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RESEARCH ARTICLE

TEACHER-ASSISTED MULTIMEDIA INSTRUCTIONAL PACKAGE – AN ASSURED MODUS TO REDUCE ACADEMIC ANXIETY OF SECONDARY SCHOOL STUDENTS.

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Abstract

Multimedia is progressively invading each and every area of teaching and learning processes in the Physics classroom. The study purported to develop a Teacher-Assisted Multimedia Instructional Package in Physics and to test its effectiveness in reducing Academic Anxiety of Secondary School Students of Kerala. Further, this effectiveness was to be compared with that of the Activity Oriented Method of Instruction. The Quasi Experimental Method with the Pre-Test Post-Test Non Equivalent Groups Design was found to be suitable for the study. The Teacher-Assisted Multimedia Instructional Package and the Activity Oriented Method of Instruction were the independent variables while the Academic Anxiety was the dependent variable of the study. The experiment was conducted on a sample of 400 Secondary School Students of Kerala with 200 each in the Experimental and Control Groups. The results of the study showed that the Teacher-Assisted Multimedia Instructional Package in Physics is more effective than the Activity Oriented Method of Instruction in reducing Academic Anxiety of the Students. The study yielded similar findings with regard to the Gender Groups of Students, viz. Boys as well as Girls.

Background Of The Study:-

Education is a never ending process of inner growth and development. It makes our life progressive, cultured and civilized. Education today is more than teaching and learning with an emphasis on technology. Science is an inseparable part of modern life. It is viewed by common man as a body of scientific information. The conventional teaching methods do not meet up to the intellectual, psychological and emotional needs of the students and are insufficient to actively involve students in studying Science. The methods of teaching need a radical change and it should be more student-centered. Modern instructional strategies provide better learning and longer retention.

This millennium is characterized by galloping advancement of science and technology. Technology continues to move forward. Multimedia is essential to meet challenges in any classroom. The challenge for educators is to determine the appropriateness of multimedia use and ensure its success in the classroom. Multimedia has an undisputed place but certainly will not replace good teaching. Schools are perhaps the best places for tapping the potentials of multimedia. Many educators perceive multimedia as a panacea to all educational woes. Multimedia has been touted as the preferred medium in revolutionizing education. Lots of new technologies are emerging in the

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field of teaching Physics, with ongoing research in teaching Physics using Multimedia. The role of Multimedia is also evident in the documentation of Physics practices. Most of the teachers practice traditional methods for teaching Physics. Since the classrooms are crowded, the teachers are unable to capture the attention of the students. Consequently, the percentage of marks and percentage of passes in a year, with regard to Physics, is obviously poor. Interactive Multimedia is an answer to this situation.

Physics is a subject that gives meaning to nature and natural phenomena. It is essential that students be taught in the natural set up. Though the traditional method of teaching helps to some extent, Multimedia is capable of motivating students towards self-achievement. For example, when the concept of friction is to be taught, Multimedia animation comes in handy. When the concept of solar eclipse is explained, graphics and animation are useful in driving home the idea of natural phenomena in a clear cut way. In optics, it is not known in which direction the ray refracted through a glass prism, but this could be clearly conveyed using Multimedia.

Need & Significance Of The Study:-

Multimedia is a popular technology that serves as an instructional delivery medium. The conception of the Multimedia as a learning environment is instantiated in varied forms, from online versions of traditional computer assisted instruction to innovative individual and group virtual – learning modes. Teacher-Assisted Multimedia Instruction is a powerful interaction medium that enables students to communicate with peers, teachers, and experts and conduct collaborative work (Mioduser, 2000). Teacher-Assisted Classroom Instruction is a method in which the teacher will contact the suitable web site and collect more and recent information related to a topic and use it in the classroom teaching. Abstract ideas can be explained easily with 3D pictures, animation and Multimedia.

Many studies have concluded that Multimedia can improve the quality of achievement in many areas. Multimedia Package can bring significant difference in achievement of Biological Science (Anboucarassy,2010). Most of the Multimedia programmes for educational purpose create situations such that Students can interpret information for their own understanding (Kumar and Hebtemariam,2010). Multimedia based instruction is effective for improving achievement in Science among problem Students (Reddy, Ramar and Ponnambalam,2009). These results point to the fact that Multimedia has high significance and immense prospects in shaping the study involvement of students in the field of Science education. Students experiencing Academic Anxiety feel apprehensive over scholastic activities. Proper development of Instructional Package in Physics can be ensured by making students feel that Multimedia is an important object of instruction. This can be done only by means of an effective method of Instruction. A Multimedia Instructional Package is bound to have profound influence on the Academic Anxiety of students. Further, it could foster and motivate the students towards learning the subject.

The Investigators, both having long innings in the field of Teaching, felt that Secondary School Students have very little Academic Anxiety. Several researchers have developed various instructional strategies in Physics for Secondary School Students, but none was found that could reduce Academic Anxiety. So it was decided to develop a Teacher-Assisted Multimedia Instructional Package to augment Academic Anxiety of Secondary School Students. In the present study, a Teacher-Assisted Multimedia Instructional Package in Physics for Secondary School Students was developed and its effectiveness tested in reducing the Academic Anxiety of Secondary School Students of Kerala.

Hypothesis Of The Study:-

It was hypothesised that the Teacher-Assisted Multimedia Instructional Package will be significantly more effective than the Activity Oriented Method of Instruction in reducing Academic Anxiety of Secondary School Students for the Total sample as well as for their Gender Sub Samples.

Objective Of The Study:-

The objective of the study was to compare the effectiveness of the Teacher-Assisted Multimedia Instructional Package and that of the Activity Oriented Method of Instruction in reducing Academic Anxiety among Secondary School Students for the Total sample as well as for their Gender Sub Samples.

Methodology In Brief:-

The Quasi Experimental Method with the Pre-Test Post-Test Non Equivalent Groups Design was adopted for the present study. The Teacher-Assisted Multimedia Instructional Package and the Activity Oriented Method of Instruction were the independent variables while Academic Anxiety was the dependent variable of the study.

Experimental verification was imperative to determine the effectiveness of the Teacher-Assisted Multimedia Instructional Package over the Activity Oriented Method of Instruction on Academic Anxiety of Secondary School Students.

Random Sampling Technique was employed for gathering data giving due representation to Gender of students. The total sample comprised 400 Secondary School Students, with 200 each in the groups randomly assigned as the Experimental and Control Groups, from schools in Thrissur and Ernakulam Districts of Kerala.
The materials used for the experiment were:

1. Teacher-Assisted Multimedia Instructional Package(Jaise and Murali, 2011)
2. Lesson Plans based on Activity Oriented Method of Instruction (Jaise and Murali, 2011)

They were developed from three Units of the Physics Textbook of Standard VIII, viz. Magnetism, Static Electricity and Celestial Sights.
The tools used for the study were:

1. Evaluation Pro forma for Validating the Teacher-Assisted Multimedia Instructional Package (Jaise and Murali, 2011)
2. Academic Anxiety Scale for Children (Singh and Gupta, 2009)

The Academic Anxiety was initially administered to the Experimental and Control Groups in order to assess the Academic Anxiety of Secondary School Students. The scores obtained were taken as the Pre-Test scores. The Experimental Group was exposed to the Teacher-Assisted Multimedia Instructional Package while the Control Group was exposed to the Activity Oriented Method of Instruction. After experimental treatment, the Academic Anxiety Inventory was again administered on both Experimental and Control Groups. The scores obtained thus were considered as Post-Test scores.

The data gathered was then analysed using statistical techniques like Arithmetic Mean, Standard Deviation, Critical Ratio (Test of Significant Difference between Means), and Tests of Variance, viz. Analysis of Variance (ANOVA) as well as Analysis of Covariance (ANCOVA).

Findings And Discussions Of Results:-

A comparison was made of the effectiveness of the Teacher-Assisted Multimedia Instructional Package and the Activity Oriented Method of Instruction on the Academic Anxiety of Secondary School Students for the Total Sample as well as for both the Gender Groups. The Pre-Test, Post-Test and Gain scores in Academic Anxiety of the Total Sample as well as of both the Gender Sub Samples in the Experimental and Control Groups were computed and the data are given in Table 1.

Table 1:- Data for Pre-Test, Post-Test and Gain scores in Academic Anxiety of Total Sample and of Gender Sub Samples in Experimental and Control Groups

Samples	Groups		N	Pre-Test Scores			Post-Test Scores			Gain Scores		
				M	SD	t value	M	SD	t value	M	SD	t value
Total Sample	Experimental		200	13.98	2.46	0.59	7.49	1.59	22.29	6.49	2.27	25.73
	Control		200	13.83	2.61		11.97	2.34		1.86	1.13	
Gender Sub Samples	Boys	Experimental	98	14.56	1.96	0.49	7.89	1.71	16.67	6.58	1.86	21.73
		Control	87	14.41	2.15		12.59	2.01		1.82	0.83	
	Girls	Experimental	102	13.41	2.75	0.08	7.02	1.31	16.48	6.39	2.61	15.42
		Control	113	13.38	2.84		11.49	2.46		1.89	1.31	

From Table D, for df 198(Total), df 183(Boys) and df 213(Girls), $t_{0.01}$=2.59

Table 1 shows that the obtained 't' values with regard to the Pre-Test Scores in Academic Anxiety of the Total Sample, of the Boys, as well as of the Girls are 0.59, 0.49 and 0.08 respectively, which are not significant. From these results, it can be inferred that there is no significant difference between the Pre-Test scores of the Total Sample, of the Boys, as well as of the Girls in the Experimental and Control Groups before the Experiment. Since the Means and Standard Deviations of the Experimental and Control Groups are almost similar in value, it can be

concluded that the Total Sample as well as both the Gender Sub Samples of Secondary School Students are almost identical with regard to their Pre-Test scores in Academic Anxiety.

Table 1 also shows that the obtained 't' values with regard to the Post-Test Scores in Academic Anxiety of the Total Sample, of the Boys, as well as of the Girls are 22.29, 16.67 and 16.48 respectively, which are significant at 0.01 level. From these results, it can be inferred that there is significant difference between the Mean Post-Test scores of the Total Sample, of the Boys, as well as of the Girls in the Experimental and Control Groups after the Experiment. Since the Mean Post-Test scores of the Experimental Group (7.49, 7.89 and 7.02) are lesser than those of the Control Group (11.97, 12.59 and 11.49) for the Total Sample, for the Boys, and for the Girls respectively, it can be concluded that the Teacher-Assisted Multimedia Instructional Package is superior to the Activity Oriented Method of Instruction for the Total Sample as well as for their Gender Sub Samples.

From Table 1, the obtained 't' values with regard to the Gain Scores of the Total Sample, of the Boys, as well as of the Girls are 25.73, 21.74 and 15.42 respectively, which are significant at 0.01 level. From these results, it can be inferred that there is significant difference between the Mean Gain scores of the Total Sample, of the Boys, as well as of the Girls in the Experimental and Control Groups. Since the Mean Gain scores of the Experimental Group (6.49, 6.58 and 6.39) are greater than those of the Control Group (1.86, 1.82 and 1.89) for the Total Sample, for the Boys, and for the Girls respectively, it can be concluded that the Teacher-Assisted Multimedia Instructional Package is superior to the Activity Oriented Method of Instruction for the Total Sample as well as for their Gender Sub Samples.

The Tests of Variance were used to ascertain the genuineness of the difference in the obtained Scores. The Total Sum of Squares, Mean Square Variance and F-ratio for the Pre- and Post-Test scores of Experimental and Control Groups were computed for the Total Sample as well as for both the Gender Sub Samples and the details of Analysis of Variance are shown in Table 2.

Table 2:- Summary of ANOVA of Pre-Test (x) and Post-Test (y) Scores in Academic Anxiety of Total Sample and of Gender Sub Samples in Experimental and Control Groups

Samples		Source of Variation	df	SS_X	SS_Y	MS_x	MS_Y	F_X	F_Y
Total Sample		Among Means	1	2.10	2007.04	2.10	2007.04	0.33	5.02.45
		Within Groups	398	2561.09	1589.80	6.43	3.99		
		Total	399	2563.19	3596.84				
Gender Sub Samples	Boys	Among Means	1	1.00	982.88	1.00	982.88	0.24	285.11
		Within Groups	183	773.24	630.88	4.23	3.45		
		Total	184	774.24	1613.76				
	Girls	Among Means	1	0.05	1069.78	0.05	1069.78	0.01	267.38
		Within Groups	213	1669.34	852.19	7.84	4.00		
		Total	214	1669.39	1921.97				
Result:				F_X values are not significant F_Y values are significant at 0.01 level					

From Table F, for df 398 (Total), $F_{0.05} = 3.86$ and $F_{0.01} = 6.70$
From Table F, for df 184 (Boys) and 213 (Girls), $F_{0.05} = 3.89$ and $F_{0.01} = 6.76$

Table 2 shows that the obtained F_X values are 0.33, 0.24 and 0.01 for the Total Sample, for the Boys, and for the Girls respectively, all of which are less than the Table values and hence are not significant. This indicates that there is no significant difference between Pre-Test scores of the Total Sample, of the Boys and of the Girls, in the Experimental and Control Groups. The obtained F_Y values are 502.45, 285.11 and 267.38 for the Total Sample, for the Boys and for the Girls respectively, all of which are greater than the Table values and are significant at 0.01 level. The significant F_Y values indicate that the Experimental and the Control Groups differ significantly in the Post-Test scores of Academic Anxiety.

The Total Sum of Squares and Adjusted Mean Square Variance for Post-Test scores of Academic Anxiety for the Total Sample as well as for the Boys and the Girls are computed and the results of Analysis of Covariance are presented in Table 3.

Table 3:- Summary of ANCOVA of Pre-Test (x) and Post-Test (y) Scores in Academic Anxiety of Total Sample and of Gender Sub Samples in Experimental and Control Groups

Samples		Source of Variation	df	SS_X	SS_Y	SS_{XY}	SS_{YX}	MS_{YX}	SD_{YX}	F_{YX}
Total Sample		Among Means	1	2.10	2007.04	-64.96	2078.97	2078.97	1.40	1055.55
		Within Groups	397	2561.09	1589.80	1438.43	781.91	1.97		
		Total	398	2563.19	3596.84	1373.47	2860.88			
Gender Sub Samples	Boys	Among Means	1	1.00	982.88	-31.38	1023.02	1023.02	1.28	620.07
		Within Groups	182	773.24	630.88	505.61	300.27	1.65		
		Total	183	774.24	1613.76	474.23		1323.29		
	Girls	Among Means	1	0.05	1069.78	-7.48	1077.12	1077.12	1.45	509.51
		Within Groups	213	1669.34	852.19	821.25	448.17	2.11		
		Total	214	1669.39	1921.97	813.77		1525.29		
Result:		All the F_{YX} values are significant at 0.01 level								

From Table F, for df 397(Total), $F_{0.01} = 6.70$; df 183(Boys), $F_{0.01} = 6.76$ and for df 212(Girls), $F_{0.01} = 6.72$

Table 3 shows that the obtained F_{YX} values for the Total Sample, for the Boys and for the Girls are 1055.55, 620.07 and 509.51 respectively, all of which are greater than the Table values, and hence the differences between the two Groups are significant at 0.01 level for the Total Sample as well as for their Gender Sub Samples.

From the results of ANCOVA pertaining to Academic Anxiety of the Total Sample as well as of both the Gender Sub Samples, the significant F-ratios for the Adjusted Post-Test scores show that the scores of students in the Experimental Group and in the Control Group differ significantly after they have been Adjusted for Differences in the Pre-Test scores. The significant F-ratios necessitate that the differences be tested separately by the calculation of Adjusted Mean scores (t-test). The Adjusted Means for the Post-Test scores of Total Sample as well as of their Gender Sub Samples in the Experimental and Control Groups were computed and the data are given in Table 4.

Table 4:- Data for Adjusted Means of Post-Test Scores in Academic Anxiety of Total Sample and of Gender Sub Samples in Experimental and Control Groups

Samples		Groups	N	M_X	M_Y	Adjusted Mean	't' value	P
Total Sample		Experimental	200	13.98	7.49	7.45	32.57	P < 0.01
		Control	200	13.83	11.97	12.01		
Gender Sub Samples	Boys	Experimental	98	14.56	7.98	7.93	24.79	P < 0.01
		Control	87	14.41	12.59	12.64		
	Girls	Experimental	102	13.41	7.02	7.01	22.40	P < 0.01
		Control	113	13.38	11.48	11.49		
Result:		All the 't' values are significant at 0.01 level						

From Table D, for df 397(Total), $t_{0.01} = 2.59$. df 182(Boys), $t_{0.01} = 2.60$ and df 212(Girls), $t_{0.01} = 2.59$

From Table 4, it can be seen that the 't' values obtained are 32.57, 24.79 and 22.40 respectively for the Total Sample as well as for the Boys and for the Girls, all of which are significant at 0.01 level. The results of Adjusted Means pertaining to Academic Anxiety for the Total Sample as well as for the Boys and the Girls in the Experimental Groups (7.45, 7.93 and 7.01 respectively) are lesser than those of the Control Groups (12.01, 12.64 and 11.49 respectively). This points to the fact that students in the Control Group are superior to those in the Experimental Group with regard to Academic Anxiety for the Total Sample as well as for both the Gender Sub Samples. It may therefore be inferred that the students who were exposed to the Teacher-Assisted Multimedia Instructional Package have reduced their Academic Anxiety as compared to those who were exposed to the Activity Oriented Method of Instruction. In other words, the Teacher-Assisted Multimedia Instructional Package is more effective than the Activity Oriented Method of Instruction in reducing Academic Anxiety among Secondary School Students for the Total Sample as well as for both the Gender Sub Samples.

Conclusion:-

The above results show that there is significant difference in Academic Anxiety with regard to the Total Sample as well as both the Gender Sub Samples of Secondary School Students in the Experimental Group. Those students who were exposed to the Teacher-Assisted Multimedia Instructional Package show reduced Academic Anxiety as compared to those who were exposed to the Activity Oriented Method of Instruction. Thus the present study revealed that the Teacher-Assisted Multimedia Instructional Package developed for the study is very effective in reducing Academic Anxiety among Secondary School Students. The above findings could be because the Teacher-Assisted Multimedia Instructional Package may have made the process oriented teaching-learning more dynamic by the presentation of different pictures and videos. This must have supported the clarification and communication of ideas, which in turn could have reduced the Academic Anxiety of the students. These findings are supported by the research studies of Abbas (2012), Mahato and Jangir (2012) as well as Afolayan, Donald, Onasoga, Babafemi and Juan (2013).

Educational Implications Of The Study:-

The findings of the study have certain educational implications that are outlined below:

- Instructional Packages based on Multimedia will help students to be aware of the changes in education arising from technological advances which in turn will go a long way in positively influencing their Academic Anxiety.
- Digital content that is meaningful, culturally responsive and has high quality must be made available for use of both teachers and students. This will have high prospects for influencing the Academic Anxiety of students.
- Multimedia Instructional Packages enables learning through exploration, discovery and experience.
- Multimedia Instructional Package help the teachers to combat anxiety everyday in the classroom.
- Multimedia Instructional Packages will help to turn Teacher-centred lessons into Student-centred ones. Such a shift in focus is likely to bring about a vast change in the Academic Anxiety of students.
- Multimedia Instructional Package will help the process of learning to be more goal oriented and participatory.
- The Teacher-Assisted Multimedia Instructional Package provides a successful platform to convey concepts effectively and help the students to reduce their Academic Anxiety.
- Innovative Multimedia based instructional strategies and materials should be provided among Secondary School teachers. They should be encouraged to use Multimedia in their teaching.
- In service and refresher courses should be organized for Secondary School teachers in order to familiarize them with the new trends and patterns of Multimedia with a view to draw out more involvement of students in studies.

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