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शैक्षणिक समाचार पत्र

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## Empirical Study on Effectiveness of Vedic Mathematics Program in Enhancing Achievement among Learners

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### Introduction

The very existence of universe and science of life is embedded in precise balance and harmony created between nature and space. The key to understand this balance and harmony lies embedded in various hypothetical and abstract specifications that have been distributed into so called disciplines of science, mathematics, philosophy, literature and much more.

Though we might have been using concepts from physics to understand and predict the basic laws and phenomenon of universe, the precision of these predictions lies in developing perfect mathematical models and accurate mathematical calculations. Besides this each act of human endeavor from trade to technology, equipment's to medicine, music to sports uses mathematics in some form or another. This importance of mathematics was realized by mathematicians in India and across world since pre historic times. Various mathematical specifications have been described in different texts of ancient times. Thus it could be said the mathematics is of immense importance.

Moving ahead India has a rich heritage of science, philosophy and culture. Tapping the relation between culture and mathematics this paper draws in from a book on Vedic Mathematics, written by Indian Monk Swami Bharati Krishna Tirtha in 1965. It is an empirical study and uses Vedic mathematics program as an intervention. The book describes a series of mental calculations claimed to be based on Vedas. The mental calculation system mentioned in the book is also known by the name, 'Vedic Math'. It is a collection of techniques/sutra to solve mathematical problems in easy and faster way. It consists of 16 Sutras (Formulas) and 13 sub-sutras (Sub Formulae) which can be used for problems involved in arithmetic, algebra, geometry, calculus and conics. the ancient system of mathematics.

### Review of Related Literature

Vedic mathematics deals with several basic as well as complex mathematical operations. Especially, methods of basic arithmetic are extremely simple and powerful (Nicholas, Williams, & Pickles, 1984). Several researches have been conducted to study the effectiveness of Vedic Mathematics. Vedic mathematics algorithms lead to faster mental calculations, high speed VLSI Arithmetic architectures can be derived from Vedic mathematics and due to its parallel and regular structure the Vedic algorithms can be easily laid out on silicon chip (Thapliyal, 2008). Bengali (2011) studied Vedic Mathematics and its application in computer arithmetic and reported that Multiplication, Squaring, Division, Sine and Cosine Vedic algorithms were designed in Virology and compared to Design Ware block with criteria as cycle time, area and power. It is observed that Vedic multiplication performs better than Design Ware for cycle time, but has significantly larger area. The Vedic system allows children to use these principles to simplify a math problem to a level that they can master and build their 'Number Sense'. (William).

### Objectives of the Study

1. To develop an instructional module based on Vedic Mathematics to teach selected concepts of mathematic to upper primary students.
2. To study the effectiveness of teaching through instructional module based on Vedic Mathematics on the achievement in mathematics of upper primary students.

## Hypothesis

**Ho<sub>1</sub>** There is no significant difference in Achievement in Mathematics between pre-test and post-test scores of experimental group of upper primary school students.

## Operationalization of Terms

### Vedic Mathematics Program

'Vedic Mathematics' is a unique technique of calculations based on simple rules and principles, with which verbally, any mathematical problem can be solved be it algebra trigonometry, arithmetic of geometry.

It is an ancient technique, which simplifies multiplication, divisibility, complex numbers squaring, cubing, square and cube roots. Even recurring decimals and auxiliary fraction can be handled by Vedic mathematics. These calculations are described in the book Vedic Mathematics written by Indian Monk Swami Bharati Krishna Tirtha in 1965.

The Vedic Mathematics program for this study includes the selected concepts of addition subtraction, multiplication and division. The content and formulas selected for the study included; For addition and subtraction - "*Ekadhiken Puven*"; for multiplication, "*Ek Newnan Puven* and *Vilkinam*"; for Division "*Nikhilam*" and *Paravartya Yojyet*

**Achievement Test:** The test prepared for measuring the effectiveness of the Vedic Mathematics program on the achievement of the students under the given study is accepted as the achievement test. It also noted the time taken by each students to complete the test.

### Research Design

The Independent variable is Vedic Mathematics Teaching Program, Dependent variable is Achievement score in Mathematics, Intervening variable includes students' interest attitude and school environment and control variable are selected concepts of Vedic Mathematics Program.

The population and sample of study was students of upper primary school of standard V of selected Primary School of Aravali District in Gujarat in the year 2017-2018. Population was 70 students out of which 30 students were selected for the study. Sample was selected through convenient sampling method. The research method selected was experimental study with one group pretest posttest design. The area of research is teaching mathematics with a level of upper primary education. The study is confined to the students of upper primary school and to selected concepts of Mathematics. The study is delimited to the sutras proposed in the book Vedic Mathematics

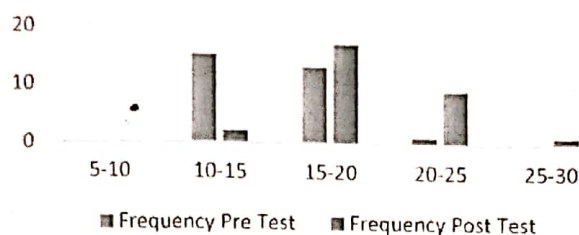
### Data Collection and Analysis

The data was collected by implementing the pretest followed by intervention and the posttest in the selected school. Utmost care was taken to maintain validity and reliability of study. The data so collected was analyzed through descriptive and inferential techniques.

**Table1: Frequency Distribution of the Pretest and Posttest Scores**

Class Interval	Frequency Pre Test	Frequency Post Test
5-10	0	0
10-15	15	2
15-20	13	17
20-25	1	9
25-30	0	1

### Frequency Distribution of Pre and Post Test Scores



**Table 5.5 Inferential Analysis of the Data of pretest and post test**

	Mean	Variance	t-value	Significance Level
Pretest (30)	15.73	6.13	6.19	S*
Post Test (30)	20	8.13		

The obtained value of 't' for the pretest and post-test scores of experimental group in mathematics is 6.19 which is more than the table value of 1.746 at 0.05 level of significance and 2.583 at 0.01 level of significance. Thus it can be inferred that 't' value is significant. Hence, the Null hypothesis is rejected.

This indicates that there is significant difference between the pretest and post-test scores of experimental group in mathematics. Since there is significant difference between pre-test and post-test score of experimental group in mathematics it can be inferred that intervention is effective and the Vedic mathematics program has proved to be effective in enhancing the achievement scores of the students of experimental group.

#### Findings of the Study

The null hypothesis was rejected and Vedic Mathematics Intervention Program was found to be effective in enhancing the achievement of mathematics among the students of standard VI.

#### Observations during Study

During the implementation of the Vedic mathematics program children were getting interested in small mathematical calculation inside and outside the class. This indicates that this program generates positive attitude and interest towards mathematics in children. It also enhanced the ability of doing calculation among students in less time.

#### Implications of the Research

Implications of the research can be summarized as

1. It offers students an easy and quick way for calculation.
2. It can make students understand hard calculations easily and offers to popularize the simple mathematical process.
3. The method if used may be helpful to increase the interest and curiosity of student in math education and decrease their fear of math.

#### Conclusion

The study has succeeded to establish the fact that the immense knowledge spread in traditional literature is of utmost importance and care needs to be taken to spread awareness about this knowledge so as to ensure that it is preserved and disseminated. Vedic Mathematics in spite of its controversial origin is a simplified version of mathematical calculation and can increase interest of students in mathematics subject.

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