



IMPACT OF LOW COST TEACHING AIDS IN TEACHING SCIENCE

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Abstract

The aim of this study was to find out the effectiveness of Low Cost Teaching Aids in Teaching Science. The sample consisted of 40 students in Control group and 40 students in Experimental group. The data were collected using appropriate tools and it was analyzed by t' and F' test. The finding is that the achievement scores of Experimental group Students were higher than the Control group Students.

INTRODUCTION

Modern world is witnessing most revolutionary changes in science and technology. The meaning of education is given as bringing up or leading out or making manifest the inherent potentialities in a pupil. John Dewey speaking of education as that reconstruction or organization of experience which adds to the meaning of experience and which increases ability to direct the course of subsequent experience. Education proceeds from birth to death and the school is not the only agency that imparts education. Though the school exerts greater influence in educating the child, other social agencies like home, religion, press, radio, library, television etc, supplement its work. Education lays emphasis on the inculcation and fostering of scientific spirit, knowledge of scientific principles and factor and also framing scientific methods.

Low Cost Teaching Aids

Low cost teaching aid refers to aid prepared with simple materials costing very little by involving teacher and student. In expensive aid could be prepared easily with little or no money to make learning effective, comprehensive and fascinating. The science teacher with a certain amount of skill and enthusiasm can replace many pieces of apparatus by an adequate if unconventional, improvised substitutes. Low cost teaching aids have an advantage of offering learning by doing approach to the teaching learning process. When teachers and students plan, produce or create their own educational materials, they invariably manifest pride and pleasure in utilizing them to the maximum. Effective science teaching depends on three factors, teacher, equipments and materials. Locally produced low cost equipment, teaching aids or models can serve the needs of the teacher, the student and the curriculum more effectively and is easier to maintain.

Developing Low Cost Teaching Aids

Main task of the teacher is to develop low cost teaching aids by using locally available materials. The teacher should be the active participant in preparing the low cost teaching aids. Teacher by himself or with the help of students may carry out the process.

To design the effective low cost teaching aid, teacher should have thorough knowledge of the objectives and science concepts. The teachers should have adequate knowledge to provide learning experiences, locally available resources and environmental conditions.

To enhance the learning process, the science teachers who have real interest in the field prepare their own teaching aids with the help of available resources. By sufficient encouragement from the superiors, parents and the community, the quality and effectiveness of these low cost teaching aids may be improved.

Effective Design of Low Cost Teaching Aids

The following basic principles may be used while preparing low cost teaching aids.

- The concept should be explained accurately, and in a simple way, so that all the students can understand the situation.

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- It must attract attention and promote sharp thinking.
- The low cost teaching aids must be very simple and easy to handle.
- Much money can be saved and some complexities of sophisticated appliances avoided.

Advantages of Low Cost Teaching Aids

Improvisation and experimentation play a major role in the success of science teaching.

- It helps to have more knowledge and understanding
- Improvisation makes science doing instead of talking
- It promotes pupils maximum participation in the learning process
- Improvisation ensures longer retention of the information gained
- It provides firsthand experience in a variety of ways
- Develops scientific attitude in children
- Cultivates research mindedness in children
- Promotes interaction between teachers and students
- Promotes interaction among students
- Improvisation generally add an interest and involvement in the lesson
- Encourage co-operative attitude in children
- Develops self confidence of pupils
- Helps the students to make use of their leisure time
- Helps the school to become self sufficient
- With the help of the improvised aids the presentation of the content will also be attractive and stimulating
- It also facilitates the propagation of new curricular ideas
- It helps to improve efficiency
- It accelerates the rate of learning and increases the span of retention
- Learning experiences appending to the senses are far more effective than abstract learning experiences.

Need and Significance of the Study

The study deals with the low cost teaching aids and its importance to teach science concepts in the present situation at secondary level. Since most of the secondary schools are situated in rural areas, they are not able to procure the needed equipments. Another factor is secondary schools suffer for want of adequate funds to procure teaching aids. Teachers should realize the present situation and they must encourage the children to college the resources available in the immediate environment to prepare the teaching aids. If the science concepts are taught with the help of teaching aids children remember these concepts for a long time.

In India money spent for education is very meager, so it is very difficult to supply sophisticated scientific equipment to all the school laboratories. Hence the study may be useful to make awareness on utilization of local resources to prepare low cost teaching aids. Scientific principles can be taught more effectively only with the use of teaching aids and apparatus. To create interest in teaching learning process low



cost teaching aids can be used. Real learning takes place only when the students observe the experiments or when they perform the actual experiment. This is impossible in our country due to lack of facilities.

Before the preparation of aids it is important to understand how to explain the concepts. Teachers should know how to prepare, use and evaluate the low cost teaching aids; so that their classroom interaction becomes meaningful. In service training should be given to the teachers in this field. By considering all the above needs and importance, the investigator felt this study may be very useful one at present.

OBJECTIVES FOR THE STUDY

1. To identify the locally available resources that are available in that particular area related to the selected science subject for secondary students.
2. To plan and develop suitable low cost teaching aids for science teaching at secondary level.
3. To find out whether there is any significant difference between the students' achievement scores in science of the control group and experimental group at Pre - test level.
4. To find out whether there is any significant difference between the students' achievement scores in science of the control group and experimental group at Post - test level.
5. To find out whether there is any significant difference among groups taught through Low Cost Teaching Aids on the achievement in science with respect to students classified on the basis of
 - i. Gender
 - ii. Locality of the students
 - iii. Father's Educational Qualification
 - iv. Father's Occupation
 - v. Residence of the Students

HYPOTHESES FOR THE STUDY

1. There is no significant difference between the students' achievement scores in science of the control group and experimental group at Pre-test level.
2. There is no significant difference between the students' achievement scores in science of control group and experimental group at Post-test level.
3. There is no significant difference among groups taught through Low Cost Teaching Aids on the achievement in science with respect to students classified on the basis of
 - i. Gender
 - ii. Locality of the students
 - iii. Father's Educational Qualification
 - iv. Father's Occupation
 - v. Residence of the Students

METHODOLOGY

In this study, the primary aim of the investigator is to study the effectiveness of low cost teaching aids of IX standard at secondary level. The study has control groups and experimental group. The control group was taught the selected science subject in traditional method, where as for the experimental group the selected science subject were taught with the help of low cost teaching aids. These groups were selected from the students at secondary level in S.U.M. Hr. Sec. School, Royappanpatti, Theni. By using t' test and F test, the



effectiveness were measured and the better performance in test scores were considered as impact of the low cost teaching aids.

Sample for the Study:

On the basis of the first midterm science marks, 80 students were selected from IX standard in S.U.M. Hr. Sec. School, Royappanpatti, Theni.

Statistical Techniques Used:

Statistical techniques serve the fundamental purpose of the description and inferential analysis. The following statistical technique was used in the study.

- t' test was applied to analyze the differential hypothesis.
- F - test was used to find out the significance of relationship between the Sub-group variables.

ANALYSIS AND INTERPRETATION OF THE DATA

The following table furnishes the data on the Post-Test performance of the Control and Experimental groups and also furnishes the significance of difference between the achievement scores of students in various groups in detail.

The t' value was computed to find out the significance of difference between the Pre-test achievement scores of the Control and Experimental group. Table 1 gives the details.

Table 1. ' Test for Achievement Scores of the Control and Experimental Group at Pre-test Level

Variable	N	Mean	S.D.	t' Test	Level of Significant
Control	40	1.75	0.84	0.33	Not Significant at 0.05 level
Experimental	40	1.7	0.46		

The calculated t' value 0.33 is very much lesser than the critical value 1.99 at 0.05 level of significant. This implies that the difference in the achievement scores of Control and Experimental Group is not significant at pre-test level in teaching science.

The t' value was computed to find out the significance of difference between the Post-test achievement scores of the Control and Experimental group. Table 2 gives the details.

Table 2. t' Test for Achievement Scores of the Control and Experimental Group at Post-test Level

Variable	N	Mean	S.D.	t' Test	Level of Significant
Control	40	12.6	1.03	12.2	Not Significant at 0.05 level
Experimental	40	16.8	1.92		

The calculated t' value 12.2 is greater than the critical value 1.99 at 0.05 level of significant. This shows that the difference in the achievement scores of Control and Experimental Group is significant at post-test level in teaching science.

The t' value was computed to find out the significance of difference between the achievement scores of Boys and Girls. Table 3 gives the details.



Table 3. t' Test for Achievement Scores of Boys and Girls at Post-test Level

Variable	N	Mean	S.D.	t' Test	Level of Significant
Boys	24	16.5	2.2	1.3	Not Significant at 0.05 level
Girls	16	17.3	1.4		

The calculated t' value 1.3 is lesser than the Critical value 2.02 at 0.05 level of significant. This indicates that the difference in the achievement scores of Boys and Girls is not significant at post-test level in teaching science.

The t' value was computed to find out the significance of difference between the achievement scores of Rural and Urban area Student. Table 4 gives the details.

Table 4. ' Test for Achievement Scores of Rural and Urban Area Students at Post-test Level

Variable	N	Mean	S.D.	t' Test	Level of Significant
Rural	17	15.7	0.91	4.02	Significant at 0.05 level
Urban	23	17.5	2.05		

The calculated t' value 4.02 is greater than the Critical value 2.02 at 0.05 level of significant. The achievement scores of Urban Area Students is higher than the Rural Area Students. So this implies that the difference in the achievement scores of Rural and Urban Area Students is significant at post-test level in teaching science.

The F' value was computed to find out significant relationship between the achievement scores of the Student of various groups, based on their Father's Educational Qualifications. Table 5 presents the details.

Table 5. F' Test for Achievement Scores of Students with Reference to Father's Educational Qualification at Post-test Level

Variable	Categories	Sum of Squares	df.	Mean	F	Level of Significant
Father's Educational Qualification	Between Groups	7.275	2	3.638	0.986	Not Significant at 0.05 level
	Within Groups	136.500	37	3.689		
	Total	143.775	39			

The calculated F value 0.986 is lesser than the Critical value 3.23 at 0.05 level of significant. It implies that the difference in the achievement scores under consideration is not significant. Therefore, it is concluded that there is no significant relationship between the achievement scores of the Student of various groups, based on their Father's Educational Qualifications.

The F' value was computed to find out significant relationship between the achievement scores of the Student of various groups, based on their Father's Occupation. Table 6 presents the details.

Table 6. F' Test for Achievement Scores of Students with Reference to Father's Occupation at Post-test Level

Variable	Categories	Sum of Squares	df.	Mean	F	Level of Significant
Father's Occupation	Between Groups	6.053	3	2.018	0.527	Not Significant at 0.05 level
	Within Groups	137.722	36	3.836		
	Total	143.775	39			



The calculated F value 0.527 is lesser than the Critical value 2.84 at 0.05 level of significant. It indicates that the difference in the achievement scores under consideration is not significant. Therefore, it is concluded that there is no significant relationship between the achievement scores of the Student of various groups, based on their Father's Occupation.

The t' value was computed to find out the significance of difference between the achievement scores of Hosteller and Day Scholar Student. Table 7 gives the details.

Table 7. t' Test for Achievement Scores of Hosteller and Day Scholar Students at Post-test Level

Variable	N	Mean	S.D.	t' Test	Level of Significant
Hosteller	12	17.25	2.09	0.92	Not Significant at 0.05 level
Day Scholar	28	16.4	1.85		

The calculated t' value 0.92 is lesser than the Critical value 2.02 at 0.05 level of significant. This indicates that the difference in the achievement scores under consideration is not significant. Therefore, it is concluded that Hosteller and Day Scholar students are not significant.

FINDINGS

The major finding of the study reveals that Experimental method of teaching more effective than the Traditional method in teaching science. In other words teaching science by using Low Cost Teaching Aids is more effective. There is no significant difference between the Control group and Experimental group in the pre-test. But in the post-test the Experimental group performed better than the Control group.

CONCLUSION

As India is economically a backward country, teachers should implant a healthy outlook towards the use of low cost teaching aids. Science teachers should encourage their students to make the low cost teaching aids with help of locally available resources. The pupils should be given a very clear picture of the resources available in the locality. Attempts can even be made to allot a separate period of the preparation of the aids. Teachers should as far as possible, make use of the low cost teaching aids rather than sophisticated ones, while they demonstrate or teach lessons.

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