

Effect of Activity Based Method on Achievement Motivation and Academic Achievement in Mathematics at secondary Level

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ABSTRACT

The present study was conducted to examine the effect of the Activity Based method in Mathematics on Achievement Motivation and academic achievement. The sample comprised of 60 students of IXth class studying in private senior secondary school of Ambala city, Punjab. The tools used for conducting the present study were; Deo-Mohan Achievement Motivation Scale (n-Ach) – (1985), Self-prepared modules of Mathematics for selected five topics of IXth grade and Self-prepared pre-post Achievement test of Mathematics. The findings revealed that Students taught Mathematics through Activity based method differ significantly in Achievement Motivation as compared to the control group (Traditional Teaching method). Results also show that the students taught Mathematics through Activity based method differ significantly in Academic Achievement as compared to the Control group (Traditional Teaching method).

Keywords: Teaching method, activity based method, achievement motivation, academic achievement, mathematics

Education is an essential human virtue. Education plays a paramount and significant role in building up the society. In the modern age, a society cannot achieve the aims of economic growth and development, which are pillars of a country, without educating and guiding their citizens. Mathematics has been recognized as one of the central strings of human intellectual activities throughout the centuries. From the very beginning, mathematics has been a living and growing pursuit. It has its roots in everyday activities and forms the basic structure of our highly advanced technological developments.

It exhibits connections between things, which can be visualized only through the agency of It also offers opportunities for opening the mind to new lines of creative ideas and channelizing thoughts. human reasoning. How the pupil will learn effectively depends on the method, the teacher adopts.

There is a great world outside and the mind within the students and it is the duty of the teacher to bring

the two together. This process of interrupting the world of knowledge to child's mind is called the Method of Teaching. "Learning by doing" is one of the important principles of teaching mathematics and activity based method is based on this principle. In Activity-based learning (ABL) teaching method, in the words of Harfield, Davies, Hede, Panko Kenley (2007) "Students actively participate in the learning experience rather than sit as passive listeners". Activity based method in reality is a procedure for stimulating and discovering on the part of students. It is psychological method because child's interest and natural instincts are given due consideration. The children have the curiosity to handle things and when they do the experiments, their curiosity, to greater extent, is satisfied. Practical work provides an activity, which can be profitable and emotionally satisfying. Activity based method is suitable for teaching mathematics to lower classes as at the stage, teaching is done with the help of concrete things and examples. Many topics of mathematics can be taught successfully with

this method. No doubt it is a time consuming and lengthy method, but it helps students to learn more easily and learning is permanent in nature. In schools, where finances do not permit, teacher can reduce the cost by way of improvising the equipments in the school.

Motivation is generally defined as internal condition that stimulates directly and maintains behavior. There is a strong relationship between learning and motivation. Motivating students to learn in school is a topic of great concern for educationist today. Lack of motivation is a big hurdle in learning and pertinent cause in the deterioration of education standards. McClelland, Atkinson, Clark, & Lowell, (1958), defined achievement motivation as an effect in connection with evaluated performance in which competition with a standard of excellence was paramount. The modern study of achievement motivation began with the work of David McClelland. He and his associates coined the term *n ach* denoting need for achievement (McClelland, 1961; McClelland & Winter; 1969). This theory says that under appropriate conditions, people will do what they have been rewarded for doing. Spence & Helmreich (1983), stated that achievement is task-oriented behavior that allows the individual's performance to be evaluated according to some internally or externally imposed criterion that involves the individual in competing with others, or that otherwise involves some standard of excellence. Harter & Connell, (1984), mentioned that achievement motivation typically refers to the *level* of one's motivation to engage in achievement behaviors, based on the interaction of such parameters as need for achievement, expectancy of success, and the incentive value of success.

Academic achievement, being a crucial area and the main center of educational research, has always been regarded as the core of educational growth as it plays an important and significant role in shaping the career of an individual and planning for the future education.

Academic achievement refers to what a student has to achieve in different subjects of studies during the course of academic years. It encompasses many aspects of student's accomplishments in school including progress in core academic subjects- math, science, language, arts and social studies as well

as in subjects that are emphasized less frequently in the contemporary curriculum such as athletics, music, arts and commerce (Kaur and Sharma, 2016). According to Guilford (1964), "When an organism discovers that certain objects and responses lead to the satisfaction of motive it shows interest in those objects or responses. Interest is inclination to attend or to seek certain stimuli or to indulge in certain activities". The scientific advancement has raised the question of better achievement for all in the highly competitive society of today.

Several research studies reported about the effectiveness of different teaching methods in increasing the achievement in Mathematics (Kamalakanthan, 1968, Miyan, 1982 and Prabha, 1992). Positive effect of the Mastery learning strategy in increasing the academic achievement in Mathematics was reported by Yadav (1984), Patadia (1987), Sahhey (1993) and Thankam (1997). Freedman (1995) investigated the relationship between laboratory instruction and attitude towards science and achievement in science of students enrolled in a ninth grade physical science and achievement in science of students enrolled in a ninth instruction influenced the students attitude towards science in a positive direction and influenced their achievement in science.

Vaidyanathan *et al.* (2001) conducted study with the aim of developing a multimedia package for the teaching of mathematics and experimenting the same with a set of children studying in 4th standard in a rural school and found its effectiveness over the conventional method of teaching. Yadav (2015) concluded in his research study that there is significant difference in the achievement of experimental group (taught with activity based teaching) and controlled group (taught without activity based teaching). The *t* value indicates the difference in the performance. So it can be concluded that teaching of mathematics to 4th class using activity based teaching is beneficial for the students in improving their achievement level in mathematics.

There is an increasing concern about the number of learners who drop mathematics in the later years of high school. Appropriate use of different teaching methods as per the requirement of the different topics of the Mathematics can play a significant role in improving the achievement motivation

and academic achievement in the mathematics. Research is required to determine which teaching method or programme would be appropriate for those who deficit in mathematics skills and varying amount of mathematic anxiety. It is felt that as much mathematics as possible should be learnt by students discovering mathematics through the mathematical laboratory, calculators, and computers and through the development of charts and models. Activity based methods can help in developing positive attitude towards learning of mathematics among the students. The time spent on these activities creates such an enthusiasm among students for learning of mathematics that learning of mathematics by them become much easier and they make faster progress and math phobia is completely eliminated. So, there felt the need to investigate the effect of the activity based method on achievement motivation and academic achievement of students in Mathematics.

Objectives

- ❑ To study the effect of Activity based method on Achievement Motivation of students in Mathematics.
- ❑ To study the effect of Activity Based Method in Mathematics on Academic Achievement of students in Mathematics.

Hypotheses

- ❑ Students taught Mathematics through Activity based method will differ significantly in Achievement motivation as compared to the control group.
- ❑ Students taught Mathematics through Activity based method will differ significantly in Academic Achievement as compared to the control group.

Delimitation of the Study

The study was delimited to class IXth Mathematics students studying in one private schools of the Ambala city of Haryana only. The study was restricted to only 5 topics of Mathematics as per the NCERT curriculum of IXth class. Academic achievement was delimited to the achievement in the subject of Mathematics only.

METHODOLOGY

Sample

A purposive sample of 60 students of IXth class was selected from one private school (Police D.A.V. Public School) of Ambala City, Haryana. 30 students formed group A (control group) and 30 formed another group B (experimental group).

Tools Used

Following tools were used in the present study:

1. Deo-Mohan Achievement Motivation Scale (n-Ach) – (1985).
2. Self-prepared pre-post Achievement test of Mathematics.
3. Self-prepared modules of Mathematics for selected five topics of IXth grade.

Procedure of data collection and analysis

- ❑ **Phase I:** Pre-test was conducted on both the groups by providing self-prepared Achievement test of Mathematics and Deo Mohan Achievement Motivation Scale (n-Ach). Two groups were equated on the basis of their scores in achievement test and Achievement motivation and named group A (control group) and group B (experimental group).
- ❑ **Phase II:** Modules of Mathematics were prepared by the investigator using Activity based method and were applied on experimental group whereas control group was taught by traditional method.
- ❑ **Phase III:** After the second phase, self-prepared post-test Academic Achievement of Mathematic and Deo Mohan Achievement Motivation Scale (n-Ach) was administered again on both the groups.

Statistical Techniques Used

Data was analysed by employing descriptive statistics such as Mean, Median and Standard Deviation, Skewness, Kurtosis. t-test was applied to determine the significance of the differences between the means of the two groups as well as pre-test and post – test scores of each group.

RESULTS & DISCUSSION

The results have been discussed in the light of the hypotheses of the study.

Hypothesis - I

H_{01} : Students taught Mathematics through Activity based method differ significantly in Achievement Motivation as compared to the control group.

To test the above hypothesis scores of pre and post-test of Achievement Motivation of both Activity based teaching method (Experimental Group) and traditional teaching method (Control Group) were calculated and then t- test was applied.

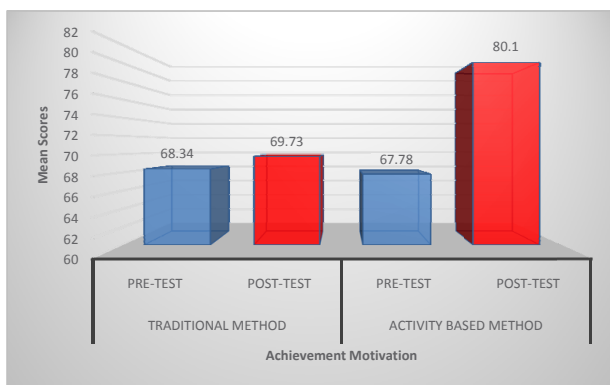


Fig. 1: Bar Diagram Showing the Mean Scores of Achievement Motivation between Traditional Method and Activity based Method

Table 1 indicates that Pre- test mean scores for achievement motivation for Experimental group (Activity Based teaching method) was 67.78 and for control group (traditional teaching method) was

68.34 .Whereas the post test scores for achievement motivation for Experimental group (Activity Based teaching method) was 80.1 and for control group (traditional teaching method) was 69.73 (Table & Fig 1). The t-test value was found to be 3.88 which is significant at 0.01 level of significance. Hence the H_{01} : “Students taught Mathematics through Activity based method differ significantly in Achievement Motivation as compared to the control group” is accepted.

Hypothesis - II

H_{02} : Students taught Mathematics through Activity based method will differ significantly in Academic Achievement as compared to the control group.

Table 2 indicates that Pre-test mean scores for Academic Achievement for Experimental group (Activity Based teaching method) was 19.933 and for control group (traditional teaching method) was 20. Whereas the post test scores for Academic Achievement for Experimental group (Activity Based teaching method) was 25.933 and for control group (traditional teaching method) was 18.033 (Table & Fig. 2).

The t-test value was found to be 5.39016 which is significant at 0.01 level of significance. Hence the H_{02} : “Students taught Mathematics through Activity based method will differ significantly in Academic Achievement as compared to the control group” is accepted.

The results of the present study are supported by the Harfield, Davies, Hede, Panko Kenley (2007), Mishra

Table 1: Comparison of Means and SD for Achievement Motivation between different groups (Traditional Method and Activity based Method)

Measures of CT and Variability	Traditional Method (N=30)		Activity Based Method (N=30)		t-value
	Pre-Test	Post-Test	Pre-Test	Post-Test	
MEAN	68.34	69.73	67.78	80.1	3.88** Between the post test of Traditional Method and Activity Based Method.
±S.D	14.02	12.13	12.40	15.25	
MEDIAN	70.00	72.50	70.00	82.50	
MODE	70.00	70.00	67.50	85.00	
SKEWNESS	-0.12	-0.69	-0.18	-0.47	
KURTOSIS	-0.56	-0.93	-1.05	-0.88	
t-value	1.53*** Between pre and post-test of Traditional Method		8.203** Between pre and post-test of Activity Based Method		

** Indicates 0.01 level of significance; *Indicates 0.05 level of significance; ***indicates insignificant

Table 2: Comparison of Means and SD for Academic Achievement between different groups (Traditional Method and Activity based Method)

Measures of CT and Variability	Traditional Method (N=30)		Activity Based Method (N=30)		t-value
	Pre-Test	Post-Test	Pre-Test	Post-Test	
MEAN±S.D	20	18.033	19.933	25.933	5.39016**
MEDIAN	5.5336	5.768	5.865	5.582	Between the post test of control group and experimental group.
MODE	21	19.5	21	28	
SKEWNESS	18,25	20	20, 24	30	
KURTOSIS	-1.84	-0.85	-1.87	-1.79	
t-value	6.753	3.136	6.333	6.490	
	1.34759**		4.05822**		
	Between pre and post-test of control group		Between pre and post-test of experimental group		

** Indicates 0.01 level of significance; * Indicates 0.05 level of significance

& Yadav (2013) and Yadav (2015). From these results we can interpret that activity based method helps in the improvement of achievement motivation and academic achievement in mathematics as compared to the traditional method.

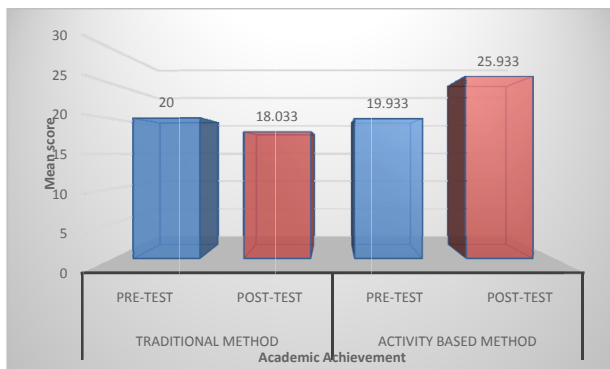


Fig. 2: Bar Diagram Showing the Mean Scores of Academic Achievement between Traditional Method and Activity based Method

The things learnt by students through purposeful activity are permanently affixed in the minds of the students. The knowledge impacted without activities remains superficial and imperfect. Acquiring the mathematical knowledge and scientific outlook are the two main objectives of teaching mathematics which can be achieved only through Activity based teaching method.

CONCLUSION

On the basis of the findings, we may conclude that:

- ❑ Students taught Mathematics through Activity based method differ significantly in

Achievement Motivation as compared to the control group (Traditional Teaching method).

- ❑ Students taught Mathematics through Activity based method differ significantly in Academic Achievement as compared to the Control group (Traditional Teaching method).

Educational Implications

Findings of the study reveal that the students taught through activity based methods differ significantly in Achievement motivation and Academic Achievement as compared to the Control group (Traditional Teaching method). The mean gain scores in the case of activity based method were better in comparison to the traditional method in the case of achievement motivation and academic achievement in Mathematics. It implies that using Activities based method in teaching mathematics gives an opportunity to make mathematical learning better and to improve self-expression of the students. With the use of the Activity based method the students are always busy in doing activities / practical work and their mind is always engaged in the observation of phenomena or outcome of the results. Activity based method also provide an opportunity to the students in getting teacher’s help on the spot and therefore relationship between the teacher and the taught becomes intimate which helps in smoothening the teaching learning process of mathematics. More motivation is created among pupils since they work in concrete situations rather than in the abstract.

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