | Methane - Properties | 14 |

**Observation and Interpretation**

The data from the Table 4.6 shows the problems pertaining to topics related to Chemistry in the standard VIII text-book which demands the use of Computer Multimedia. Three topics were identified from the standard VIII text-book which demands the use of Computer Multimedia.

The difficulties pertaining to conceptual difficulties, difficult terminologies, differentiating concepts, mentally visualizing some processes without adequate support have been expressed and specifically the difficult concepts have been mentioned, which the teacher fails to communicate and the students fail to master, in the existing mode of teaching and learning.

While developing Computer Multimedia Software Package, above mentioned difficulties were tried to overcome by the researcher using appropriate components of multimedia like text, sound, video, picture and animation and with the suggestions of Research guide and subject experts.

**Objective No. 5**
To test the effectiveness of the Computer Multimedia Software Package prepared for the study.

While achieving objective No 6 and 7 above objective was automatically achieved as it was dependent on objective No 6 and 7

**Pre-test score obtained to equalize the Experimental and Control Group**

To equalize the two Groups and select one randomly as Experimental Group of standard VI and retain other as Control Group of standard VI. A pre-test was administered and almost identical pairs based on pre-test scores of VI students were made from four selected schools.

The pre-test scores and the mean values for standard VI are presented in Table 4.7 and the Null Hypothesis No 1 stated as follows is tested and values for the same are presented in Table 4.7

The symbols given below denotes –

S – Significant

HS – Highly Significant

NS – Not Significant

Null Hypothesis No. 1  There is no significant difference in the mean pre-test scores obtained by the Control and Experimental groups of Standard VI.

**Table 4.7**

Mean, S.D. and ‘t’ value of Pre- Test Scores of Control and Experimental Groups of Standard VI.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’</th>
<th>‘t’</th>
<th>Significance</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Level 0.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>49</td>
<td>14.39</td>
<td>4.2</td>
<td>48</td>
<td>0.798</td>
<td>2.66</td>
</tr>
<tr>
<td></td>
<td>49</td>
<td>14.65</td>
<td>4.72</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Observation and Interpretation**

The Table 4.7 shows the ‘t’ test applied to the pre-test scores obtained by the 49 pairs of the Control and Experimental group of standard VI. The ‘t’ statistical value and ‘t’ critical value at 0.01 significance level is 0.798 and 2.66 respectively. The mean value of the Control Group is 14.39 and of Experimental Group is 14.65. The Table also shows the standard deviation, degree of freedom.

The ‘t’ statistical value compared with the ‘t’ critical value, it revealed that there is no significant difference found at 0.01 level of significance.

The mean score of the Control Group on the pre-test compared to the mean score of the Experimental Group on the pre-test. It was found that mean scores were equal.

Thus, the Null Hypothesis No. 1 is accepted.

This clearly confirms that the Control and Experimental group taken for the Experimentation are of equal ability with reference to knowledge of concept of Chemistry, So the two groups are equal.

**Objective No.6**

To Compare the effectiveness of Computer Multimedia Software Package over the traditional method of teaching.
To find out the effectiveness of developed Computer Multimedia Software Package, the post-test scores of Experimental Group of standard VI was compared with the post-test scores of the Control Group of standard VI. The Null Hypothesis stated as follows for the post-test scores of Control Group and Experimental Group and tested and values obtained are presented in Table 4.8

Null Hypothesis No.2 There is no significant difference in the mean post-test scores obtained by the Control and Experimental groups of standard VI.

Table 4.8

Mean, S.D. and ‘t’ value of Post- Test Scores of Control and Experimental Groups of Standard VI.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>49</td>
<td>12.02</td>
<td>2.734</td>
<td>48</td>
<td>7.976</td>
<td>2.66</td>
<td>HS</td>
</tr>
<tr>
<td>Experimental</td>
<td>49</td>
<td>17.24</td>
<td>2.428</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Observation and Interpretation**

The Table 4.8 shows the ‘t’ test applied to the post-test scores obtained by the 49 students of the Control Group and 49 students of the Experimental Group of standard VI. The ‘t’ statistical value and ‘t’ critical value at 0.01 significance level is 7.976 and 2.66 respectively. The mean value of the Control Group is 12.02 and of Experimental Group is 17.24. The Table also shows the standard deviation, degree of freedom.

The ‘t’ test results in the Table 4.8 shows highly significant difference in the mean of post-test scores obtained by the Control and Experimental groups of standard VI. It implies that Experimental Group of standard VI performed better in the post-test compared to the Control Group of standard VI.

The Null Hypothesis No. 2 is rejected.

The finding indicated that the teaching learning with the Computer Multimedia Software Package is a factor associated with the higher achievement of Experimental Group in the post-test of standard VI over the factor ‘traditional method of teaching learning’ to the Control Group of standard VI.

**Objective No. 7**

To enhance the academic achievement in Science and Chemistry in particular of Upper Primary Level School students with the help of Computer Multimedia Software Package.

To find out the enhancement in the academic achievement of the school students, annual Science marks of the Experimental Group of standard VI were compared with the annual Science marks of the Control
Group of standard VI. The Null Hypothesis No. 3 stated as follows for the same and tested and the scores obtained are presented in the Table 4.9

Null Hypothesis No. 3 There is no significant difference in the mean annual Science marks obtained by the Control and Experimental Groups of standard VI.

Table 4.9

Mean, S.D. and ‘t’ value of Annual Science Marks Obtained by The Control and Experimental Groups of Standard VI

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>49</td>
<td>59.24</td>
<td>20.50</td>
<td>48</td>
<td>3.05</td>
<td>2.66</td>
<td>HS</td>
</tr>
<tr>
<td>Experimental</td>
<td>49</td>
<td>72.67</td>
<td>24.04</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Observation and Interpretation**

The Table No. 4.9 Shows the ‘t’ test applied to the annual marks in Science obtained by the 49 pairs of students of standard VI of the Control Group and Experimental Group in Annual examination. The means of marks are 59.24 and 72.67 respectively.

The ‘t’ statistical value is 3.05 and ‘t’ critical value is 2.66 at 0.01 significance level. The Table also shows the degrees of freedom and standard deviation.
From the above observation researcher concluded that the ‘t’ statistical value is exceeds than the ‘t’ critical value at 0.01 significance level. Hence it is taken to be significant resulting in the rejection of the Null hypothesis.

Thus, the Null Hypothesis No. 3 is rejected.

Hence, it can be said that there exists a highly significant difference between mean scores of Annual examination marks in Science of Control and Experimental groups. So, the use of Computer Multimedia Software Package has affect positively the achievement of standard VI Experimental Group in Science.

Null Hypothesis No. 4 There is no significant difference in the mean pre-test scores obtained by Boys of the Control and Experimental groups of standard VI.

Table 4.10

Mean, S.D. and ‘t’ Value of Pre-Test Scores of Boys of The Control and Experimental Groups of Standard VI.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>30</td>
<td>14</td>
<td>4.525</td>
<td>29</td>
<td>0.47</td>
<td>2.756</td>
<td>NS</td>
</tr>
<tr>
<td>Experimental</td>
<td>30</td>
<td>14.066</td>
<td>4.585</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Observation and Interpretation

The Table 4.10 shows the ‘t’ test applied to the pre-test scores obtained by the 30 pairs of boys of the Control and Experimental groups of standard VI. The ‘t’ statistical value and ‘t’ critical value at 0.01 significance level is 0.47 and 2.756 respectively. The mean value of the Control Group is 14 and of Experimental group is 14.06. The Table also shows the standard deviation, degree of freedom.

The ‘t’ statistical value compared with the ‘t’ critical value, it revealed that there is no significant difference found at 0.01 level of significance.

The mean score of the Boys of Control Group on the pre-test compared to the mean score of the Boys of Experimental Group on the pre-test. It was found that mean scores were equal.

Thus, the Null Hypothesis No. 4 is accepted.

This clearly confirms that the Boys of the Control and Experimental groups taken for the Experimentation are of equal ability with reference to the concept of Chemistry given in the previous year Science text-book.

Objective No. 6

To compare the effectiveness of Computer Multimedia Software Package over the traditional method of teaching

To find out the effectiveness of developed Computer Multimedia Software Package, the post-test scores of the Boys of the Experimental Group of standard VI was compared with the post-test scores of Boys of
the Control Group of standard VI. The Null Hypothesis No. 5 stated as follows for the same and tested.

Null Hypothesis No. 5  There is no significant difference in the mean post-test scores obtained by Boys of the Control and Experimental groups of standard VI.

Table 4.11

Mean, S.D. and ‘t’ Value of Post-Test Scores of Boys of The Control and Experimental Groups of Standard VI.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>30</td>
<td>12.566</td>
<td>3.297</td>
<td>29</td>
<td>8.82</td>
<td>2.756</td>
<td>HS</td>
</tr>
<tr>
<td>Experimental</td>
<td>30</td>
<td>17.133</td>
<td>2.431</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Observation and Interpretation**

The Table 4.11 shows ‘t’ test applied to the post-test scores obtained by the 30 pairs of Boys of the Control Group and Experimental Group of standard VI. The ‘t’ statistical value and ‘t’ critical value at 0.01 significance level is 8.82 and 2.756 respectively. The mean value of the Control Group is 12.56 and of Experimental Group is 17.133. The Table also shows the standard deviation, degree of freedom.

The Table shows the mean of post-test scores obtained by the Boys of the Control and Experimental groups of standard VI. It implies that the Boys of the Experimental Group of standard VI performed better than the Boys of the Control Group of standard VI.

The Null Hypothesis No.5 is rejected.
The finding indicates that the teaching learning with the Computer Multimedia Software Package is a factor associated with the higher achievement of Boys of Experimental Group in the post-test of standard VI over the factor ‘traditional method of teaching learning’ to the Boys of Control Group of standard VI.

**Objective No. 7**

To enhance the academic achievement in Science and Chemistry in particular of Upper Primary Level School students with the help of Computer Multimedia Software Package.

To find out the enhancement in the academic achievement of the Boys of standard VI, annual Science marks of the Experimental Group of standard VI were compared with the annual Science marks of the Control Group of standard VI. The Null Hypothesis No 6 stated as follows for the same and tested and the scores obtained are presented in the Table 4.12

Null Hypothesis No. 6 There is no significant difference in the mean annual Science marks obtained by Boys of the Control and Experimental groups of standard VI.

**Table 4.12**

Mean, S.D. and ‘t’ Value of Annual Science Marks of Boys of The Control and Experimental Groups of Standard VI.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>30</td>
<td>59.57</td>
<td>12.70</td>
<td>29</td>
<td>3.578</td>
<td>2.756</td>
<td>HS</td>
</tr>
<tr>
<td>Experimental</td>
<td>30</td>
<td>70.47</td>
<td>14.32</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Observation and Interpretation

The Table 4.12 Shows the ‘t’ test applied to the annual marks in Science obtained by the 30 pairs of Boys of standard VI of the Control Group and Experimental Group in Annual examination. The means of marks are 59.57 and 70.47 respectively.

The ‘t’ statistical value is 3.578 and ‘t’ critical value is 2.756 at 0.01 significance level. The Table also shows the degrees of freedom and standard deviation.

From the above observation researcher concluded that the ‘t’ statistical value is exceeds than the ‘t’ critical value at 0.01 significance level. Hence it is taken to be significant resulting in the rejection of the Null hypothesis.

Thus, the Null Hypothesis No. 6 is rejected.

Hence, it can be said that there exists a significant difference between mean scores of Annual examination marks in Science of Control and Experimental group. So, the use of Computer Multimedia Software Package has affect positively the achievement of standard VI Experimental Group in Science.

Null Hypothesis No.7 There is no significant difference in the mean scores obtained by Girls of the Control and Experimental groups of standard VI

Table 4.13

Mean, S.D. and ‘t’ Value of Pre-Test Scores of Girls of The Control and Experimental Groups of Standard VI.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’</th>
<th>‘t’</th>
<th>Significance</th>
</tr>
</thead>
</table>

Observation and Interpretation

The Table 4.13 shows the ‘t’ test applied to the pre-test scores obtained by the 19 pairs of Girls of the Control and Experimental groups of standard VI. The ‘t’ statistical value and ‘t’ critical value at 0.01 significance level is 0.725 and 2.878 respectively. The mean value of the Control Group is 15 and of Experimental Group is 15.58. The Table also shows the standard deviation, degree of freedom.

The ‘t’ statistical value compared with the ‘t’ critical value, it revealed that there is no significant difference found at 0.01 level of significance.

The mean score of the Girls of Control Group on the pre-test compared to the mean score of the Girls of Experimental Group on the pre-test. It was found that mean scores were equal.

Thus, the Null Hypothesis No.7 is accepted.

This clearly confirms that the Girls of the Control and Experimental groups taken for the Experimentation are of equal ability with reference to the concept of Chemistry given in the previous year Science text-book.

Objective No. 6

To Compare the effectiveness of Computer Multimedia Software Package over the traditional method of teaching.
To find out the effectiveness of developed Computer Multimedia Software Package, the post-test scores of Girls of the Experimental Group of standard VI was compared with the post-test scores of the Girls of Control Group of standard VI. The Null hypothesis stated as follows for the post-test scores of Control Group and Experimental Group and tested and values obtained are presented in Table No.4.14

Null Hypothesis No.8 There is no significant difference in the mean post-test scores obtained by the Girls of the Control and Experimental groups of standard VI

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>19</td>
<td>11.157</td>
<td>1.067</td>
<td>18</td>
<td>12.77</td>
<td>2.878</td>
<td>HS</td>
</tr>
<tr>
<td>Experimental</td>
<td>19</td>
<td>17.421</td>
<td>2.479</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 4.14**

Mean, S.D. and ‘t’ Value of Post-Test Scores of Girls of The Control and Experimental Groups of Standard VI.

**Observation and Interpretation**

The Table 4.14 shows ‘t’ test applied to the post-test scores obtained by the 19 Girls of the Control Group and 19 Girls of the
Experimental Group of standard VI. The ‘t’ statistical value and ‘t’
critical value at 0.01 significance level is 12.77 and 2.878 respectively.
The mean value of the Control Group is 11.15 and of Experimental
Group is 17.42. The Table also shows the standard deviation, degree of
freedom.

The ‘t’ test results in the Table 4.14 shows significant difference
in the mean of post-test scores obtained by the Control and Experimental
groups of Girls of standard VI. It implies that Girls of Experimental
Group of standard VI performed better in the post-test compared to the
Girls of Control Group of standard VI.

The Null Hypothesis No. 8 is rejected.

The finding indicated that the teaching learning with The Computer
Multimedia Software Package is a factor associated with the higher
achievement of Girls of Experimental Group in the post-test of standard
VI over the factor ‘traditional method of teaching learning’ to the Control
Group of standard VI.

**Objective No. 7**

To enhance the academic achievement in Science and Chemistry in
particular of Upper Primary Level School students with the help of
Computer Multimedia Software Package.

To find out the enhancement in the academic achievement of the
Girls of standard VI, annual Science marks of the Girls of Experimental
Group of standard VI were compared with the annual Science marks of
the Girls of Control Group of standard VI. The Null Hypothesis No 9
stated as follows for the same and tested and the scores obtained are
presented in the Table 4.15
Null Hypothesis No.9 There is no significant difference in the mean annual Science marks obtained by Girls of the Control and Experimental groups of standard VI.

Table 4.15

Mean, S.D. and ‘t’ Value of Annual Science Marks of Girls of The Control and Experimental Groups of Standard VI

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>19</td>
<td>58.74</td>
<td>14.03</td>
<td>18</td>
<td>3.55</td>
<td>2.878</td>
<td>HS</td>
</tr>
<tr>
<td>Experimental</td>
<td>19</td>
<td>76.15</td>
<td>13.17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Observation and Interpretation

The Table 4.15 Shows the ‘t’ test applied to the annual marks in Science obtained by the 19 pairs of Girls of standard VI of the Control Group and Experimental Group in Annual examination. The means of marks are 58.74 and 76.15 respectively.

The ‘t’ statistical value is 3.55 and ‘t’ critical value is 2.878 at 0.01 significance level. The Table also shows the degrees of freedom and standard deviation.

From the above observation researcher concluded that the ‘t’ statistical value is exceeds than the ‘t’ critical value at 0.05 significance level. Hence it is taken to be significant resulting in the rejection of the Null hypothesis.
Thus, the Null Hypothesis No. 9 is rejected.

Hence, it can be said that there exists a significant difference between mean scores of Annual examination marks in Science of Control and Experimental groups. So, the use of Computer Multimedia Software Package has affect positively the achievement of standard VI Experimental Group in Science.

**Pre-test score obtained to equalize the Experimental and Control Group**

To equalize the two groups and select one randomly as Experimental Group of standard VII and retain other as Control Group of standard VII, a pre-test was administered and almost identical pairs based on pre-test scores of VII students were made from four selected schools and group of one considered as Experimental and other as Control Group.

The pre-test scores and the mean values for standard VII are presented in Table 4.16 and the Null Hypothesis No. 10 stated as follows is tested and values for the same are presented in Table 4.16.

Null Hypothesis No. 10: There is no significant difference in the mean pre-test scores obtained by the Control and Experimental groups of standard VII.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
</table>

Table 4.16

Mean, S.D. and ‘t’ value of Pre- Test Scores of Control and Experimental Groups of Standard VII.
Observation and Interpretation

The Table 4.16 shows the ‘t’ test applied to the pre-test scores obtained by the 55 pairs of the Control and Experimental groups of standard VII. The ‘t’ statistical value and ‘t’ critical value at 0.01 significance level is 1.42 and 2.660 respectively. The mean value of the Control Group is 17.49 and of Experimental Group is 17.38. The Table also shows the standard deviation, degree of freedom.

The ‘t’ statistical value compared with the ‘t’ critical value, it revealed that there is no significant difference found at 0.01 level of significance.

The mean score of the Control Group on the pre-test compared to the mean score of the Experimental Group on the pre-test. It was found that mean scores were equal.

Thus, the Null Hypothesis No. 10 is accepted.

This clearly confirms that the Control and Experimental groups taken for the Experimentation had equal recall and recognition ability with reference to knowledge of concept of Chemistry in the previous year Science text-book. So the two groups are equal.

Objective No. 6

To Compare the effectiveness of Computer Multimedia Software Package over the traditional method of teaching.

<table>
<thead>
<tr>
<th>Control</th>
<th>Experimental</th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>17.49</td>
</tr>
<tr>
<td></td>
<td>17.381</td>
</tr>
<tr>
<td>1.399</td>
<td>1.433</td>
</tr>
<tr>
<td>54</td>
<td>1.42</td>
</tr>
<tr>
<td></td>
<td>2.660</td>
</tr>
<tr>
<td></td>
<td>NS</td>
</tr>
</tbody>
</table>
To find out the effectiveness of developed Computer Multimedia Software Package, the post-test scores of Experimental Group of standard VII was compared with the post-test scores of the Control Group of standard VII. The Null Hypothesis No. 11 stated as follows for the post-test scores of Control Group and Experimental Group and tested and values obtained are presented in Table 4.17

Null Hypothesis No.11 There is no significant difference in the mean post-test scores obtained by the Control and Experimental groups of standard VII.

Table 4.17

Mean, S.D. and ‘t’ value of Post- Test Scores of Control and Experimental Groups of Standard VII.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>55</td>
<td>12.15</td>
<td>2.26</td>
<td>54</td>
<td>18.43</td>
<td>2.660</td>
<td>HS</td>
</tr>
<tr>
<td>Experimental</td>
<td>55</td>
<td>18.42</td>
<td>1.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Observation and Interpretation

The Table 4.17 shows the ‘t’ test applied to the post-test scores obtained by the 55 students of the Control Group and 55 students of the
Experimental Group of standard VII. The ‘t’ statistical value and ‘t’ critical value at 0.01 significance level is 18.43 and 2.660 respectively. The mean value of the Control Group is 12.15 and of Experimental Group is 18.42. The Table also shows the standard deviation, degree of freedom.

The ‘t’ test results in the Table 4.17 shows significant difference in the mean of post-test scores obtained by the Control and Experimental groups of standard VII. It implies that Experimental Group of standard VII performed better in the post-test compared to the Control Group of standard VII.

The Null Hypothesis No. 11 is rejected.

The finding indicated that the teaching learning with the Computer Multimedia Software Package is a factor associated with the higher achievement of Experimental Group in the post-test of standard VII over the factor ‘traditional method of teaching learning’ to the Control Group of standard VII.

Objective No. 7

To enhance the academic achievement in Science and Chemistry in particular of Upper Primary Level School students with the help of Computer Multimedia Software Package.

To find out the enhancement in the academic achievement of the school students, annual Science marks of the Experimental Group of standard VII were compared with the annual Science marks of the Control Group of standard VII. The Null Hypothesis No.12 stated as follows for the same and tested and the scores obtained are presented in the Table 4.18
Null Hypothesis 12 There is no significant difference in the mean annual Science marks obtained by the Control and Experimental groups of standard VII.

Table 4.18

Mean, S.D. and ‘t’ value of Annual Science Marks Obtained by The Control and Experimental Groups of Standard VII.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>55</td>
<td>55.98</td>
<td>15.83</td>
<td>54</td>
<td>3.34</td>
<td>2.660</td>
<td>HS</td>
</tr>
<tr>
<td>Experimental</td>
<td>55</td>
<td>67.67</td>
<td>16.22</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Observation and Interpretation

The Table 4.18 Shows the ‘t’ test applied to the annual marks in Science obtained by the 55 pairs of students of standard VII of the Control Group and Experimental Group in Annual examination. The means of marks are 55.98 and 67.67 respectively.

The ‘t’ statistical value is 3.34 and ‘t’ critical value is 2.660 at 0.01 significance level. The Table also shows the degrees of freedom and standard deviation.

From the above observation researcher concluded that the ‘t’ statistical value is exceeds than the ‘t’ critical value at 0.01 significance level. Hence it is taken to be significant resulting in the rejection of the Null hypothesis.
Thus, the Null Hypothesis No. 12 is rejected.

Hence, it can be said that there exists a significant difference between mean scores of Annual examination marks in Science of Control and Experimental group. So, the use of Computer Multimedia Software Package has affect positively the achievement of standard VII Experimental Group in Science.

Null Hypothesis No. 13 There is no significant difference in the mean pre-test scores obtained by Boys of the Control and Experimental groups of standard VII.

Table 4.19

Mean, S.D. and ‘t’ Value of Pre-Test Scores of Boys of The Control and Experimental Groups of Standard VII.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>27</td>
<td>17.962</td>
<td>0.897</td>
<td>26</td>
<td>1.78</td>
<td>2.779</td>
<td>NS</td>
</tr>
<tr>
<td>Experimental</td>
<td>27</td>
<td>17.777</td>
<td>0.847</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Observation and Interpretation

The Table 4.19 shows the ‘t’ test applied to the pre-test scores obtained by the 27 pairs of Boys of the Control and Experimental groups.
of standard VII. The ‘t’ statistical value and ‘t’ critical value at 0.01 significance level is 1.78 and 2.779 respectively. The mean value of the Control Group is 17.96 and of Experimental Group is 17.777. The Table also shows the standard deviation, degree of freedom.

The ‘t’ statistical value compared with the ‘t’ critical value, it revealed that there is no significant difference found at 0.01 level of significance.

The mean score of the Boys of Control Group on the pre-test compared to the mean score of the Boys of Experimental Group on the pre-test. It was found that mean scores were equal.

Thus, the Null Hypothesis No.13 is accepted.

This clearly confirms that the Boys of the Control and Experimental groups taken for the Experimentation had equal recall and recognition ability for concept regarding Chemistry given in the previous year Science text-book.

**Objective No. 6**

To compare the effectiveness of Computer Multimedia Software Package over the traditional method of teaching

To find out the effectiveness of developed Computer Multimedia Software Package, the post-test scores of the Boys of the Experimental Group of standard VII was compared with the post-test scores of Boys of the Control Group of standard VII. The Null Hypothesis No. 14 stated as follows for the same and tested.
Null Hypothesis No. 14 There is no significant difference in the mean post-test scores obtained by Boys of the Control and Experimental groups of standard VII.

Table 4.20
Mean, S.D. and ‘t’ Value of Post-Test Scores of Boys of The Control and Experimental Groups of Standard VII.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>27</td>
<td>12.15</td>
<td>1.68</td>
<td>26</td>
<td>19.79</td>
<td>2.779</td>
<td>HS</td>
</tr>
<tr>
<td>Experimental</td>
<td>27</td>
<td>18.48</td>
<td>0.975</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Observation and Interpretation

The Table 4.20 shows the ‘t’ test applied to the post-test scores obtained by the 27 pairs of Boys of the Control Group and Experimental Group of standard VII. The ‘t’ statistical value and ‘t’ critical value at 0.01 significance level is 19.79 and 2.779 respectively. The mean value of the Control Group is 12.15 and of Experimental Group is 18.48. The Table also shows the standard deviation, degree of freedom.

The Table shows the mean of post-test scores obtained by the Boys of the Control and Experimental groups of standard VII. It implies that the Boys of the Experimental Group of standard VII performed better than the Boys of the Control Group of standard VII.

The Null Hypothesis No. 14 is rejected.
The finding indicates that the teaching learning with the Computer Multimedia Software Package is a factor associated with the higher achievement of Boys of Experimental Group in the post-test of standard VII over the factor ‘traditional method of teaching learning’ to the Boys of Control Group of standard VII.

**Objective No. 7**

To enhance the academic achievement in Science and Chemistry in particular of Upper Primary Level School students with the help of Computer Multimedia Software Package.

To find out the enhancement in the academic achievement of the Boys of standard VII, annual Science marks of the Experimental Group of standard VII were compared with the annual Science marks of the Control Group of standard VII. The Null Hypothesis No.15 stated as follows for the same and tested and the scores obtained are presented in the Table 4.21

Null Hypothesis No. 15 There is no significant difference in the mean annual Science marks obtained by Boys of the Control and Experimental groups of standard VII.

Table 4.21

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>27</td>
<td>54.44</td>
<td>19.06</td>
<td>26</td>
<td>1.62</td>
<td>2.779</td>
<td>NS</td>
</tr>
<tr>
<td>Experimental</td>
<td>27</td>
<td>63.63</td>
<td>14.53</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Observation and Interpretation

The Table 4.21 Shows the ‘t’ test applied to the annual marks in Science obtained by the 27 pairs of Boys of standard VII of the Control Group and Experimental Group in Annual examination. The means of marks are 54.44 and 63.63 respectively.

The ‘t’ statistical value is 1.62 and ‘t’ critical value is 2.779 at 0.01 significance level. The Table also shows the degrees of freedom and standard deviation.

From the above observation researcher concluded that the ‘t’ critical value is exceeds than the ‘t’ statistical value at 0.01 significance level. Therefore Researcher justified in accepting the Null Hypothesis.

Thus, the Null Hypothesis No. 15 is accepted.

Hence, it can be said that there exists no significant difference between mean scores of Annual examination marks in Science of Control and Experimental groups. So, the use of Computer Multimedia Software Package has does not affect positively the achievement of standard VII Experimental Group in Science.

Null Hypothesis No.16 There is no significant difference in the mean pre-test scores obtained by Girls of the Control and Experimental groups of standard VII

Table 4.22

Mean, S.D. and ‘t’ Value of Pre-Test Scores of Girls of The Control and Experimental Groups of Standard VII.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
</table>


## Observation and Interpretation

The Table 4.22 shows the ‘t’ test applied to the pre-test scores obtained by the 28 pairs of Girls of the Control and Experimental groups of standard VII. The ‘t’ statistical value and ‘t’ critical value at 0.01 significance level is 0.153 and 2.771 respectively. The mean value of the Control Group is 17.035 and of Experimental Group is 17.037. The Table also shows the standard deviation, degree of freedom.

The ‘t’ statistical value compared with the ‘t’ critical value, it revealed that there is no significant difference found at 0.01 level of significance.

The mean score of the Girls of Control Group on the pre-test compared to the mean score of the Girls of Experimental Group on the pre-test. It was found that mean scores were equal.

Thus, the Null Hypothesis No.16 is accepted.

This clearly confirms that the Girls of the Control and Experimental groups taken for the Experimentation had equal recall and recognition ability for concept of Chemistry given in the previous year Science text-book.

### Objective No. 6

To Compare the effectiveness of Computer Multimedia Software Package over the traditional method of teaching.
To find out the effectiveness of developed Computer Multimedia Software Package, the post-test scores of Girls of the Experimental Group of standard VII was compared with the post-test scores of the Girls of Control Group of standard VII. The Null Hypothesis No. 17 stated as follows for the post-test scores of Control Group and Experimental Group and tested and values obtained are presented in Table 4.23

Null Hypothesis No. 17 There is no significant difference in the mean post-test scores obtained by the Girls of the Control and Experimental groups of standard VII

Table 4.23

Mean, S.D. and ‘t’ Value of Post-Test Scores of Girls of The Control and Experimental Groups of Standard VII.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>28</td>
<td>12.14</td>
<td>2.744</td>
<td>27</td>
<td>10.37</td>
<td>2.771</td>
<td>HS</td>
</tr>
<tr>
<td>Experimental</td>
<td>28</td>
<td>18.36</td>
<td>1.39</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Observation and Interpretation**

The Table 4.23 shows the ‘t’ test applied to the post-test scores obtained by the 28 Girls of the Control Group and 28 Girls of the Experimental Group of standard VI. The ‘t’ statistical value and ‘t’ critical value at 0.01 significance level is 10.37 and 2.771 respectively. The mean value of the Control Group is 12.14 and of Experimental
Group is 18.36. The Table also shows the standard deviation, degree of freedom.

The ‘t’ test results in the Table 4. 23 shows highly significant difference in the mean of post-test scores obtained by the Control and Experimental groups of Girls of standard VII. It implies that Girls of Experimental Group of standard VII performed better in the post-test compared to the Girls of Control Group of standard VII.

The Null Hypothesis No. 17 is rejected.

The finding indicated that the teaching learning with the Computer Multimedia Software Package is a factor associated with the higher achievement of Girls of Experimental Group in the post-test of standard VII over the factor ‘traditional method of teaching learning’ to the Girls of Control Group of standard VII.

**Objective No. 7**

To enhance the academic achievement in Science and Chemistry in particular of Upper Primary Level School students with the help of Computer Multimedia Software Package.

To find out the enhancement in the academic achievement of the Girls of standard VII, annual Science marks of the Girls of Experimental Group of standard VII were compared with the annual Science marks of the Girls of Control Group of standard VII. The Null Hypothesis No.18 stated as follows for the same and tested and the scores obtained are presented in the Table 4.24

Null Hypothesis No.18 There is no significant difference in the mean annual Science marks obtained by Girls of the Control and Experimental groups of standard VII.
Table 4.24

Mean, S.D. and ‘t’ Value of Annual Science Marks of Girls of The Control and Experimental Groups of Standard VII.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>28</td>
<td>57.46</td>
<td>12.09</td>
<td>27</td>
<td>3.34</td>
<td>2.771</td>
<td>HS</td>
</tr>
<tr>
<td>Experimental</td>
<td>28</td>
<td>71.57</td>
<td>17.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Observation and Interpretation**

The Table 4.24 Shows the ‘t’ test applied to the annual marks in Science obtained by the 28 pairs of Girls of standard VII of the Control Group and Experimental Group in Annual examination. The means of marks are 57.464 and 71.57 respectively.

The ‘t’ statistical value is 3.34 and ‘t’ critical value is 2.771 at 0.01 significance level. The Table also shows the degrees of freedom and standard deviation.

From the above observation researcher concluded that the ‘t’ statistical value is exceeds than the ‘t’ critical value at 0.01 significance level. Hence it is taken to be significant resulting in the rejection of the Null hypothesis.

Thus, the Null Hypothesis No. 18 is rejected.

Hence, it can be said that there exists a significant difference between mean scores of Annual examination marks in Science of Control
and Experimental groups. So, the use of Computer Multimedia Software Package has affect positively the achievement of standard VII Experimental Group in Science.

Pre-test score obtained to equalize the Experimental and Control Group

To equalize the two groups and select one randomly as Experimental Group of standard VIII and retain other as Control Group of standard VIII. A pre-test was administered and almost identical pairs based on pre-test scores of VIII standard students were made from four selected schools.

The pre-test scores and the mean values for standard VIII are presented in Table 4.25 and the Null Hypothesis No 19 stated as follows is tested and values for the same are presented in Table 4.25

Null Hypothesis No. 19: There is no significant difference in the mean pre-test scores obtained by the Control and Experimental groups of standard VIII.

Table 4.25

Mean, S.D. and ‘t’ value of Pre-Test Scores of Control and Experimental Groups of Standard VIII.
<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>52</td>
<td>13.567</td>
<td>2.906</td>
<td>51</td>
<td>0.924</td>
<td>2.660</td>
<td>NS</td>
</tr>
<tr>
<td>Experimental</td>
<td>52</td>
<td>13.461</td>
<td>2.682</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Observation and Interpretation**

The Table 4.25 shows the ‘t’ test applied to the pre-test scores obtained by the 52 pairs of the Control and Experimental groups of standard VIII. The ‘t’ statistical value and ‘t’ critical value at 0.01 significance level is 0.924 and 2.660 respectively. The mean value of the Control Group is 13.55 and of Experimental Group is 13.46. The Table also shows the standard deviation, degree of freedom.

The ‘t’ statistical value compared with the ‘t’ critical value, it revealed that there is no significant difference found at 0.01 level of significance.

The mean score of the Control Group on the pre-test compared to the mean score of the Experimental Group on the pre-test. It was found that mean scores were equal.

Thus, the Null Hypothesis No. 19 is accepted.

This clearly confirms that the Control and Experimental groups taken for the Experimentation are of equal ability with reference to
knowledge of concept of Chemistry given in the previous year Science text-book.

**Objective No.6**

To Compare the effectiveness of Computer Multimedia Software Package over the traditional method of teaching.

To find out the effectiveness of developed Computer Multimedia Software Package, the post-test scores of Experimental Group of standard VIII was compared with the post-test scores of the Control Group of standard VIII. The Null Hypothesis No.20 stated as follows for the post-test scores of Control Group and Experimental Group and tested and values obtained are presented in Table 4.26

Null Hypothesis No.20 There is no significant difference in the mean post-test scores obtained by the Control and Experimental groups of standard VIII

**Table 4.26**

Mean, S.D. and ‘t’ value of Post-Test Scores of Control and Experimental Groups of Standard VIII.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>52</td>
<td>13.65</td>
<td>3.04</td>
<td>51</td>
<td>3.42</td>
<td>2.660</td>
<td>HS</td>
</tr>
<tr>
<td>Experimental</td>
<td>52</td>
<td>15.48</td>
<td>2.80</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Observation and Interpretation**

The Table 4.26 shows the ‘t’ test applied to the post-test scores obtained by the 52 students of the Control Group and 52 students of the
Experimental Group of standard VIII. The ‘t’ statistical value and ‘t’ critical value at 0.01 significance level is 3.42 and 2.660 respectively. The mean value of the Control Group is 13.65 and of Experimental Group is 15.48. The Table also shows the standard deviation, degree of freedom.

The ‘t’ test results in the Table 4.26 shows highly significant difference in the mean of post-test scores obtained by the Control and Experimental groups of standard VIII. It implies that Experimental Group of standard VIII performed better in the post-test compared to the Control Group of standard VIII.

The Null Hypothesis No. 20 is rejected.

The finding indicated that the teaching learning with the Computer Multimedia Software Package is a factor associated with the higher achievement of Experimental Group in the post-test of standard VIII over the factor ‘traditional method of teaching learning’ to the Control Group of standard VIII.

Objective No. 7

To enhance the academic achievement in Science and Chemistry in particular of Upper Primary Level School students with the help of Computer Multimedia Software Package.

To find out the enhancement in the academic achievement of the school students, annual Science marks of the Experimental Group of standard VIII were compared with the annual Science marks of the Control Group of standard VIII. The Null Hypothesis No.21 stated as follows for the same and tested and the scores obtained are presented in the Table 4.27
Null Hypothesis No.21 There is no significant difference in the annual Science marks obtained by the Control and Experimental groups of standard VIII.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>52</td>
<td>60.36</td>
<td>9.94</td>
<td>50</td>
<td>7.46</td>
<td>2.660</td>
<td>HS</td>
</tr>
<tr>
<td>Experimental</td>
<td>52</td>
<td>80.06</td>
<td>14.72</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Observation and Interpretation**

The Table 4.27 Shows the ‘t’ test applied to the marks in Science obtained by the 52 pairs of students of standard VIII of the Control group and Experimental Group in Annual examination. The means of marks are 60.36 and 80.06 respectively.

The ‘t’ statistical value is 7.46 and ‘t’ critical value is 2.660 at 0.01 significance level. The Table also shows the degrees of freedom and standard deviation.
From the above observation researcher concluded that the ‘t’ statistical value is exceeds than the ‘t’ critical value at 0.01 significance level. Hence it is taken to be significant resulting in the rejection of the Null hypothesis.

Thus, the Null Hypothesis No. 21 is rejected.

Hence, it can be said that there exists a highly significant difference between mean scores of Annual examination marks in Science of Control and Experimental groups. So, the use of Computer Multimedia Software Package has affect positively the achievement of standard VIII Experimental Group in Science.

Null Hypothesis No.22 There is no significant difference in the mean pre-test scores obtained by Boys of the Control and Experimental groups of standard VIII.

Table 28

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>36</td>
<td>13.44</td>
<td>3.246</td>
<td>35</td>
<td>0.43</td>
<td>2.704</td>
<td>NS</td>
</tr>
<tr>
<td>Experimental</td>
<td>36</td>
<td>13.38</td>
<td>3.026</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Observation and interpretation**

The Table 4.28 shows the ‘t’ test applied to the pre-test scores obtained by the 36 pairs of Boys of the Control and Experimental groups of standard VIII. The ‘t’ statistical value and ‘t’ critical value at 0.01
significance level is 0.43 and 2.704 respectively. The mean value of the Control Group is 13.44 and of Experimental Group is 13.38. The Table also shows the standard deviation, degree of freedom.

The ‘t’ statistical value compared with the ‘t’ critical value, it revealed that there is no significant difference found at 0.01 level of significance.

The mean score of the Boys of Control Group on the pre-test compared to the mean score of the Boys of Experimental Group on the pre-test. It was found that mean scores were equal.

Thus, the Null Hypothesis No. 22 is accepted.

This clearly confirms that the Boys of the Control and Experimental groups taken for the Experimentation had equal recall and recognition ability with reference to the concept of Chemistry given in the previous year Science text-book.

**Objective No.6**

To compare the effectiveness of Computer Multimedia Software Package over the traditional method of teaching

To find out the effectiveness of developed Computer Multimedia Software Package, the post-test scores of the Boys of the Experimental Group of standard VIII was compared with the post-test scores of Boys of the Control Group of standard VIII. The Null Hypothesis No. 23 stated as follows for the same and tested.
Null Hypothesis No. 23 There is no significant difference in the mean post-test scores obtained by Boys of the Control and Experimental groups of standard VIII.

Table 4.29

Mean, S.D. and ‘t’ Value of Post-Test Scores of Boys of The Control and Experimental Groups of Standard VIII.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>36</td>
<td>13.58</td>
<td>2.91</td>
<td>35</td>
<td>2.02</td>
<td>2.024</td>
<td>S at 0.05</td>
</tr>
<tr>
<td>Experimental</td>
<td>36</td>
<td>14.88</td>
<td>2.92</td>
<td></td>
<td></td>
<td>2.704</td>
<td>NS at 0.01</td>
</tr>
</tbody>
</table>

Observation and Interpretation

The Table 4.29 shows the ‘t’ test applied to the post-test scores obtained by the 36 pairs of Boys of the Control Group and Experimental Group of standard VI. The ‘t’ statistical value and ‘t’ critical value at 0.05 significance level is 2.02 and 2.024 respectively. The mean value of the Control Group is 13.58 and of Experimental Group is 14.88. The Table also shows the standard deviation, degree of freedom.
The ‘t’ statistical value and ‘t’ critical value at 0.01 significance level is 2.02 and 2.704 respectively. The mean value of the Control Group is 13.58 and of Experimental Group is 14.88. The Table also shows the standard deviation, degree of freedom. Hence it can be said that there exist no significance difference between mean scores of post-test of Science of Control and Experimental groups.

The Table shows the mean of post-test scores obtained by the Boys of the Control and Experimental groups of standard VIII. It implies that the Boys of the Experimental Group of standard VIII performed better than the Boys of the Control Group of standard VIII.

The Null Hypothesis No.23 is rejected.

The finding indicates that the teaching learning with the Computer Multimedia Software Package is a factor associated with the higher achievement of Boys of Experimental Group in the post-test of standard VIII over the factor ‘traditional method of teaching learning’ to the Boys of Control Group of standard VIII.

Objective No. 7

To enhance the academic achievement in Science and Chemistry in particular of Upper Primary Level School students with the help of Computer Multimedia Software Package.

To find out the enhancement in the academic achievement of the Boys of standard VIII , annual Science marks of the Experimental Group of standard VIII were compared with the annual Science marks of the Control Group of standard VIII. The Null Hypothesis No. 24 stated as follows for the same and tested and the scores obtained are presented in the Table 4.30
Null Hypothesis No. 24 There is no significant difference in the mean annual Science marks obtained by Boys of the Control and Experimental groups of standard VIII.

Table 4.30

Mean, S.D. and ‘t’ Value of Annual Science Marks of Boys of The Control and Experimental Groups Of Standard VIII.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>36</td>
<td>58.78</td>
<td>8.36</td>
<td>35</td>
<td>6.75</td>
<td>2.704</td>
<td>HS</td>
</tr>
<tr>
<td>Experimental</td>
<td>36</td>
<td>78.64</td>
<td>14.69</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Observation and Interpretation

The Table 4.30 Shows the ‘t’ test applied to the annual marks in Science obtained by the 36 pairs of Boys of standard VIII of the Control Group and Experimental Group in Annual examination. The means of marks are 58.78 and 78.64 respectively.

The ‘t’ statistical value is 6.75 and ‘t’ critical value is 2.704 at 0.01 significance level. The Table also shows the degrees of freedom and standard deviation.

From the above observation researcher concluded that the ‘t’ statistical value is exceeds than the ‘t’ critical value at 0.01 significance
level. Hence it is taken to be significant resulting in the rejection of the Null hypothesis.

Thus, the Null Hypothesis No. 24 is rejected.

Hence, it can be said that there exists highly significant difference between mean scores of Annual examination marks in Science of Control and Experimental groups. So, the use of Computer Multimedia Software Package has affect positively the achievement of standard VIII Experimental Group in Science.

Null Hypothesis No.25 There is no significant difference in the mean pre-test scores obtained by Girls of the Control and Experimental groups of standard VIII.

Table 4.31

Mean, S.D. and ‘t’ Value of Pre-Test Scores of Girls of The Control and Experimental Groups of Standard VIII.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>16</td>
<td>12.63</td>
<td>2.00</td>
<td>15</td>
<td>1.56</td>
<td>2.947</td>
<td>NS</td>
</tr>
<tr>
<td>Experimental</td>
<td>16</td>
<td>12.37</td>
<td>1.74</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Observation and Interpretation

The Table 4.31 shows the ‘t’ test applied to the pre-test scores obtained by the 16 pairs of Girls of the Control and Experimental groups of standard VI. The ‘t’ statistical value and ‘t’ critical value at 0.01 significance level is 1.56 and 2.947 respectively. The mean value of the
Control Group is 12.63 and of Experimental Group is 12.37. The Table also shows the standard deviation, degree of freedom.

The ‘t’ statistical value compared with the ‘t’ critical value, it revealed that there is no significant difference found at 0.01 level of significance.

The mean score of the Girls of Control Group on the pre-test compared to the mean score of the Girls of Experimental Group on the pre-test. It was found that mean scores were equal.

Thus, the Null Hypothesis No.25 is accepted.

This clearly confirms that the Girls of the Control and Experimental groups taken for the Experimentation had equal recall and recognition ability with reference to the concept of Chemistry given in the previous year Science text-book.

**Objective No. 6**

To Compare the effectiveness of Computer Multimedia Software Package over the traditional method of teaching.

To find out the effectiveness of developed Computer Multimedia Software Package, the post-test scores of Girls of the Experimental Group of standard VIII was compared with the post-test scores of the Girls of Control Group of standard VIII. The Null Hypothesis No.26 stated as follows for the post-test scores of Control Group and Experimental Group and tested and values obtained are presented in Table 4.31

Null Hypothesis No.26 There is no significant difference in the mean post-test scores obtained by the Girls of the Control and Experimental groups of standard VIII
Table 4.32

Mean, S.D. and ‘t’ Value of Post-Test Scores of Girls of The Control and Experimental Groups of Standard VIII.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>16</td>
<td>13.81</td>
<td>3.42</td>
<td>15</td>
<td>3.96</td>
<td>2.947</td>
<td>HS</td>
</tr>
<tr>
<td>Experimental</td>
<td>16</td>
<td>16.81</td>
<td>2.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Observation and Interpretation**

The Table 4.32 shows the ‘t’ test applied to the post-test scores obtained by the 16 Girls of the Control Group and 16 Girls of the Experimental Group of standard VIII. The ‘t’ statistical value and ‘t’ critical value at 0.01 significance level is 3.96 and 2.947 respectively. The mean value of the Control Group is 13.81 and of Experimental Group is 16.81. The Table also shows the standard deviation, degree of freedom.

The ‘t’ test results in the Table 4.32 shows highly significant difference in the mean of post-test scores obtained by the Control and Experimental groups of Girls of standard VIII. It implies that Girls of Experimental Group of standard VIII performed better in the post-test compared to the Girls of Control Group of standard VIII.

The Null Hypothesis No. 26 is rejected.
The finding indicated that the teaching learning with the Computer Multimedia Software Package is a factor associated with the higher achievement of Girls of Experimental Group in the post-test of standard VIII over the factor ‘traditional method of teaching learning’ to the Control Group of standard VIII.

**Objective No. 7**

To enhance the academic achievement in Science and Chemistry in particular of Upper Primary Level School students with the help of Computer Multimedia Software Package.

To find out the enhancement in the academic achievement of the Girls of standard VIII, annual Science marks of the Girls of Experimental Group of standard VIII were compared with the annual Science marks of the Girls of Control Group of standard VIII. The Null Hypothesis No.27 stated as follows for the same and tested and the scores obtained are presented in the Table 4.33

Null Hypothesis No.27 There is no significant difference in the mean annual Science marks obtained by Girls of the Control and Experimental groups of standard VIII.

Table 4.33

Mean, S.D. and ‘t’ Value of Annual Science Marks of Girls of The Control and Experimental Groups of Standard VIII.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>16</td>
<td>63.94</td>
<td>12.37</td>
<td>15</td>
<td>3.39</td>
<td>2.947</td>
<td>HS</td>
</tr>
<tr>
<td>Experimental</td>
<td>16</td>
<td>83.25</td>
<td>14.73</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Observation and Interpretation

The Table 4.33 Shows the ‘t’ test applied to the annual marks in Science obtained by the 16 pairs of Girls of standard VIII of the Control Group and Experimental Group in Annual examination. The means of marks are 63.94 and 83.25 respectively.

The ‘t’ statistical value is 3.39 and ‘t’ critical value is 2.947 at 0.01 significance level. The Table also shows the degrees of freedom and standard deviation.

From the above observation researcher concluded that the ‘t’ statistical value is exceeds than the ‘t’ critical value at 0.01 significance level. Hence it is taken to be significant resulting in the rejection of the Null hypothesis.

Thus, the Null Hypothesis No. 27 is rejected.

Hence, it can be said that there exists a highly significant difference between mean scores of Annual examination marks in Science of Control and Experimental groups. So, the use of Computer Multimedia Software Package has affect positively the achievement of standard VIII Experimental Group in Science.

Pre-test score obtained to equalize the Experimental and Control Group

To equalize the two groups and select one randomly as Experimental Group of Upper Primary School Level students and retain other as Control Group of Upper Primary School Level students. A pre-
test was administered and almost identical pairs based on pre-test scores of Upper Primary School Level students were made from four selected schools.

The pre-test scores and the mean values for Upper Primary School Level are presented in Table 4.34 and the Null Hypothesis No 28 stated as follows is tested and values for the same are presented in Table 4.34

Null Hypothesis No. 28: There is no significant difference in the mean pre-test scores obtained by the Control and Experimental groups of Upper Primary School Level students

Table 4.34

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>156</td>
<td>15.20</td>
<td>3.45</td>
<td>155</td>
<td>0.118</td>
<td>2.576</td>
<td>NS</td>
</tr>
<tr>
<td>Experimental</td>
<td>156</td>
<td>15.21</td>
<td>3.57</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Observation and Interpretation

The Table 4.34 shows the ‘t’ test applied to the pre-test scores obtained by the 156 pairs of the Control and Experimental groups of Upper Primary School Level students. The ‘t’ statistical value and ‘t’ critical value at 0.05 significance level is 0.11 and 2.576 respectively. The mean value of the Control Group is 15.20 and of Experimental Group is 15.21. The Table also shows the standard deviation, degree of freedom.
The ‘t’ statistical value compared with the ‘t’ critical value, it revealed that there is no significant difference found at 0.01 level of significance.

The mean score of the Control Group on the pre-test compared to the mean score of the Experimental Group on the pre-test. It was found that mean scores were equal.

Thus, the Null Hypothesis No. 28 is accepted.

This clearly confirms that the Control and Experimental groups of Upper Primary School Level students taken for the Experimentation had equal recall and recognition ability with reference to knowledge of concept of Chemistry. So the two groups are equal.

**Objective No. 6**

To Compare the effectiveness of Computer Multimedia Software Package over the traditional method of teaching.

To find out the effectiveness of developed Computer Multimedia Software Package, the post-test scores of Experimental Group of Upper Primary School Level students was compared with the post-test scores of the Control Group of Upper Primary School Level students. The Null Hypothesis No. 29 stated as follows for the post-test scores of Control Group and Experimental Group and tested and values obtained are presented in Table 4.35

Null Hypothesis No.29 There is no significant difference in the mean post-test scores obtained by the Control and Experimental groups of Upper Primary School Level students
Table 4.35

Mean, S.D. and ‘t’ value of Post- Test Scores of Control and Experimental Groups of Upper Primary School Level Students.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>156</td>
<td>12.66</td>
<td>2.80</td>
<td>155</td>
<td>15.44</td>
<td>2.576</td>
<td>HS</td>
</tr>
<tr>
<td>Experimental</td>
<td>156</td>
<td>17.01</td>
<td>2.55</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Observation and Interpretation**

The Table 4.35 shows the ‘t’ test applied to the post-test scores obtained by the 156 students of the Control Group and 156 students of the Experimental Group of Upper Primary School Level students. The ‘t’ statistical value and ‘t’ critical value at 0.01 significance level is 15.44 and 2.576 respectively. The mean value of the Control Group is 12.66 and of Experimental Group is 17.01. The Table also shows the standard deviation, degree of freedom.

The ‘t’ test results in the Table 4.35 shows significant difference in the mean of post-test scores obtained by the Control and Experimental groups of Upper Primary School Level students. It implies that Experimental Group of Upper Primary School Level students performed better in the post-test compared to the Control Group of Upper Primary School Level students.
The Null Hypothesis No. 29 is rejected.

The finding indicated that the teaching learning with the Computer Multimedia Software Package is a factor associated with the higher achievement of Experimental Group in the post-test of Upper Primary School Level students over the factor ‘traditional method of teaching learning’ to the Control Group of Upper Primary School Level students.

**Objective No. 7**

To enhance the academic achievement in Science and Chemistry in particular of Upper Primary Level School students with the help of Computer Multimedia Software Package.

To find out the enhancement in the academic achievement of the Upper Primary School Level students, annual Science marks of the Experimental Group of Upper Primary School Level students were compared with the annual Science marks of the Control Group of Upper Primary School Level students. The Null Hypothesis No. 30 stated as follows for the same and tested and the scores obtained are presented in the Table 4.36.

Null Hypothesis No.30 There is no significant difference in the mean annual Science marks obtained by the Control and Experimental groups of Upper Primary School Level students.
Table 4.36

Mean, S.D. and ‘t’ value of Annual Science Marks Obtained by The Control and Experimental Groups of Upper Primary School Level Students

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>156</td>
<td>58.47</td>
<td>13.28</td>
<td>155</td>
<td>8.52</td>
<td>2.576</td>
<td>HS</td>
</tr>
<tr>
<td>Experimental</td>
<td>156</td>
<td>73.25</td>
<td>15.93</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Observation and Interpretation**

The Table 4.36 Shows the ‘t’ test applied to the annual marks in Science obtained by the 156 pairs of students of Upper Primary School Level of the Control Group and Experimental Group in Annual examination. The means of marks are 58.47 and 73.25 respectively.

The ‘t’ statistical value is 8.52 and ‘t’ critical value is 2.576 at 0.01 significance level. The Table also shows the degrees of freedom and standard deviation.

From the above observation researcher concluded that the ‘t’ statistical value is exceeds than the ‘t’ critical value at 0.01 significance level. Hence it is taken to be significant resulting in the rejection of the Null hypothesis.

Thus, the Null Hypothesis No. 30 is rejected.
Hence, it can be said that there exists a highly significant difference between mean scores of Annual examination marks in Science of Control and Experimental groups. So, the use of Computer Multimedia Software Package has affect positively the achievement in Science of Experimental Group at the Upper Primary School Level.

Null Hypothesis No. 31 There is no significant difference in the mean pre-test scores obtained by Boys of the Control and Experimental groups of Upper Primary School Level students

Table 4.37

Mean, S.D. and ‘t’ Value of Pre-Test Scores of Boys of The Control and Experimental Groups of Upper Primary School Level Students

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>93</td>
<td>14.93</td>
<td>3.81</td>
<td>92</td>
<td>0.74</td>
<td>2.617</td>
<td>NS</td>
</tr>
<tr>
<td>Experimental</td>
<td>93</td>
<td>14.88</td>
<td>3.72</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Observation and Interpretation

The Table 4.37 shows the ‘t’ test applied to the pre-test scores obtained by the 93 pairs of Boys of the Control and Experimental groups of Upper Primary School Level students. The ‘t’ statistical value and ‘t’ critical value at 0.01 significance level is 0.74 and 2.617 respectively. The mean value of the Control Group is 14.93 and of Experimental Group is 14.88. The Table also shows the standard deviation, degree of freedom.
The ‘t’ statistical value compared with the ‘t’ critical value, it revealed that there is no significant difference found at 0.01 level of significance.

The mean score of the Boys of Control Group on the pre-test compared to the mean score of the Boys of Experimental Group on the pre-test. It was found that mean scores were equal.

Thus, the Null Hypothesis No.31 is accepted.

This clearly confirms that the Boys of the Control and Experimental groups at the Upper Primary School Level students taken for the Experimentation had equal recall and recognition ability with reference to the concept of Chemistry given in the previous year Science text-book.

**Objective No.6**

To compare the effectiveness of Computer Multimedia Software Package over the traditional method of teaching

To find out the effectiveness of developed Computer Multimedia Software Package, the post- test scores of the Boys of the Experimental Group of Upper Primary School Level students was compared with the post-test scores of Boys of the Control Group of Upper Primary School Level students. The Null Hypothesis No. 32 stated as follows for the same and tested.

Null Hypothesis No. 32 There is no significant difference in the mean post-test scores obtained by Boys of the Control and Experimental groups of Upper Primary School Level students
Table 4.38

Mean, S.D. and ‘t’ Value of Post-Test Scores of Boys of The Control and Experimental Groups of Upper Primary School Level Students.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>93</td>
<td>12.924</td>
<td>2.79</td>
<td>92</td>
<td>10.16</td>
<td>2.617</td>
<td>HS</td>
</tr>
<tr>
<td>Experimental</td>
<td>93</td>
<td>16.634</td>
<td>2.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Observation and Interpretation

The Table 4.38 shows the ‘t’ test applied to the post-test scores obtained by the 93 pairs of Boys of the Control Group and Experimental Group of Upper Primary School Level students. The ‘t’ statistical value and ‘t’ critical value at 0.01 significance level is 10.16 and 2.617 respectively. The mean value of the Control Group is 12.924 and of Experimental Group is 16.634. The Table also shows the standard deviation, degree of freedom.

The Table shows the significant difference in the mean of post-test scores obtained by the Boys of the Control and Experimental groups of Upper Primary School Level students. It implies that the Boys of the Experimental Group of Upper Primary School Level students performed better than the Boys of the Control Group of Upper Primary School Level students.
The Null Hypothesis No.32 is rejected.

The finding indicates that the teaching learning with the Computer Multimedia Software Package is a factor associated with the higher achievement of Boys of Experimental Group in the post-test of Upper Primary School Level students over the factor ‘traditional method of teaching learning’ to the Boys of Control Group of Upper Primary School Level students.

**Objective No. 7**

To enhance the academic achievement in Science and Chemistry in particular of Upper Primary Level School students with the help of Computer Multimedia Software Package.

To find out the enhancement in the academic achievement of the Boys of Upper Primary School Level students, annual Science marks of the Experimental Group of Upper Primary School Level students were compared with the annual Science marks of the Control Group of Upper Primary School Level students. The Null Hypothesis No.33 stated as follows for the same and tested and the scores obtained are presented in the Table 4.39

Null Hypothesis No. 33 There is no significant difference in the mean annual Science Marks obtained by Boys of the Control and Experimental groups of Upper Primary School Level students.
Table 4.39

Mean, S.D. and ‘t’ Value of Annual Science Marks of Boys of The Control and Experimental Groups of Upper Primary School Level Students.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>93</td>
<td>57.77</td>
<td>13.60</td>
<td>92</td>
<td>6.01</td>
<td>2.617</td>
<td>HS</td>
</tr>
<tr>
<td>Experimental</td>
<td>93</td>
<td>71.24</td>
<td>15.55</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Observation and Interpretation**

The Table 4.39 shows the ‘t’ test applied to the annual marks in Science obtained by the 93 pairs of Boys of Upper Primary School Level of the Control Group and Experimental Group in Annual examination. The means of marks are 57.77 and 71.24 respectively.

The ‘t’ statistical value is 6.01 and ‘t’ critical value is 2.617 at 0.01 significance level. The Table also shows the degrees of freedom and standard deviation.

From the above observation researcher concluded that the ‘t’ statistical value is exceeds than the ‘t’ critical value at 0.01 significance level. Hence it is taken to be significant resulting in the rejection of the Null hypothesis.

Thus, the Null Hypothesis No. 33 is rejected.
Hence, it can be said that there exists a highly significant difference between mean scores of Annual examination marks in Science of Control and Experimental groups. So, the use of Computer Multimedia Software Package has affect positively the achievement in Science of Experimental Group at the Upper Primary School Level.

Null Hypothesis No.34 There is no significant difference in the mean pre-test scores obtained by Girls of the Control and Experimental groups of Upper Primary School Level students

Table 4.40

Mean, S.D. and ‘t’ Value of Pre-Test Scores of Girls of The Control and Experimental Groups of Upper Primary School Level Students.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>63</td>
<td>15.60</td>
<td>2.81</td>
<td>62</td>
<td>0.44</td>
<td>2.617</td>
<td>NS</td>
</tr>
<tr>
<td>Experimental</td>
<td>63</td>
<td>15.71</td>
<td>3.31</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Observation and Interpretation**

The Table 4.40 shows the ‘t’ test applied to the pre-test scores obtained by the 63 pairs of Girls of the Control and Experimental groups of Upper Primary School Level students. The ‘t’ statistical value and ‘t’ critical value at 0.01 significance level is 0.44 and 2.617 respectively. The mean value of the Control Group is 15.60 and of Experimental Group is 15.71. The Table also shows the standard deviation, degree of freedom.
The ‘t’ statistical value compared with the ‘t’ critical value, it revealed that there is no significant difference found at 0.01 level of significance.

The mean score of the Girls of Control Group on the pre-test compared to the mean score of the Girls of Experimental Group on the pre-test at Upper Primary School Level. It was found that mean scores were equal.

Thus, the Null Hypothesis No.34 is accepted.

This clearly confirms that the Girls of the Control and Experimental groups at the Upper Primary School Level students taken for the Experimentation had equal recall and recognition ability with reference to the concept of Chemistry given in the previous year Science text-book.

Objective No. 6

To Compare the effectiveness of Computer Multimedia Software Package over the traditional method of teaching.

To find out the effectiveness of developed Computer Multimedia Software Package, the post-test scores of Girls of the Experimental Group of Upper Primary School Level students was compared with the post-test scores of the Girls of Control Group of Upper Primary School Level students. The Null Hypothesis No. 35 stated as follows for the post-test scores of Control Group and Experimental Group and tested and values obtained are presented in Table 4.41

Null Hypothesis No.35 There is no significant difference in the mean post-test scores obtained by the Girls of the Control and Experimental groups of Upper Primary School Level students.
Table 4.41

Mean, S.D. and ‘t’ Value of Post-Test Scores of Girls of The Control and Experimental Groups of Upper Primary School Level Students.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>63</td>
<td>12.269</td>
<td>2.80</td>
<td>62</td>
<td>12.53</td>
<td>2.617</td>
<td>HS</td>
</tr>
<tr>
<td>Experimental</td>
<td>63</td>
<td>17.587</td>
<td>2.12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Observation and Interpretation**

The Table 4.41 shows the ‘t’ test applied to the post-test scores obtained by the 63 Girls of the Control Group and 63 Girls of the Experimental Group of Upper Primary School Level students. The ‘t’ statistical value and ‘t’ critical value at 0.01 significance level is 12.53 and 2.617 respectively. The mean value of the Control Group is 12.269 and of Experimental Group is 17.587. The Table also shows the standard deviation, degree of freedom.

The ‘t’ test results in the Table No.4.41 shows significant difference in the mean of post-test scores obtained by the Control and Experimental groups of Girls of Upper Primary School Level students. It implies that Girls of Experimental Group of Upper Primary School Level students performed better in the post-test compared to the Girls of Control Group of Upper Primary School Level students.

The Null Hypothesis No. 35 is rejected.
The finding indicated that the teaching learning with the Computer Multimedia Software Package is a factor associated with the higher achievement of Girls of Experimental Group in the post-test of Upper Primary School Level students over the factor ‘traditional method of teaching learning’ to the Control Group of Upper Primary School Level students.

**Objective No. 7**

To enhance the academic achievement in Science and Chemistry in particular of Upper primary level school students with the help of Computer Multimedia Software Package.

To find out the enhancement in the academic achievement of the Girls of Upper Primary School Level students, annual Science marks of the Girls of Experimental Group of Upper Primary School Level students were compared with the annual Science marks of the Girls of Control Group of Upper Primary School Level students. The Null Hypothesis No.36 stated as follows for the same and tested and the scores obtained are presented in the Table 4.42

Null Hypothesis No.36 There is no significant difference in the mean annual Science marks obtained by Girls of the Control and Experimental groups of Upper Primary School Level students.
Table 4.42

Mean, S.D. and ‘t’ Value of Annual Science Marks of Girls of The Control and Experimental Groups of Upper Primary School Level Students.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D.</th>
<th>df</th>
<th>‘t’ stat.</th>
<th>‘t’ critical</th>
<th>Significance level 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>63</td>
<td>59.49</td>
<td>12.84</td>
<td>62</td>
<td>17.39</td>
<td>2.617</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>63</td>
<td>76.22</td>
<td>16.15</td>
<td></td>
<td></td>
<td></td>
<td>HS</td>
</tr>
</tbody>
</table>

**Observation and Interpretation**

The Table 4.42 Shows the ‘t’ test applied to the annual marks in Science obtained by the 63 pairs of Girls of Upper Primary School Level of the Control Group and Experimental Group in Annual examination. The means of marks are 59.49 and 76.22 respectively.

The ‘t’ statistical value is 17.39 and ‘t’ critical value is 2.617 at 0.05 significance level. The Table also shows the degrees of freedom and standard deviation.

From the above observation researcher concluded that the ‘t’ statistical value is exceeds than the ‘t’ critical value at 0.05 significance level. Hence it is taken to be significant resulting in the rejection of the Null hypothesis.

Thus, the Null Hypothesis No. 36 is rejected.

Hence, it can be said that there exists highly significant difference between mean scores of Annual examination marks in Science of Control
and Experimental groups. So, the use of Computer Multimedia Software Package has affect positively the achievement in Science of Experimental Group at the Upper Primary School Level.

**Objective No. 8**

To find out School Students view regarding the developed Software.

To attain to above objective researcher prepared questionnaire about the school student’s views regarding the developed Computer Multimedia Software Package. The feedback regarding developed software was analyzed and presented the Table 4.33
### Table 4.43

**School Student’s Views Regarding The Developed Software**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Questions</th>
<th>Mean Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>1</td>
<td>Was the method of instruction / learning using computer more helpful than other methods normally used?</td>
<td>73</td>
</tr>
<tr>
<td>2</td>
<td>Would you like to learn Science topics with the help of computer next year also?</td>
<td>75</td>
</tr>
<tr>
<td>3</td>
<td>Is there ample opportunity for interaction between students and computer?</td>
<td>47</td>
</tr>
<tr>
<td>4</td>
<td>Is this method more interesting than the regular classroom teaching – learning method?</td>
<td>71</td>
</tr>
<tr>
<td>5</td>
<td>Was the language used in this multimedia software is simple to understand?</td>
<td>79</td>
</tr>
<tr>
<td>6</td>
<td>Would you like to learn other subjects also with the help of computers in next year?</td>
<td>74</td>
</tr>
<tr>
<td>7</td>
<td>Has the animations helped to understand the subject matter better?</td>
<td>66</td>
</tr>
<tr>
<td>8</td>
<td>Were explanations as well as definitions of terms clear?</td>
<td>75</td>
</tr>
<tr>
<td>9</td>
<td>Has the discussions after the computer presentation of the main points among students helped the students?</td>
<td>60</td>
</tr>
<tr>
<td>10</td>
<td>Was the questioning style appropriate?</td>
<td>55</td>
</tr>
<tr>
<td>11</td>
<td>Were the texts, pictures and animations quite balanced?</td>
<td>68</td>
</tr>
<tr>
<td>12</td>
<td>Was the animations and pictures useful in learning?</td>
<td>83</td>
</tr>
<tr>
<td>13</td>
<td>Are letters of the next readable?</td>
<td>68</td>
</tr>
<tr>
<td>14</td>
<td>Is it boring to learn through computer sometime?</td>
<td>43</td>
</tr>
<tr>
<td>15</td>
<td>Do you feel motivated while learning through the computer multimedia software?</td>
<td>45</td>
</tr>
<tr>
<td>16</td>
<td>Are the pictures used in the software appropriate to the subject matter?</td>
<td>77</td>
</tr>
<tr>
<td>17</td>
<td>Can one learn by oneself using this software appropriate to the subject matter?</td>
<td>54</td>
</tr>
<tr>
<td>18</td>
<td>If this method is used for learning then, can teachers help be eliminated?</td>
<td>41</td>
</tr>
<tr>
<td>19</td>
<td>Do you have suggestions for improving the developed software package?</td>
<td>Open ended question</td>
</tr>
</tbody>
</table>
Observation and Interpretation

From above Table 4.44 and Graph 4.1 it is observed that two questions were prepared regarding the method of instruction 73% and 71% respondents gave positive responses respectively. 20% and 23% respondents gave negative responses respectively and 7% and 6% respondents gave neutral responses respectively.

It can be seen that respondents found that the method of instructions / learning using computer was more helpful than other method normally used by their Science teachers, further with regard to interest, most of the respondent were found that learning with digital media was more interesting than the regular classroom teaching- learning method. On further probing it was found that respondents were physically and mentally participated in the teaching – learning process, that why respondents were interested in teaching – learning through developed software.

In all, the most of the respondents were interested in this method of teaching – learning through developed software.

Table 4.45
Student’s Responses Regarding Learning Subjects With Computer In Next Year

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Questions</th>
<th>Mean Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>1.</td>
<td>Would you like to learn Science topics with the help of computers next year also?</td>
<td>75</td>
</tr>
<tr>
<td>2</td>
<td>Would you like to learn other subjects also with the help of computers in next year?</td>
<td>74</td>
</tr>
</tbody>
</table>

Observation and Interpretation

From above Table 4.45 and Graph 4.2 it is observed that two questions were prepared regarding learning Science and other subjects with computer in next years. 75% and 74% respondents gave positive responses respectively. 21% and 18% respondents gave negative responses respectively and 4% and 8% respondents gave neutral responses respectively.

It can be seen that respondents were interested in learning Science subject and other subjects with the help of computers next year also. The views of the respondents were based on their motivation they got learning Chemistry components with the help of computer software that developed by the researcher. It was positive sign that student themselves like to learn with the help of computers.

Table 4.46
Responses Regarding Multimedia Components of Developed Software
<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Questions</th>
<th>Mean Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>1.</td>
<td>Has the animations helped to understand the subject matter better?</td>
<td>66</td>
</tr>
<tr>
<td>2</td>
<td>Were the texts, pictures and animations quite balanced?</td>
<td>68</td>
</tr>
<tr>
<td>3</td>
<td>Was the animations and pictures useful in learning?</td>
<td>83</td>
</tr>
<tr>
<td>4</td>
<td>Are letters of text readable?</td>
<td>68</td>
</tr>
<tr>
<td>5</td>
<td>Are the pictures used in the software appropriate to the subject matter?</td>
<td>77</td>
</tr>
</tbody>
</table>

**Observation and Interpretation**

From above Table 4.46 and Graph 4.3 it is observed that five questions were prepared regarding the multimedia components of developed software 66%, 68%, 83%, 68% and 77% respondents gave positive responses respectively. 21%, 21%, 11%, 17% and 12% respondents gave negative responses respectively and 13%, 11%, 6%, 15% and 11% respondents gave neutral responses respectively.

From the above observations it can be interpreted that majority of respondents said that the animation had helpful for understanding the subject matter better. The text, pictures and animations used in the software were quite balanced, the respondents revealed that the animations and pictures were very beneficial in learning process. The text size used in the software was readable. The pictures used in the software were appropriate to the subject matter.

On further probing it was found that components of multimedia used in the software were helped them to understanding concepts clearly.

**Table 4.47**
### Student’s Responses Regarding Interactivity of Software

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Questions</th>
<th>Mean Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Is there ample opportunity for interaction between students and computer?</td>
<td>47</td>
</tr>
<tr>
<td>5</td>
<td>Was the language used in this multimedia software is simple to understand?</td>
<td>79</td>
</tr>
<tr>
<td>8</td>
<td>Were explanations as well as definitions of terms clear?</td>
<td>75</td>
</tr>
<tr>
<td>9</td>
<td>Has the discussions after the computer presentation of the main points among students helped the students?</td>
<td>60</td>
</tr>
<tr>
<td>10</td>
<td>Was the questioning style appropriate?</td>
<td>55</td>
</tr>
<tr>
<td>14</td>
<td>Is it boring to learn through computer sometime?</td>
<td>43</td>
</tr>
</tbody>
</table>

### Observation and Interpretation

From above Table 4.47 and Graph 4.4 it is observed that six questions were prepared regarding the interactivity of the developed software 47%, 79%, 75%, 60%, 55% and 43% respondents gave positive responses respectively. 27%, 13%, 17%, 22%, 24% and 47% respondents gave negative responses respectively and 26%, 8%, 8%, 18%, 21% and 10% respondents gave neutral responses respectively.

From the above observations it can be inferred that majority of the respondents were satisfied with the interactivity of the software. They also mentioned that there was ample opportunity for interaction between students and computer. The language used in the software was easy to understand. This helps to them to understand the concepts taught in better way. The explanation given in the software was clear. There was no ambiguity in the questions it was easy for them to give feedback. Whenever necessary the main points were discussed by the Researcher.
among students as well as the questions asked by the students were clarified by the Researcher in better way.

Respondents found that they were interested in learning with multimedia software but 43% respondents sometimes found boring to learn with computer. This was due to the expectation of VI and VII standard students to have maximum animations than text and pictures.

In all the interactivity used in the software was up to the satisfactory level of the students.

Table 4.48

Student’s Responses Regarding Learning Motivation Through Software

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Questions</th>
<th>Mean Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>15</td>
<td>Do you feel motivated while learning through the computer multimedia software?</td>
<td>45</td>
</tr>
</tbody>
</table>

Observation and Interpretation

From above Table 4.48 and Graph 4.5 revealed that 45% respondents gave positive responses, 37% respondents gave negative responses and 18% respondents gave neutral responses.

With regard to the above aspect majority of the respondents feel motivated while learning through the computer multimedia software. This was because the moving content matter has animations, videos pictures
and texts. Whenever, necessary researcher conducted discussion on the topic to clarify the doubts and to keep students alert during presentation of software. novelty in the teaching – learning process also motivated these students to learn through the computer multimedia software.

On the other hand 37% respondents goes not get motivated while learning through the computer multimedia software. This was happened due to students from standard VI and VII wanted more animations than text and pictures. Where as students from VIII were satisfy with the content of the developed software.

Table 4.49
Student’s Responses Regarding Self Learning

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Questions</th>
<th>Mean Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>17</td>
<td>Can one learn by oneself using this software at one’s own speed?</td>
<td>54</td>
</tr>
</tbody>
</table>

Observation and Interpretation

From above Table 4.49 and Graph 4.6 revealed that 54% respondents gave positive responses, 25% respondents gave negative responses and 21% respondents gave neutral responses.

From the above observations it can be interpreted that 54% students revealed confidently that they learn by themselves using the software at their own speed and 25% students have no confidence to learn by themselves using this software at their own speed. On further probing
it was revealed that lack of confidence among the 25% and 21% students was due to lack of enough exposure to the computer and there was no scope to operate the digital instruments during experimentation.

Table 4.50

Student’s Responses Regarding Help Of The Teachers In The Learning With Developed Software

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Questions</th>
<th>Mean Percentage</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>18</td>
<td>If this method is used for learning then, can teachers help be eliminated?</td>
<td>41</td>
<td>34</td>
</tr>
</tbody>
</table>

Observation and Interpretation

From above Table 4.50 and Graph 4.7 revealed that 41% respondents gave positive responses, 34% respondents gave negative responses and 25% respondents gave neutral responses regarding elimination of Teachers help while learning with multimedia software.

This revealed that the students are divided in their opinion regarding the teacher role in teaching, learning process with the help of multimedia software.

Table 4.51

An Open Ended Question “Do You Have Suggestions For Improving The Developed Software Package” Was Posed To Students Responses

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Standard VI students like to have animation loaded educational software.</td>
</tr>
</tbody>
</table>
2. Standard VII students found that the teaching learning process by the animation loaded educational software was highly interactive.

3. VIII standard students felt there is a good balance of text, pictures and animation in the software. Also, felt motivated while learning by developed software.

RESULTS

1. There is no significant difference in the mean pre-test score obtained by the Control and Experimental groups of standard VI.

2. There is significant difference in the mean post-test score obtained by the Control and Experimental groups of standard VI.

3. There is significant difference in the mean annual Science marks obtained by the Control and Experimental groups of standard VI.

4. There is no significant difference in the mean pre-test score obtained by the Boys of the Control and Experimental groups of standard VI.
5. There is significant difference in the mean post-test score obtained by the Boys of the Control and Experimental groups of standard VI.

6. There is significant difference in the mean annual Science marks obtained by the Boys of the Control and Experimental groups standard VI.

7. There is no significant difference in the mean pre-test score obtained by the Girls of the Control and Experimental groups of standard VI.

8. There is significant difference in the mean post-test score obtained by the Girls of the Control and Experimental groups of standard VI.

9. There is significant difference in the mean annual Science marks obtained by the Girls of the Control and Experimental groups of standard VI.

10. There is no significant difference in the mean pre-test score obtained by the Control and Experimental groups of standard VII.

11. There is significant difference in the mean post-test score obtained by the Control and Experimental groups of standard VII.

12. There is significant difference in the mean annual Science marks obtained by the Control and Experimental groups of standard VII.

13. There is no significant difference in the mean pre-test score obtained by the Boys of the Control and Experimental groups of standard VII.

14. There is significant difference in the mean post-test score obtained by the Boys of the Control and Experimental groups of standard VII.

15. There is no significant difference in the mean annual Science marks obtained by the Boys of the Control and Experimental groups of standard VII.
16. There is no significant difference in the mean pre-test score obtained by the Girls of the Control and Experimental groups of standard VII.

17. There is significant difference in the mean post-test score obtained by the Girls of the Control and Experimental groups of standard VII.

18. There is significant difference in the mean annual Science marks obtained by the Girls of the Control and Experimental groups of standard VII.

19. There is no significant difference in the mean pre-test score obtained by the Control and Experimental groups of standard VIII.

20. There is significant difference in the mean post-test score obtained by the Control and Experimental groups of standard VIII.

21. There is significant difference in the mean annual Science marks obtained by the Control and Experimental groups of standard VIII.

22. There is no significant difference in the mean pre-test score obtained by the Boys of the Control and Experimental groups of standard VIII.

23. There is significant difference in the mean post-test score obtained by the Boys of the Control and Experimental groups of standard VIII.

24. There is significant difference in the mean annual Science marks obtained by the Boys of the Control and Experimental groups of standard VIII.

25. There is no significant difference in the mean pre-test score obtained by the Girls of the Control and Experimental groups of standard VIII.

26. There is significant difference in the mean post-test score obtained by the Girls of the Control and Experimental groups of standard VIII.
27. There is significant difference in the mean annual Science marks obtained by the Girls of the Control and Experimental groups of standard VIII.

28. There is no significant difference in the mean pre-test score obtained by the Control and Experimental groups at the Upper Primary School Level.

29. There is significant difference in the mean post-test score obtained by the Control and Experimental groups at the Upper Primary School Level.

30. There is significant difference in the annual Science marks obtained by the Control and Experimental groups at the Upper Primary School Level.

31. There is no significant difference in the mean pre-test score obtained by the Boys of the Control and Experimental groups at the Upper Primary School Level.

32. There is significant difference in the mean post-test score obtained by the Boys of the Control and Experimental groups at the Upper Primary School Level.

33. There is significant difference in the mean annual Science marks obtained by the Boys of the Control and Experimental groups at the Upper Primary School Level.

34. There is no significant difference in the mean pre-test score obtained by the Girls of the Control and Experimental groups at the Upper Primary School Level.
35. There is significant difference in the mean post-test score obtained by the Girls of the Control and Experimental groups at the Upper Primary School Level.

36. There is significant difference in the mean annual Science marks obtained by the Girls of the Control and Experimental groups at the Upper Primary School Level.

37. Students found that the method of teaching – learning with developed software was interesting and interactive.

38. Students were ready to learn Science and other subjects with computer in next year.

39. Students found that quit balanced multimedia components used in the developed software positively influenced the teaching – learning process.

40. Students found the level of the interactivity of the software is satisfactory.

41. Students feel motivated while learning with developed software.

42. Student found that they themselves individually learn with developed software.

43. Students also found that they need help of Science teacher while learning with developed software and computers.