

Effect Of Activity-Based Physical Science Teaching Upon Students At Secondary Level And Experimental Study

Sujit Samanta

Assistant Professor,
Vidyasagar Teacher's Training College,
Medinipur, Paschim Medinipur, West Bengal, India

Abstract: *This Study aimed at finding out the effects of Activity Based Method (ABM) of teaching on student's achievement in physical science. The study is experimental. The target population comprised of class X students of Lakshipari High School of Paschim Medinipur District. The students were taught the same topic of "Nature & uses of Normal salt and cupric sulphate". The Students are divided into two equivalent groups (experimental and control). In the experimental groups ABM was used while Traditional Lecture method (TLM) was used in the control group. The instrument used in the study was Physical Science Achievement Test (PAT) to measure student's achievement. Data was analysed using mean, SD & t-test. The results of the Study Show that ABM of teaching resulted in higher achievement in comparison to TLM of teaching.*

Keywords: *Activity Based Method (ABM), Traditional Lecture method (TLM), experimental and control, Achievement Test and t-test*

I. INTRODUCTION

Activities incorporated in lesson proved to be an effective tool in an educational environment. We used activities to follow up lessons in physical science. We included activities that reinforced presentation, team-building skills during a physical science class. We used simple materials such as test-tube, papers, normal salt, cupric sulphates, litmus paper, silver nitrate solution, ammonium hydroxide solution etc. to emphasize the concept to be delivered during the lesson. We observed the students participated with enthusiasm and even contributed to new activities, thus adding sparkle and liveliness to the teaching-learning atmosphere. Our aim focused on ways to improve the self-confidence of students who are in the developmental stages of learning.

II. REVIEW OF LITERATURE

Breddereman, T. (1983) study, meta-analysis techniques were used to synthesize research on the effectiveness of activity-based elementary science program.

Desai, R. M. (1986) studies the effectiveness of programmed learning strategy in teaching physical science in eleventh grade.

Agnihotri, S. K. (1987) studies the influence on some the methods of teaching physical science on achievement in physics of class X students in Delhi.

Raman, J.(1989) work on impact of remedial teaching programmers for common errors committed by students of standard XI in calculus.

Gangopadhyay, T. K. (1991) undertook an experimental study of the effectiveness of classroom teaching techniques in relation to students' achievement

Vineeta, M. (1991) developed textual in biology for class IX, using Bruner's Concept Attainment Model of Teaching.

Nazim, A. (1992) conducted a study on chemistry achievement and science attitude of Indian Students,

stemming from lecture-demonstration and small group laboratory teaching methods.

Reddy, G. L. And Ramar, R. (1995) conducted on effectiveness of multimedia based modular approach in teaching mathematics to low achievers.

Rajan, K. M. (1996) conducted a comparative study of three methods of presenting analogies in chemistry.

Datta, S. (1998) studies an investigation into modification of teaching behaviour of upper primary science teacher through verbal interaction analysis feedback and its effect on scholastic achievement of pupil studying in class VIII of south Delhi schools.

Thornton, R. K. (1999) reported that traditional science instruction in the United States, refined by decades of work, has been shown to be largely ineffective in altering student understandings of the physical world.

Mallick, R. R. (2000) conducted a study on the effectiveness of individually guided system of instruction for mastery learning in physical science at class VIII students.

Lakshmi, E.V.A. (2005) studied a variety of interactive activities designed based on social constructivist principles had stimulated interest and involvement in the learning process with the positive outcome of seeing students actively participating in the construction of their own knowledge rather than being passive learners.

Kiyoyuki, O. (2006) research aimed to find out the effectiveness of activity-based materials on students' learning process using the project WILD which is an environmental education program focused on wildlife.

Sola, A. O. And Ojo, O. E. (2007) assessed and compared the relative effectiveness of three methods for teaching and conducting experiments in separation of mixtures in chemistry.

Wambugu, P. W. And Changeiywo, J. M. (2008) conducted a study aimed at finding out the effect of Mastery Learning Approach (MLA) on students' achievement in physics.

Agboghroma, T. E. (2009) examines the interaction effects of instructional mode and school setting on students' knowledge of integrated science.

Gok, T. and Silay, I. (2010) study was to examine the effects of teaching of the problem solving strategies on the students' physics achievement, strategy level, attitude and achievement motivation.

Hence, we see that all the studies reported above were conducted in different subject either to verify the effectiveness of the various methods or to find out the gaps. Some of the researcher although tried to prove the effectiveness of activity-based teaching method but no one conduct the study on the effectiveness of activity-based method of teaching experimentally. So we want to study the effect of Activity-Based Physical Science teaching experimentally.

III. EXPERIMENTAL STUDY

A. INTRODUCTION

The science teacher has a challenging job of actively involving his students, so that nature of science pervades the

instruction. Science as a body of knowledge, a way of investigating and as a way of thinking should be stressed in science teaching activities-projects, demonstration, assignments and others. Science teaching activities provide an opportunity to involve students, so that all the three aspect of science can be covered. For this reason, I tried to develop activity-based method of teaching and investigate its effectiveness under classroom environment.

B. OBJECTIVE OF THE STUDY

The specific objective of the study was to compare the achievement in physical science of secondary level students' by using activity-based method with that of students taught through traditional lecture method.

C. NULL HYPOTHESIS

H_{01} : There is a no significant difference between traditional lecture method and activity-based method of teaching in the achievement of students in physical science at secondary level.

D. ALTERNATIVE HYPOTHESIS

H_1 : Activity-based method of teaching has a more significant impact on students achievement compared with traditional lecture method of teaching.

E. VARIABLES

The study was experimental. In this study the following variables were identified to verify the hypothesis.

INDEPENDENT VARIABLES: Teaching Learning Process (Activity based method & Traditional lecture method)

DEPENDENT VARIABLES: Learning outcome of students (i.e., Achievement in Physical science).

F. RESEARCH DESIGN

In this experimental study the students are divided into two pre-selected equivalent group (experimental and control group) of class-x. In the experimental groups Activity-Based Method (ABM) of teaching was used while Traditional Lecture Method (TLM) of teaching was used in the control group. Then a well-structured achievement test on the selected topic of physical science will be administered on both the group and their achievement on the test will be analysed.

G. SAMPLING PROCEDURE

Considering the objectives one Higher Secondary school of Paschim Medinipur district was selected randomly for the study.

H. SAMPLE SIZE

A Bengali medium school, Lakshipari High School (H.S), Paschim Medinipur has been chosen for sampling. In the school two sections of class ten (XA & XB) were selected for

this purpose, which have almost same achievement level (equivalent group) according to their performance in the fourth unit test. Here section A (XA) was considered as the experimental group and the section B (XB) as the control group.

Number of students for experimental group (XA) = 59

Number of students for experimental group (XA) = 63

H. ADMINISTERING THE ACHIEVEMENT TEST

After the discussion, in both the control and experimental groups, an achievement test was administered. The achievement test was same for both the groups. The achievement test was a question containing ten multiple type question, five fill in the blank question and five very short answer type question.

I. DATA COLLECTION

The scores of students of both the group in the achievement test are collected and analysed by statistical procedure.

J. DATA ANALYSIS

With the collected data mean, SD and t-test was done. With the help of t-test the differences in achievement of students of both the groups (the control and experimental group) were analysed.

K. RESULTS

The results of the collected data in the following table:

No. Of Student		Mean	Standard Deviation(σ)	Degree of freedom	t-score
Experimental Group(XA)	59	12.03	2.52	120	4.34
Control Group (XB)	63	10.11	2.32		

Here degree of freedom=59+63-2=120

T-TEST

The following null hypothesis was tested by t-test in this study at significance of 1% level.

H_0 : There is a no significant difference between traditional lecture method and activity based method of teaching in the achievement of students in physical science at secondary level.

The critical value of t-score at 1% level for 120 degree of freedom is 2.62 (taken from t-table) and the observed value is 4.34, which is higher than the critical value. Therefore the null hypothesis rejected and alternative hypothesis is accepted. Hence, there is statistically significant difference between traditional lecture method and activity based method of teaching in the achievement of students in physical science at secondary level. Therefore we may conclude that in our study there is a positive effectiveness of the activity based method of

teaching on the achievement in the physical science of class-X students.

IV. DISCUSSION

Based on the results of this study it can be commented that activity based teaching method can facilitates students learning in physical science better as compared to traditional lecture method. This study offers evidence that activity based teaching method can increase the achievement. Since achievement is important in the student learning process, physical science teachers should be encouraged to use activity based teaching method in order to improve performance in teaching physical science. The achievement of students taught through activity based teaching method was able to get higher scores compared to those taught using traditional lecture method. This means therefore that there is a likelihood of improvement in performance in physical science if this method is implemented in the six years of the secondary school cycle. The features of activity based method suggest that it can be easily implemented in the existing school setting. However it should be realised that time needed to develop the materials is considerable and that the development of learning objectives along with corresponding formative tests and corrective activities is an enormous burden on the teachers.

V. CONCLUSION

Based on the result of this study it can be concluded that activity based method of teaching facilitates students learning in physical science better as compared to traditional lecture method of teaching.

REFERENCES

- [1] Agboghroma, T. E. (2009), Interaction Effects of Instruction Mode and School Setting on Students' Knowledge of Integrated Science, "International journal of Scientific research in Education", December 2009, vol. 2(2), 67-75
- [2] Agnihotri, S. K., (1987), Study of influence of some of the methods of teaching physics on the achievement in physics of class X students in Delhi "Fourth Survey of research in education" (1983-88); N.C.E.R.T., New Delhi, p-719
- [3] Bedderman, T. (1983) Effect of Activity-based Elementary Science on student outcomes: A Quantitative Synthesis, "Review of Educational Research" Winter, 1983. Vol. 53 No.4, Pp. 499-518.
- [4] Breddermen, T. (1984), The influence of activity-based elementary science programs on classroom practices: A quantitative synthesis, journal of Research in Science Teaching, Vol. 21 Issues 3, Pages 289-303.
- [5] Datta, S. (1998), An investigation into modification of teaching behaviour of upper primary science teacher through verbal interaction analysis feedback. "Indian Education Abstract Jan"; 1998, P-37

- [6] Desai, R. M. (1986), A study of effectiveness of programmed learning strategy in teaching of physics in the eleventh grade, "Fourth Survey of Research in Education" (1983-88); N.C.E.R.T., New Delhi, p-778.
- [7] Gangopadhyay, T. K. (1991), An experimental study of the effectiveness of classroom teaching techniques in the relation to student achievement, "Fourth Survey of Research in Education" (1988-92); N.C.E.R.T., New Delhi, p-1407.
- [8] Gok, T. and Silay, L. (2010), The effect of problem solving strategies on students' Achievement, Attitude and Motivation, "Latin-American Journal of Physics Education" Vol.4, No. 1, P7-21
- [9] Kiyoyuki, O. (2006) The Effect of Activity-Based Teaching Materials on "Human and Nature" in science Field II at Junior High School: Practical Research Using the Environmental Education Program "Project WILD". "Japanese Journal of Biological Education", VOL, 45; NO. 3; 70-180.
- [10] Lakshmi, E. V. A. (2005), Activity-based teaching for effective learning, "ITE Teachers' conference" 2005.
- [11] Mallick, R.R., (2000), A study on the effectiveness of Individually Guided system of Instruction for mastery learning in physical science. Ph.D. Thesis, Visva-Bharati.
- [12] Narain, A.,(1992) Chemistry achievement and science attitude of Indian students, stemming from lecture-demonstration and small group laboratory teaching methods,"Fifth Survey of Research in Education" (1988-92); N.C.E.R.T., New Delhi, p-1421.
- [13] Rajan, K. M.,(1996), A comparative Study of three methods of presenting analogies in chemistry. "Perspective in Education"; vol. 12(4), P215-230
- [14] Raman, J., (1989), Impact of remedial teaching programmes for the common errors committed by students XI in calculus, "Fifth Survey of Research in Education" (1988-92); N.C.E.R.T., New Delhi, p-1289.
- [15] Reddy, G. L. And Ramar, R., (1995), Effectiveness of multimedia based modular approach in teaching mathematics and science to achievers, "Journal of Higher Education"; vol. XVIII (2); p-283-288.
- [16] Sola, A. O. and Ojo, O. E. (2007), Effects of project, inquiry and lecture-demonstration teaching methods on senior secondary students' achievement in separation of mixtures practical test, Educational Research and Review vol. 2 (6),p124-132, June 2007.
- [17] Thornton, R. K. (1999), Using the Results of Research in Science Education to improve Science Learning, International conference on science Education, Nicosia, Cyprus, Jan., 1999.
- [18] Vineeta, M., (1991), Development of textual material in biology for class IX using Bruner's Concept Attainment Model of teaching, "Fifth Survey of Research in Education" (1988-92); N.C.E.R.T., New Delhi, p-1418.
- [19] Wambugu, P. W. And Changeiywo, J. M. (2008), Effects of Mastery Learning Approach on Secondary School students' physics achievement, "Eurasia Journal of Mathematics, science & Technology Education"; 2008, 4(3), P-293-302.