EFFECTIVENESS OF VEDIC MATHEMATICS ON ACHIEVEMENT IN MULTIPLICATION AMONG VIII GRADE STUDENTS

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ABSTRACT

The present study was aimed to study the effect of Vedic Mathematics on achievement in multiplication among VIII grade students. A sample of 100 students was drawn randomly from class VIII studying in two CBSE schools of Amritsar city. Pre-Post experimental design was used for this present study. Experimental group was taught with Vedic Mathematics and controlled group was taught with conventional method. The study revealed that the mean score of experimental group is greater than the controlled group, which proves that Vedic mathematics is more effective than conventional method. Also this technique does not effect on the achievement of boys and girls of experimental group. Technique of Vedic mathematics is very helpful in competitive exam where learner have to solve lengthy mathematical problems in short span of time.

KEYWORDS:
Vedic mathematics, Achievement, sixteen sutras, lenthy calculation

INRODUCTION

Mathematics is a science dealing with study of quantities and their relationships expressed in numbers and other special symbols. Mathematics helps counting, measuring& comparing things. Addition, subtraction, multiplication and divisions are the basic operations of the mathematics, through which we can define and develop many more operations suiting our practical situation. Mathematics makes our life orderly and prevents chaos. Certain qualities that are nurtured by mathematics are power of reasoning, creativity, abstract or spatial thinking, critical thinking, problem-solving ability and even effective communication skills. In support of above views I quote Francis Bacon's view which he expressed in his famous essay 'Of Studies' that Mathematics makes intellectually sharp to learner.

According to Webster's Dictionary, "Mathematics is a science of numbers and their operations, interrelations, combinations, generations and abstractions and of space configuration and their structure measurement transformation and generalizations"

Mathematics is the foundation in today's systematic life. Without numerical and

mathematical proof one cannot decide many issues in day to day life . Mathematics plays a very important role in the economic and social development of a country because it is the foundation for all science and technology. In any profession one can't survive without the knowledge of Mathematics. Mathematics is one of the most crucial subject for students. Almost every student studies math during their academic life. They use it for analyzing data, pattern recognition, and evidence seeking. It offers a way that is quite helpful for students to understand the complex information. Mathematics subject has very vital role in our day to day life.

Mathematics is the science that deals with the logic of shape, quantity and arrangement. Math is all around us, in everything we do. It is the building block for everything in our daily lives, including mobile devices, computers, software, architecture (ancient and modern), art, money, engineering and even sports.Mathematics is the base of all creations, without which the world cannot move an inch. Be it a cook or a farmer, a carpenter or a mechanic, a shopkeeper or a doctor, an engineer or a scientist, a musician or a magician, an astrologer everyone needs mathematics in their day-to-day life. Even insects use mathematics in their everyday life for existence. Experience says learning mathematics can be made easier and enjoyable if our curriculum includes mathematical activities and games. Math's puzzles and riddles encourage and attract an alert and open-minded attitude among youngsters and help them develop clarity in their thinking. Emphasis should be laid on development of clear concept in mathematics in child, right from the primary classes. But many students feel fear about mathematics because of long formulas and calculations. To avoid these fear and anxiety about mathematics, Vedic mathematics is a new technique which is very original and totally unconventional and provides a new thinking approach for Mathematical calculations.

VEDIC MATHEMATICS

The name Vedic Mathematics is given by Jagad guru Swami Sri Bharati Krishna Tirtha ji Maharaja of Govardhana Matha, Puri (1884-1960). The "Vedic Mathematics" is called so because of its origin from Vedas. The Vedas are divided into four main sections : the RIG-VEDA,SAMA-VEDA,YAJUR-VEDA and the ATHARVA-VEDA, known collectively as the Vedas (Samhitas)To be more specific, it has originated from "Atharva Vedas" the fourth Veda "Atharva Veda "deals with the branches like Engineering, Mathematics, Sculpture, Medicine, and all other sciences with which we are today aware of.

Vedic Mathematics is the name given to the ancient system of mathematics, unique technique of calculations based on simple rules and principles with which

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any mathematical problem- be it arithmetic, algebra, geometry or trigonometry-can besolved, orally.

The Verdang Jyotish (1000 B.C.) includes the statement," Just as the feathers of peacock and the jewel-stone of a snake are placed at the highest amongst all branches of the Vedas and the Shastras".

Vedic mathematics has been claimed to remove math phobia and to be able to replace "Mathematics with tears to Mathematics with smiles". Vedic Mathematics provide many methods to solve a single problem, we can solve a problem with variousmethods.

On Practicing one can solve any kind of problem easily. Vedic Mathematics is very flexible and it is very easy to understand.

The system of Vedic Mathematics encourages mental calculations. Vedic Mathematics is easy, simple, direct and straightforward. Vedic Mathematics helps in understanding of Mathematics and enriches our knowledge of the subject. Vedic Mathematics methods come to us as a boon for all competitions. Today's mathematics requires much effort in learning and to understand. Vedic Mathematics being most natural way of working can be learnt and mastered with very little efforts and in very short time. Vedic Mathematics also provides a system of checking the calculations and getting the correct results. If you make the habit of applying the simple and quick checks at different stages of working, we move on confidently after confirming the correctness of work. Nicholas (1984) viewed Vedic mathematics system as one of the most delightful chapters of the 20th century mathematical history. Gupta (1989) opined that this system has great educational value because the Sutras contain techniques for performing some elementary mathematical operations in simple ways, and results are obtained quickly. According to Russell (2008)' Mathematics may be defined as the subject in which we never know what we are talking about, not whether what we are saying is true'. According to Stone (2008)' Mathematics is the study of abstract system built of abstract elements. These elements are not described in concrete fashion'. Vedic mathematics is the ancient system of mathematics which was rediscovered from Vedas between 1911-1918 by Sri Bharati KrishnaTirthaji. He is a scholar of Sanskrit, Mathematics, History and Philosophy, after lengthy and careful investigation was able to reconstruct the mathematics of Vedas. According to Tirthaji all mathematics is based on sixteen sutras. He wrote book: Vedic Mathematics in 1965.The term Vedic Mathematics now refers to asset of sixteen sutras and their corollaries derived from Vedas.

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SIGNIFICANCE OF THE PROBLEM

Mathematics is the study of numbers, quantity, space, structure and change. It is a branch of science that uses numbers and symbols which are arranged using systematic mathematics rules. It can create moment of pleasure and wonder for all pupils when they solve a problem for the first time, discover a more efficient solution, or notice hidden connection. But the essence and nature of teaching of mathematics is degrading day by day which creates a fear and phobia among students. Due to excessive use of electronic gadgets and internet-software, student and teacher both are diverting their path from efficient and effective teaching learning process. Now a student is laying less stress on mental calculation and is more dependent on the gadgets and software for the solution. Many students now a day facing problem in solving mathematical problem and most commonly they are unable to connect the abstract or conceptual aspects of mathematics with reality. It is observed that students find mathematics difficult due to long multiplication and division as basic and have problem in applying mathematical formula in practical life. Learning mathematics is an unpleasant experience to some students mainly because it involves mental exercise. Usually, students complain that mathematics is a difficult, dull and confusing subject. Infact, it is not difficult, but the system which is being used to teach mathematics is making the subject abstract and difficult. In order to enable the child to learn mathematics in an easy way, it is necessary to get him acquainted with alternative system like 'Vedic Mathematics'. Such a system not only creates interest in the subject but also provides tricks for easy and quick calculations. Therefore, the present study has been undertaken to see the effectiveness of Vedic Mathematics over traditional method of teaching of mathematics.Vedic Mathematics is a unique concept. It enables faster calculation when compared with traditional method. It saves time.Vedic mathematics helps in speed and accuracy in solving numericals which prepare school children to overcome the fear of maths. It is a mental tool for calculation that encourages the development and use of intuition an innovation, while giving the student a lot of flexibility fun and satisfaction.Vedic mathematicsis a unique method of solving problems by the useof fast calculations. It is unique system as it helpsto solve all kinds of mathematical problems easilyand efficiently. Tiwari, Gankhuyag, Kim & Cho(2008) found that the proposed Vedic multiplier circuit seems to have better performance in terms of speed. The goal of teaching mathematics is not just academic achievement but its personal and professional growth also. Vedic mathematics not only helps in understanding the concept efficiently but also brings interest while learning mathematics through magical techniques. And these techniques help the students to resist the concepts for longer duration. Vedic mathematics is found more effective in solving multiplication problems than traditional technique (Sharma,2014). Jiji (2012) also found Vedic

mathematics is more effective, in terms of students' achievement in mathematics, than talk and chalk method. The study covered the major topics viz., square, square-root, factorization. So the results of the study can contribute an effective and interestingmathematics problem solving approach with high speed and accuracy to educational planners and curriculum developers.

STATEMENT OF THE PROBLEM

EFFECTIVENESS OF VEDIC MATHEMATICS ON ACHIEVEMENT IN MULTIPLICATION AMONG VIII GRADE STUDENTS

Operational definitions of the key terms used

Effectiveness

In the study, effectiveness is described as significant mean difference of a group over the other group on posttest in terms of students' achievement in mathematics. In this way, the group having greater mean is called more 'effective' than the other group.

Achievement in mathematics

Measurement of students' grasp of knowledge or their proficiency in certain skills based on taught mathematical themes during experimental treatment. Here in this study it means achievement score in mathematics obtained through achievement test.

Vedic mathematics approach

Solving mathematical problems easily with the help of some sutras, specifically based on the book Vedic Mathematics, authored by Sri Bharati Krishna Tirath Maharaja (1884-1960) of Govardhan Peetha, Puri (India). But it is originally rediscovered from Atharvaveda (Sthapathya-subveda).

Conventional method

A teacher centered traditional method of teaching with a due weightage to talk and chalk, based on class VIII mathematics text-books

OBJECTIVES

1. To develop achievement test for selected topics of mathematics of grade VIII.
2. To study the difference in achievement of grade VIII students taught through Vedic Mathematics and conventional method.
3. To compare the Mean scores of the Pre-test and Post-test of the Experimental group of the VIII grade students.
4. To compare the Mean scores of the Pre-test and Post-test of the Control group of the VIII grade students.

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HYPOTHESES

1. There exists no significant difference between mean achievement scores in multiplication taught through Vedic Mathematics and conventional method.

2. There exists significant difference between the Mean scores of the Pre-test and Post-test of the Multiplication Test on the Experimental group.

3. There is exists significant difference between the Mean scores of the Pre-test and Post-test ofthe Multiplication Test on the Control group.

DELIMITATION

The study is delimited in the following field:

1. The present study was confined to the two schools of CBSE of Amritsar city.
2. The study was restricted only to the students of VIII class.

SAMPLE

The technique of sampling was random and representative. A sample consists of 100 students of VIII grade from two schools affiliated to CBSE of Amritsar city were selected. Out of 100 students,50 students from experimental group and 50 students from control group were selected for the purpose of study.

TOOLS USED

1. Group General test of Intelligence by Ahuja (1990) was administered to equate the students on the basis of intelligence test scores.

2. Vedic Mathematics programmes was developed by the investigator.

STATISTICAL TECHNIQUES EMPLOYED

Descriptive statistics such as measures of central tendency and dispersion were used to study the nature of distribution of data. T-ratio was computed to find the significance difference between means of pre-test and post-test scores.

RESULTS AND DISCUSSION
HYPOTHESIS-I

There exists no significant difference between mean achievement scores in multiplication taught through Vedic Mathematics and conventional method. In order to test this hypothesis, Mean and S.D.and t-ratio of achievement scores are shown in table I:

Table-I
Mean, S.D. and t-ratio of achievement scores in Mathematics of students

Group	N	Mean	S.D.	SED	Mean Difference	df	t-ratio	Remarks
Experimental group	50	17.73	2.25	0.74	9.05	98	10.56	Significant at 0.05 level
Control group	50	8.68	2.151					

From the above table, the value of t-ratio is 10.56 which is significant at 0.05 level. It reveals that

there is significant difference between the mean achievement scores of the experimental group and controlled group. Hence the hypothesis," There is no significant difference between mean achievement scores of experimental group and controlled group" is rejected.Thus it can be concluded that the Vedic method of multiplication is effective over the conventional method in terms of students' achievement in the Post-test.

HYPOTHESIS-II

There exists significant difference between the Mean scores of the Pre-test and Post-test of the Multiplication Test on the Experimental group.In order to test this hypothesis, Mean, S.D. and t-ratio of pre-test and post-test of Experimental group are shown in the table IIgiven below:

Table-II
t-value of pre-test and post-test of Experimental group

Experimental Group	N	Mean	S.D.	SE_D	Mean Difference	df	t-ratio	Remarks
Pre test	50	10.52	5.92	1.26	7.84	98	6.19	significant at 0.05 level
Post test	50	18.36	6.98					

From above table mean scores of pre-test and post-test are 10.52 and 18.36 respectively and their mean difference 7.84. calculated t-ratio 6.19 is significant which indicates that the difference between the Mean of the Pre-test and Post-test of the experimental group is statistically significant. Hence the hypothesis," There exists significant difference between the Mean scores of the Pre-test and Post-test of the Multiplication Test on the Experimental group", stands accepted. Therefore, it is concluded that students of the experimental group have performed better in post-test due to the implementation Vedic method of multiplication.

HYPOTHESIS-III

There exists significant difference between the Mean scores of the Pre-test and Post-test of the Multiplication Test on the Control group.In order to test this hypothesis, Mean, S.D. and t-ratio of pre-test and post-test of control group are shown in the table IIIgiven below:

Table- III
t-value of pre-test and post-test of control group

Control Group	N	Mean	S.D.	SE_D	Mean Difference	df	t-ratio	Remarks
Pre test	50	10.32	5.80	1.178	1.18	98	1.00	Insignificant at 0.05 level
Post test	50	11.50	5.98					

From above table mean scores of pre-test and post-test are 10.32 and 11.50 respectively and their mean difference 1.18 calculated t-ratio 1.00 is insignificant, which indicates that the difference between the Mean of the Pre-test and Post-test of the control group is statistically not significant. Hence the hypothesis," There exists significant difference between the Mean scores of the Pre-test and Post-test of the Multiplication Test on the control group", stands rejected.It may be

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concluded that by the use of the traditional method of multiplication students failed to minimize the common mistakes which can be avoided by the Vedic method of multiplication as shown in the case of the Experimental group.

EDUCATIONAL IMPLICATIONS

Vedic Mathematics approach plays an important role in improving achievement in mathematics. It is less time consuming technique. It is faster than the other methods. It is very useful in competitive exams where students have to solve lengthy mathematical problems in short period of time. This technique remove fear about mathematics from the mind of students. This technique takes lesser time than conventional method to solve mathematical problems. This technique can be more useful for high intelligence group and average intelligence group. It reduces burden. It improves the concentration of students. Vedic mathematics emphasizes, meaningful learning than mechanical learning. Finding answer through Vedic mathematics may help to reduce the student's anxiety level. It increases concentration, as it encourages the mental calculations. This method develops better understanding among students and teachers. Vedic mathematics endures creativity among intelligent pupil, while helping the slow, learners to grasp the basic concepts of mathematics. Students can be motivated to the learn mathematics interestingly if the Vedic system of mathematics will be included into our curriculum. Mathematics can be learnt and mastered with minimum effort in a very short span of time and can be translated into a playful manner. In this context, every teacher should inculcate thehabit of reading books related to Vedic mathematics.   Some periods should be allotted in the class to use Vedic mathematics tricks. So students can actively participate in solving problems. Schools should also realize the classrooms are not meant only for transaction of knowledge but also for developing creative abilities and talents throughjoyful teaching-learning approaches. With the help of Vedic mathematics students can score high marks and also excel in competitive examinations. In the present scenario, almost all the competitive examinations contain reasoning aptitude sessions,in which students have to score good marks. Sinceeducation has its main aim to transfer the cultural-heritage from one generation to other. In this orderVedic mathematics should be conserved as non-materialistic Indian cultural-heritage also. Also according to NEP 2020 more focus is to develop reasoning abilities of students and also to improve numeracy and accuracy of students. So the teacher should use this approach along with different methods like lecture method, inductive deductive method. So school authorities should provide training to their teachers in Vedic mathematics so that they can use this technique in their teaching. For this workshops should be arranged for teachers to improve their teaching skills and make mathematics fear free and interesting subject for students.

CONCLUSION

Hence it is concluded that Vedic Mathematics is an effective approach over traditional method. It effects achievement in multiplication of the students of VIII grade. But it has no significant effect on gender. So we can say that Vedic Mathematics is an effective approach which should be used along with traditional methods of teaching. It should be incorporated in classroom teaching so that interest in mathematics can be developed among students at school level. It helps in to learn tricks and shortcuts for fast calculations..

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