MULTIMEDIA PACKAGE FOR TEACHING COMPUTER SCIENCE AMONG RURAL AND URBAN STUDENTS AT PLUS ONE: VALIDATION AND ITS EFFECTIVENESS

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ABSTRACT

The prime intention of the study is to prepare a multimedia package for developing programming skill of computer science students among rural and urban at plus one standard. And also find out the effectiveness of multimedia package for teaching in computer science. 60 students from Sri Swamy and JAY Matriculation School in Salem district are selected as a sample of this research, in that thirty students were considered as control group students and trained with traditional method of teaching. Rest of the thirty students were considered as experimental group students and trained with multimedia package. Achievement test was used as tool for the study. The results of the study represent that the students learned Computer programming through multimedia package is more effective than students learned through traditional method. The experimental results show that multimedia package was found effective with respect to academic achievement in rural and urban students also.

Keywords: Multimedia Package, Computer Science, t-test, Rural, Urban, Effectiveness.

I. INTRODUCTION

A. Multimedia

Multimedia [1], [5] products integrates text, pictures, sounds and full motion videos interactivity into interesting, informative and entertaining productions. It uses different ways of communication e.g. text, recorded data, numeric data, graphics, images, voice and videos. Multimedia technology [2] has a tremendous impact on representing and imparting information. It has taken computer users to high technology desktop systems that offer fun adventure and interactive learning. Higher Secondary [6], [7] is an essential stage of school education because at this stage specialized, discipline based, content oriented courses are introduced. Students who reach this stage after 10 years of general education choose subjects that would enable them to pursue their career. "The Computer students of today are tomorrow's computer scientists, Computer engineers, Software Developers, Programmers, and teachers at the different levels. So the component of Higher Secondary stage should emphasize on ability and that the awareness of the content and programming language.

II. PROPOSED METHODOLOGY

In this research, the proposed methodology explores the development of multimedia package using Programming Languages such as Java Script and Html for the 11th standard (C++ Programming Language from the Computer science text book for the term II- Government syllabus) and an achievement test was constructed which is used to test the effectiveness in this experimentation study. The multimedia package was developed with 6 modules including self-assessment module. Using the self-assessment module, students can test their computer programming knowledge individually. After developed the multimedia package, the teachers can trained the students for learning computer programming language through the multimedia package. In the Achievement test, the objective type test such as Pre-test and Post-test were constructed to assess the entry level behavior and performance of the total sample The performance of the students in the control group and experimental group for learning computer programming were identified and compared with the mean, standard deviation and t test values.
In this research, selected for the purposive sampling method was selected to carry for the study. In this study, the experimental method for parallel group design such as control and experimental group was used and also to find the facts through the collection of data and analysis of data given the representation of the phenomenon under the study.

III. VALIDITY AND RELIABILITY OF THE INSTRUMENTATION

The purpose of this tool is given in order to find out the achievement level of the student. This tool was used to conduct the pre-test and post-test for computer science students. The tool contains 50 objective type questions of C++ Programming Language are prepared from the chapters in Computer text book prescribed by state board of Tamil Nadu. The validity of the tool is 0.79.

A. Statistical techniques used for the study

Mean: The Mean, Median and Mode [3] are the arithmetic average of a data set. This is found by adding the numbers in a data set and dividing by how many numbers there are

\[ \bar{X} = \frac{\sum X}{N} \]  

(1)

Here \( \sum \) represents the summation, X represents scores and N represents number of scores.

Standard deviations (SD): Standard Deviation [4] is a measure that is used to quantify the amount of variation or dispersion of a set of data values.

\[ S = \sqrt{\frac{\sum (x_i - \bar{X})^2}{N-1}} \]  

(2)

Where \( \{x_1, x_2, ..., x_N\} \) are the observed values of the sample items, \( \bar{X} \) is the mean value of these observations, and N is the number of observations in the sample.

T-Test: The t-test is any statistical hypothesis test in which the test statistic follows a student’s t-distribution under the null hypothesis. T-test uses means and standard deviations of two samples to make a comparison. The formula for T-test is given below:

\[ T = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} \]  

(3)

Where, \( \bar{x}_1 \) represents the Mean of first set of values, \( \bar{x}_2 \) represents Mean of second set of values, 

\( S_1 \) represent the Standard deviation of first set of values, \( S_2 \) represents Standard deviation of second set of values, \( n_1 \) represents total number of values in first set, \( n_2 \) represents Total number of values in second set.

IV. RESULT ANALYSIS AND INTERPRETATION

A. Hypothesis of the Study

1. There is no significant difference between the post test score of Control Group and Experimental Group

In this study, there are 30 students were involved in the control group and experimental group for the post-test. The obtained mean scores, standard deviation scores and t test values are listed in the Table I given below.

<table>
<thead>
<tr>
<th>Group</th>
<th>No of students</th>
<th>Mean</th>
<th>S.D</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Group</td>
<td>30</td>
<td>22.5</td>
<td>5.51</td>
<td>3.01</td>
<td>Significant</td>
</tr>
<tr>
<td>Experimental Group</td>
<td>30</td>
<td>31.11</td>
<td>2.78</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(At 5% level of significance the table value of ‘t’ is 1.96)

From the above Table I, it is clear that the obtained t-value (3.01) is greater than the table value (1.96). It is significant at 0.05 levels. This indicates that there is significant difference between the
experimental group and control group in the achievement. So it can be concluded that the students taught through Multimedia package performed better than those who were taught through conventional method of teaching.

Figure 1. Analysis of Post-Test scores for control group and experimental group

From the above Figure 1, it shows clearly that the mean scores and standard deviation scores of the post-test of control group and experimental group is not similar. Hence there is significant difference in the post-test means scores of computer science students of control group and experimental group.

2. There is no significant difference between the post-test score of Rural and Urban students in Experimental Group.

In this study, there are 30 students were involved in the Rural and Urban in Experimental group for the post-test of the computer science students. The obtained mean scores, standard deviation scores and t-test values are listed in the Table II given below.

Table II: Comparison of Post Test Scores of Rural and Urban students in Experimental Group

<table>
<thead>
<tr>
<th>Experimental Group</th>
<th>No of Students</th>
<th>Mean</th>
<th>S.D</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>15</td>
<td>27.23</td>
<td>4.25</td>
<td>2.76</td>
<td>Significant</td>
</tr>
<tr>
<td>Urban</td>
<td>15</td>
<td>35.06</td>
<td>2.73</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(At 5% level of significance the table value of ‘t’ is 1.96).

From the above Table II, it is clear that the calculated t-value (2.76) is greater than the table value (1.96). So it is significant at 0.05 levels. This shows that there is significant difference between the means of the post-test score of Rural and Urban in Experimental group. Therefore the Rural and Urban students are differ in their learning and understanding of the computer science at plus one level. The Urban students are using multimedia to get high achievement of learning better than the Rural students. So there is significant difference between the post-test score of Rural and Urban students in Experimental Group.

Figure 2: Analysis of post-test score of rural and urban students in experimental group.

From the above Figure 2, it shows clearly that the mean scores and standard deviation scores of the post-test are not similar. Hence there is significant difference in the post-test mean scores of computer science students of Experimental group.

3. There is no significant difference between the post-test score of Experimental Group and Control Group for rural.

In this study, there are 30 students were involved in the post test is experimental group and control group for rural for teaching computer science students and the obtained mean scores, standard deviation scores and t test values are listed in the Table III given below.

Table III. Comparison of Post Test Score of Students in Experimental and Control Group for Rural.
From the Table III, it is clear that the calculated t-value (3.01) is greater than the table value (1.96). So it is significant at 0.05 levels. This shows that there is significant difference between the means of the post-test scores of rural in the experimental group and control group. The control group students are learning through blackboard and chalk. But the experimental group of rural students was learning through interactive method such as Multimedia package. So the Experimental groups of rural students learning better than the rural of Control group students. The two groups were of the post-test of experimental group have different ability of achievement in computer science. Therefore the significant difference between the post-test scores of experimental and control group for rural.

![Figure 3. Analysis of Post-Test of Rural in Experimental Groups and Control Group](image)

From the above figure 3, it shows clearly that the mean scores and standard deviation scores of post-test of experimental and control group of rural are similar, hence there is significant difference between the post-test of control and experimental of rural means scores of computer science students of experimental group.

4. There is no significant difference between the post-test score of Experimental Group and Control Group for Urban.

In this study, there are 30 students were involved in the post test is experimental group and control group for urban for learning in computer science students and the obtained mean scores, standard deviation scores and t test values are listed in the Table IV given below.

<table>
<thead>
<tr>
<th>Group</th>
<th>No of Students (Urban)</th>
<th>Mean</th>
<th>S.D</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>15</td>
<td>35.06</td>
<td>2.73</td>
<td>2.15</td>
<td>Significant</td>
</tr>
<tr>
<td>Control</td>
<td>15</td>
<td>20.69</td>
<td>4.76</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(At 5% level of significance the table value of ‘t’ is 1.96)

From the Table IV, it is clear that the calculated t-value (2.15) is greater than the table value (1.96). So it is significant at 0.05 levels. This shows that there is significant difference between the means of the post-test scores of urban in the experimental group and control group. The control group students were learning through the present method. In this method teachers were using blackboard and chalk only. But, in the Experimental group, the teachers were using interactive method of Multimedia package. So that, the urban students in the experimental group were learning programming language much better than the Control group. Therefore significant difference between the post-test scores of experimental group and control group for urban.
Figure 4. Analysis of Post-Test of Rural in Experimental group and Control group.

From the above Figure 4, it shows clearly that the mean scores and standard deviation scores of post-test of experimental and control group of urban is not similar, hence there is significant difference between the post-test of control and experimental of urban.

V. FINDINGS AND CONCLUSION

The resultant findings and conclusions are made based on the above experimental results. There is a significant difference was found on post-test mean scores and achievement scores of students of control group and experimental group and significant difference between the urban and rural students also was found. The computer science students of experimental group trained through the multimedia package having better achievement in learning computer programming language when compared to the students learned through the traditional method of teaching. In the Computer science, post-test of experimental group the urban students having better learning achievement than the experimental group of rural students. The experimental results shows that the urban students scored slightly better than the rural students in the post test scores of experimental group for learning computer programming language. So, the uses of multimedia package can increase student’s academic achievement and active participation in classroom teaching and learning. Efforts are to be taking by the educational institutional to provide multimedia facilities. Teachers are being potentially trained to make best use of the multimedia in order to promote active learning. It is high time that multimedia technology be included in the teacher education curriculum. This will enable to meet the needs of the future challenges for students.

REFERENCES