

Effect of Using Activity Based Teaching on Achievement of Students in Mathematics at Primary Level

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Abstract

Mathematics should offer us logical thinking. When the child learns various approaches of problem-solving in learning mathematics, they come to know which approach is the best. Primary standard curriculum should be rich in such activities that are helpful in learning numbers, their place values and face values, additions, subtractions, multiplications, divisions, decimals and make transition to algebra easier too. To keep the interest of students in the subject, it was found that engages the students in an activity which helps in their learning and provide them strong foundation. The present study is designed to test the effectiveness of activity based mathematics teaching in the achievement of primary level students.

Keywords

Logical Thinking, Mathematization, Numerical Ability, Mathematical Skill, Problem solving.

I. Introduction

Mathematics is a subject with its own dignity and pride. It has a strong position in all fields of science and technology. With its greater importance, we insisted on learning mathematics from our childhood to still. Lack of mathematical knowledge and skill could not make a man to progress in life since it is required in our day to day life. We can say Mathematicians rule the world with their immense inventions. At school level, teacher has an important role in creating a mathematician. Because teachers can produce students with their immense mathematical skill and create an insight of discovering new things in mathematics.

The main goal of mathematics education in school is the mathematisation of the child's thought process through joyful learning, to develop useful capabilities pertaining to numbers (Numerical ability), to pursue assumption to their logical conclusion, child should be in a position to know which approach is best for him/her for problem solving, to allow the child to articulate his/her reasons behind doing a particular exercise, to nurture mathematical thinking and systematic reasoning. The children should learn to enjoy mathematics rather than fear it. They should pose and solve meaningful problems. Teacher should engage every child in the class.

Mathematics being a compulsory subject of study, access to quality mathematics education is every child's right. Mathematics education should be affordable as well as enjoyable. A culture of learning outside the classroom should be encouraged.

“Life is good for only two things, discovering mathematics and teaching mathematics”. - Simeon Poisson

In the above statement, it shows that a teacher and a student both are equally important to make inventions or discoveries in mathematics. Thus, teaching mathematics in a correct way to discover new horizons of mathematics is must. Hence, teaching of mathematics has a greater importance in a life of a person. The root of such teaching and learning should be strongly kept in lower age. If not, the growth will not be an expected one. There are so many ways of teaching it. Here comes the better ways of teaching mathematics to the students at primary level. Hopefully, it will help to adopt the suitable method of teaching.

The syllabus of mathematics at 'Primary Level' was reviewed keeping in view the N.C.F. 2005 guidelines. Knowledge of the subject gained in school is to be linked with the child's everyday experiences. There is more focus on activities and exercises so that the learner feels encouraged to do them. Activities and exercises

are such that they reflect thinking and reasoning. Learning should be shifted away from rote method and learning by doing should be encouraged. Syllabus follows from known to unknown, simple to complex, concrete to abstract and is child-centred and minimum level of learning of the child is kept in mind. Continuity from one level to another and from one class to another is maintained, e.g. Unit on 'Patterns' is included in the syllabus from class Ist to Vth. Interdisciplinary and thematic linkages are maintained as per N.C.F. guidelines e.g. Numbers/ days of the week, etc. are in Eng/ Hindi and Maths.

'Shapes and spatial understanding' topic is included in the syllabus to create awareness about surrounding and for joyful learning at I class. Unit of patterns is included from class 1st to 5th syllabus as they help in developing mathematical thinking and reasoning powers. From class II we have incorporated place value of numbers, addition and subtraction of zero commutative property, multiplication by one and zero, as the students are mature enough to understand the concept of place value and concept of zero. Inclusion of 3D shapes will make them familiar with the surroundings and will also help in maintaining continuity from present class to next higher class. Associative property of addition is introduced in class III as the child has learned commutative property in IInd class.

L.C.M & H.C.F. of two numbers is added after common factors in the syllabus. For multiplication and division of fractions calculation of no's must be encouraged wherever necessary at appropriate step. Knowledge of leap year is given. By measuring the angles of triangle the students must be able to draw conclusion that the sum of all angles of the triangle. At senior level of primary, International system of numeration Roman Notation & Average are included. Only DMAS is included in the syllabus.

Evaluation pattern will be both oral as well as written activity-based in classes I, II & III and exercises based for classes IV & V. The evaluation should be periodic and continuous. Evaluation by observation, interaction with teacher and among the peer group. Teaching of Mathematics can be done in many ways. At primary level, it should be cautious that the method used should involve the students, as they remember and understand. The method which involves the students make the foundation of their mental level strong and they come the reason and process of the solution. For eg. Play-way method of teaching mathematics involves a serious teaching along with playing games. This method was introduced by Froebel who is known as "Father of Kindergarten method"

The Mathematics teacher should provide some simple games and make the child to play for acquiring math. Usually, this method is more suitable for primary level students. Obviously, mathematics is taught from our childhood at the age of four or five. For a better future, a strong foundation should be laid down at this particular age. Mainly, the teacher has to teach arithmetic skill to this age group of students. So, it can be easily incorporated with games. The teacher can use as many apparatus for gaming such as toys and playing objects. This will make the child to learn mathematics with more desire. By learning in play-way method, the child learns mathematics clearly and more easily. Thus, learning will not be burden for them.

In the same way, Activity Based Teaching of Mathematics (Also known as Activity Learning Method) is another method to be used for teaching mathematics to the students of primary level. This method was adopted by an English man David Horsburgh. This method made the students as a active learner and not as a passive learner. Here the teacher should provide activities and experiments for each subject theme. The activity should be appropriate to several constraints like age of the students, concept of the subject. The activity should not deviate the child from learning the concepts. Such activity gives a pleasure of learning and develops a self-reliance in students. Gradually, it encourages the student to learn new concepts and makes the learning in a joyful manner. Mathematics can be taught using this method in a niche manner. The concept of arithmetic and algebra shall be easily implemented with this method of teaching.

II. Objectives of the study

To study the effectiveness of activity based teaching in improvement of mathematical achievement of 4th class students.

To study if activity based teaching causes any difference in the mathematical achievement of different levels of intelligence.

To study if activity based teaching causes any difference in the mathematical achievement of boys and girls.

III. Hypothesis of the study

Significant differences exist between the mean achievement scores of experimental group (taught with activity based teaching technique) and controlled group (taught without activity based teaching) in teaching mathematics.

There is no significant effect of gender, intelligence and their interaction on achievement in mathematics of students of experimental group.

IV. Method

Design of the study

Experimental research can be conducted under the framework of several experimental designs. For the purpose of the present study, the researcher selected equated group design. In this type of design

the relative effects of two treatments are compared on the basis of two groups which are equated in all relevant aspects.

V. Sample of the study

Sampling technique was random and representative. The sample consists 120 students of class 4th from 2 selected schools of equal level. Out of 120 students, 60 students were boys and 60 students were girls, in order to confine the present study to a specific age and educational level.

VI. Tools of the study

For intelligence test, advanced progressive matrices by J.C.Raven were used to equate different groups of 4th class students on the basis of their intelligence test scores. Pretest and post test were prepared from the tests of selected topic for teaching of mathematics to 4th class students.

VII. Statistical techniques

Descriptive analysis- Such as mean, S.D. were used to compare groups on pretest scores and intelligence scores. Coefficient of correlation was used to find out relationship between matching variables i.e. intelligence scores and achievement scores.

Inferential statistics- t test was employed to study significance of differences between Mean achievement scores of experimental group and controlled group of 4th class students.

F test was also used to study the significance effect of gender, intelligence and their interaction on achievement.

VIII, Analysis and discussion

Hypothesis 1- “Significant differences exist between the Mean achievement scores of experimental group and controlled group in teaching mathematics.”

To test this hypothesis, the data obtained from intelligence test, pretest and posttest was tabulated and analyzed. The 1st table reveals Mean achievement scores of experimental group are high in comparison to controlled group.

Hypothesis 2- “There is no significant effect of gender, intelligence and their interaction on achievement in mathematics of students of experimental group.”

To test this hypothesis, raw data of male and female students were obtained and distributed again under high intelligent group and low intelligent group of boys and girls. 2x2 ANOVA was applied to the achievement scores of boys and girls with high and low intelligence levels. The 2nd table reveals that f value of SS (AxB) is significantly low. It is also shown that f value of SSA i.e. the sum of Mean squares of gender do not differ significantly but value of SSB i.e. some of mean squares of intelligence has significant difference at different levels of intelligence of males and females.

Table 1: ‘t’ values of experimental and controlled group of 4th level

Groups	Mean	S.D.	R	S.Ed	Mean Difference	df	t value	Level of significance
Experimental 60	15.2667	4.029	0.417	0.60	7.45	118	11.36	Significant at 0.01 level
Controlled 60	7.8167	3.094						

Table 2: Results of f test

Source	Sum of squares	df	Mean Squares	f value	remarks
SS A(column)	0.339	1	0.339	0.035	Insignificant
SS B(row)	511.5	1	511.5	53.28	Significant
SS AxB	13.16	1	13.16	1.37	Insignificant
SS E	164	17	9.6		
SS T	689	20			

Level of Significance 0.01

IX. Conclusion

The achievement scores of different groups of different schools were analyzed by applying various statistical techniques and it became clear 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.

The achievement scores of boys and girls of different schools of experimental group clarify that gender has no significance effect on the achievement in mathematics of the students. Further, the achievement scores of students of experimental group with different levels of intelligence (high, average, low) have significant difference as well as the interaction of gender and intelligence on the achievement in mathematics is insignificant. The t test and F test indicate the difference in mean scores of different levels of intelligence and insignificant difference in mean scores of boys and girls of experimental groups.

X. Educational Implications

- Activity based teaching is useful for teaching mathematics at primary level.
- It helps the children to learn through concrete material in efficient way.
- It can be beneficial to students learning mathematics by developing systems thinking, logic and reasoning.
- It helps to save the time of students and arouses interest in mathematics subject.
- Students enjoy learning mathematics which was considered as a boring and scary subject.

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