Effect of Activity Based Teaching on Retention of Science Achievement of Elementary School Students

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Abstract

This experimental study determined the effectiveness of activity based teaching in retaining the achievement in science. In the present study, pre-test, post test equivalent group design was employed. It involved two groups of students (one experimental and one control). Experimental group was exposed to activity based teaching method and the control group was confined to the conventional method. The design comprised of five stages. The first stage involved matching of one-to-one subject on the basis of previous science test scores obtained from the school record. The second stage includes pre testing of student's attitude of both the groups. The third stage involved treatment in the experimental group for eight weeks. The experimental treatment consisted of teaching four chapters of Science through activity based teaching. In the fourth stage the students of both the groups were post tested on science achievement. In the fifth stage the students of both the groups were again retested after a lapse of 15 days of the experimentation. Random sampling was used to assign the groups. Both the groups were equated on mental ability on the basis of previous science test scores of the school. After equating the groups 25 students of each group were taken as sample. Result indicated that the students who were taught through activity based teaching had shown significant improvement in their retention of science achievement than students who were taught through the conventional method. Students taught through activity based method showed gender neutrality on retention of science achievement.

Keywords: Effectiveness, activity based teaching, science achievement retention.

Introduction

Science has been playing truly liberating role by assisting people to get rid of the vicious circle of poverty, ignorance and superstition. In a democratic political framework, the possible aberrations and misuse of science can be checked by the people themselves. Science, blended with wisdom has led to the welfare of mankind. Science helps to develop a rational mind and thus helps the human society constructively

Science a practical body of knowledge needs to be transmitted properly to the learner in order to bring about desirable changes in behavior related to cognitive, conative and affective domain. Science teacher is no longer perceived as a purveyor of scientific information rather is considered as facilitator, provider of experiences so that the child could construct his/her own knowledge that will be long lasting and practically usable. On teaching science Indian Education Commission report (1966) has said "If science is poorly taught and badly learned it is little more than burdening the mind with dead information and it could degenerate even into a new superstition". Science has to be imbibed by the child and that should continue to be within him throughout his life.

According to Piaget (1958) for better cognitive development children should be engaged in activities. Children need more context specific activities by which teaching learning can be more joyful and active which will ultimately lead to a positive attitude towards science.

Activity based teaching

Various methods have been designed for effective science teaching. One of these methods is activity method. Activity-based learning describes a range of pedagogical approaches to teaching. Its core premises include the requirement that learning should be based on doing some hands-on experiments and activities. The idea of activity-based learning is rooted in the common notion that children are active learners rather than passive recipients of information. If child is provided the opportunity to explore by his own and provided an optimum

learning environment then the learning becomes joyful and long-lasting. Activity method is proving to be fruitful to enhance learning as well as attitude of learner towards science. This method is gaining ground as a very practical and relevant method in science teaching learning process. It is a learner oriented approach and learning takes place due to active involvement of the child. In this method classroom teaching is designed looking to the need, interest, abilities development level and socio-cultural background of the child.
Emphasizing the activity method of teaching science National Curriculum Framework (2005) states "At upper primary stage the child should be engaged in learning principles of science through familiar experiences, working with hands to design simple technological unit and modules and continuing to learn more about environment and health through activities and surveys. Scientific concepts are to be arrived at mainly from activities and experiments. Science content at this stage is not to be regarded as a diluted version of secondary school science. Group activities discussion with peer and teachers, surveys, organization of data and their display through exhibition etc in school and neighborhood are to be an important component of pedagogy.

Retention of Science Achievement

Science education in Indian schools has deviated much from its direction. It is criticized as it is largely bookish and theoretical. Science discipline which intended to develop higher mental abilities in students, has been given the same status as that of other disciplines with regard to method of teaching. Even the best schools carry out science education on traditional lines. Teachers evaluate students' performance by using conventional instruments which measure mostly their ability to memorize and to comprehend the information provided.
Looking at the complex scenario of science education in India, three issues stand out clearly. First, science education is still far from achieving the goal of enquiry enshrined in our constitution. Second, science education in Indian even at its best develops competence but does not encourage inventiveness and creativity. Third the overpowering examination system is basic to most, if not all the fundamental problems of science education in India.
For any qualitative change from the present situation, science education in India must undergo a paradigm shift. Rote learning should be discouraged. Inquiry skills should be supported and strengthened by language, design and quantitative skills. Schools should place much greater emphasis on co-curricular activities aimed at stimulating investigative ability, inventiveness and creativity, even if these are not part of the external examination system.
Achievement in science means pupils learning outcome in science in terms of acquisition of knowledge, understanding and skills of the particular topics taught in class. Achievement according to the dictionary of psychology is a specified level of attainment or proficiency in academic work as evaluated by teachers, by standardized test or by combination of both. Every education program aims at achieving some goal. Students learn to achieve something. Achievement in school situation depends on the methods by which knowledge is being imparted. Researches show that method of teaching influence the achievement level. Agrawal and Gupta (2006) have found out that activity based instruction material has enhanced the achievement of elementary students. Achievement of a child should be in such a way that it is retained by the learner for a considerable length of time. Achievement in examination sometimes may not be the true indicator of achievement as child tends to lose that information or knowledge in a short duration. So retention of achievement is of utmost importance in terms of achievement.

Significance of the study

Education and particularly school education finally looks for the achievement. Science education also looks forward for the achievement in science of the students. Method of teaching has a great say in the achievement in science. When science is taught in an experiential way definitely students take interest and the learning becomes enduring and so has an effect on the achievement and its retention.
The classroom transaction must be suitable, interesting, and involving to develop a positive attitude to learning. Activities in and outside classroom really gives a firsthand information and practical approach to learning which develops a sense of belongingness and joy. This inculcates a feeling that anything can be learnt and utilized in real life situation. Science which many students find difficult in a 'cook book' approach of teaching becomes really interesting and appealing when students are actively involved in the processes of

science. Children feel sense of freedom and come closer to the content and thus develop interest in science which further helps in science achievement and its retention.
Keeping in mind that well planned activities in teaching science will induce a positive interest among elementary school students in science which will make science learning easy and enduring the study "Effect of Activity based Teaching on Retention of Science Achievement" was conducted.

Objectives of the Study
(i) To study the effect of activity based teaching on Retention of Science Achievement.
(ii) To compare the retention of science achievement of boys and girls taught through activity based teaching.

Hypotheses of the Study
(i) Activity based teaching strategy would facilitate retention of Science Achievement.
(ii) Boys and girls taught through activity based teaching would not differ with respect to gain in retention of science achievement.

Design of the study
This study was an experimental study. In this experimental study pre-test, post test equivalent group design was employed. It involved two groups of students, one experimental and one control. Both the groups were taught biology lessons. Experimental group was taught through activity based method while the control group was taught through the conventional method.
Paradigm of the study

Random assignment of the groups	Matching of one-to-one subject	Pre-test	Treatment	Post test	Retention Test
Experimental group	Achievement test	Achievement in Science	Activity based teaching	Attitude towards science	Achievement in Science
Control group	Achievement test	Achievement in science	Conventional method of teaching	Attitude towards science	Achievement in Science

Sample:
Random sampling was used for the study. CBSE affiliated School of Jamshedpur was chosen for drawing of sample. The subjects for the study were the students of class VIII. As there were four sections of class VIII, two sections were selected randomly. The students of these two sections were matched by pairing of achievement test scores of science (achievement test taken by the school i.e. the last terminal examination). By matching the subjects 25 pairs were selected. Out of these 25 pairs, 25 students of one section were taken as experimental group and 30 students were taken as control group.
Tools used:
Science Achievement Test developed and standardized by the researcher with split half reliability of co efficient 0.88 and test re test reliability coefficient of .726. Content validity of the test was also established. The test consisted of 50 items from general science. Each item carried one marks. The maximum marks for the test was 50.
Analysis and discussion.
1. ***Comparision of gain scores in retention of science achievement of experimental and control group***.
The data and results of this comparison are summarized in Table 1 given below

Table-1

Experimental Group (N=25)		Control Group (N=25)		
Mean	S.D	Mean	S.D	t-value
4.33	2.72	2.03	1.68	3.597*

*Significant at .01 level of significance .

Table 1 reveals that the mean gain score of experimental group is higher when compared with the mean gain score of the control group. The obtained‘t’ value 3.597 is greater than the table ‘t’ value of 2.68 for 48 degrees of freedom at 0.01 level of significance. This indicates that there is a significant difference between mean gain score s of experimental and control group in the retention of science achievement test. It is thus concluded that activity based teaching strategy helped in improving the retention of science achievement.

Increased retention of science achievement of experimental group can be attributed to the activities, which drew attention and called for the active and equal participation of the students. Students were not just passive listeners rather they were given chance to explore, discuss and come out with results. They enjoyed and found the activities to be useful hence participated enthusiastically in the learning process. This helped in improvement of their achievement. The result of this study goes with the findings of Nbina and Joseph (2011) where they found that experimental group taught through activity based method helps in retention of subject matter amongst **2**.

Comparision of gain in retention of science achievement of boys and girls of experimental and control group.

The data and result of this comparison are summarized in table 2 given below.

Table-2

Experimental Group					Control Group				
Boys N=15		Girls N=10			Boys N=14		Girls N=11		
Mean	S.D.	Mean	S.D	t- value	Mean	S.D	Mean	S.D	t- value
4.08	2.2	4.52	2.5	0.4642	2.12	1.63	1.91	1.68	.3155

Table 2 result shows that mean gain score of girl is higher than the boys in experimental group and the reverse in case of the control group. The t-value of experimental group and control group are 0.609 and .3278 respectively which is less than table t-value of 2.07 at 0.05 level for 23 degrees of freedom.

Though the mean gain score of retention of science achievement of girls of experimental group is slightly higher than the boys the t-value reveals that there is no such significant difference between them. So as the case for the control group where though the mean gain scores of boys are slightly higher than the girls, the difference is not significant at 0.05 levels. Hence there is no significant difference between the boys and girls with regard to retention of science achievement when taught through activity as well as conventional method of teaching.

Gender neutrality in retention of science achievement can be attributed to class room activities which equally drew attention of boys and girls which resulted in equal interest and hence they performed and retained equally.

Conclusion:

The finding suggest that activity based teaching has a significant positive impact on retention of achievement in science. It also suggests that there is no significant gender difference with regard to gain in retention of achievement in science in experimental group.

Educational Implications:

Analysis, interpretation and conclusion of the present study indicate that the modern teaching strategies in the form of activity based teaching should be applied in Indian classroom teaching. The aim of teaching should

not be only to acquaint the learners with the knowledge rather is to construct their knowledge that would be more sustainable and develops a positive interest in the subject.

The present study has the implication that teaching of science should be revamped from chalk talk to any constructive approach where children will develop their own concepts that will last for a longer period. In this light role of teachers, teacher training programmes, text book writers, school administration becomes important as they can bring a paradigm shift in science teaching.

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