Research Paper E-ISSN NO : 2455-295X | VOLUME : 11 | ISSUE : 1 | JANUARY 2025

A COMPARATIVE STUDY OF EFFECTIVENESS OF TEACHING MATHEMATICS THROUGH CONVENTIONAL & VEDIC MATHEMATICS TECHNIQUES

DR. MITESH J. DOSHI [1]

[1] ASSISTANT PROFESSOR, B. D. SHAH COLLEGE OF EDUCATION, MODASA, ARVALLI, GUJARAT.

ABSTRACT:

Vedic mathematics is the name given to the ancient Indian system of mathematics that was rediscovered in the early twentieth century from ancient Indian scripture namely Atharvaveda. The study was intended to compare the effectiveness of teaching mathematics through conventional and Vedic mathematics technique in the terms of students' achievement in mathematics. In this experimental study, only posttest equivalent control groups design was used having randomly selected sample of 40 students in each group from Sakariya Primary School, Modasa. The study covered the major topics of Gujarat Secondary Education Board class VIII mathematics syllabus viz., cube, cube-root and factorization of algebraic expressions. Mean, standard deviation, t-test were used for analyzing the data collected through self-made Achievement Tests in Mathematics (ATM) as posttest. Students' achievement in mathematics of experimental group on posttest was significant over that of control group. No significant difference was found between male and female students in each group on posttest. Thus the Vedic mathematics approach is found highly effective for enhancing the students' achievement in mathematics as well as that of male and female students equally.

KEYWORDS:

EFFECTIVENESS, VEDIC MATHEMATICS, CONVENTIONAL APPROACH, ACHIEVEMENT IN MATHEMATICS.

PAPER ACCEPTED DATE:	PAPER PUBLISHED DATE:
11th January 2025	13th January 2025

INTRODUCTION

The education commission (1964-1966) recommended mathematics as a compulsory subject for students at all school level. The National Policy on Education (1986) has also considered the importance of mathematics in general education and suggests that mathematics should be visualized as the vehicle to train a child to think, reason, analysis and articulate logically apart from being a specific subject. But due to lack of understanding its essence and technique of teaching, mathematics is now considered as a dry subject by many learners. Now a learner shows no interest in learning mathematics, teacher is teaching and students are learning just for the sake of obtaining marks. Most of the problems in Mathematics have magic and mysteries. The National Policy of Education (NPE-1986) stated "Mathematics could be considered as a medium to train a child to develop his thinking capacity, to develop his reasoning power, and to coherent logically". So mathematics should be shown as a way of thinking, an art or form of beauty, and as human achievement and it can be achieved easily through Vedic mathematics as it not only helps in generating interest and concept clarity in students but also stabilizing the knowledge for longer duration too.

NEED AND SIGNIFICANCE OF THE STUDY

Now a student is laying less stress on mental calculation and is more dependent on the gadgets and software for the solution. Vedic mathematics is a unique method of solving problems by the use of fast calculations. It is unique system as it helps to solve all kinds of mathematical problems easily and 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.

The study covered the major topics viz., cube, cube-root and factorization of algebraic expressions. So the results of the study can contribute an effective and interesting mathematics problem solving techniques with high speed and accuracy to educational planners and curriculum developers.

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 fashion, 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 ATM.

VEDIC MATHEMATICS TECHNIQUES

Solving mathematical problems easily with the help of some *sutras*, specifically based on the book Vedic Mathematics, authored by Sri Bharati Krishna Tirathaji 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 problem solving approaches given in class VIII mathematics text-books of UP Basic Education Board.

OBJECTIVES OF THE STUDY

- To compare the means scores on the achievement in mathematics of the two groups of students on posttest.
- To compare the means scores on the achievement in mathematics of male and female students of the control group on posttest.
- To compare the means scores on the achievement in mathematics of male and female students of the experimental group on posttest.

NULL HYPOTHESES

Ho_1: There is no significant difference in the mean scores of experimental and control group on posttest.

Ho_2: There is no significant difference in the mean scores of male and female students of the control group on posttest.

Ho_3: There is no significant difference in the mean scores of male and female students of the experimental group on posttest.

POPULATION

All the students of class VIII of Gujarati medium schools of Aravalli district for the academic year 2023-24 following the Gujarat Basic Education Board syllabus were constituted the population for the study.

SAMPLE

In the study, Sakariya Primary School, Modasa was selected using purposive sampling. Further eighth standard 64 students from Sakariya Primary School, Modasa were randomly selected as the sample. In this manner the selection and the assignment of the students were performed randomly into two groups; Experimental group & Control group. So the number of students in each group was 32.

RESEARCH DESIGN

Since the nature of the present study was Experimental. For this purpose the only posttest equivalent groups design was selected.

PROCEDURE OF THE STUDY

The groups were randomly assigned to one control and another experimental group. The experimental group was taught using the Vedic mathematics techniques while the control group was taught using traditional method. The experiment had been continued for 15 working days. The posttest was administered on both the groups, after the treatment was over.

TOOL

Self-made Achievement Tests in Mathematics (ATM) only post-test were administered for testing the class VIII students' achievement in mathematics. The test-retest reliability was established and it was found that 0.87 and 0.83 respectively.

VARIABLES

Independent variables: Techniques of teaching mathematics i.e. Vedic mathematics and conventional (traditional) mathematics.

Dependent variables: Students' achievement in mathematics.

Variables uncontrolled: Interest and attitude, socio-economic status, self-concept.

Variables controlled: Time, average-age, classrooms-conditions.

DELIMITATIONS

The present study was confined to the class VIII Gujarati medium students from Aravalli district under Gujarat Basic Education Board curriculum only.

The present study was carried on class VIII students' in terms of their achievement in mathematics only.

The present study covered these topics only viz., cube, cube-root and factorization of algebraic expressions. So only few Vedic mathematics sutras were used to teach these topics.

ANALYSIS AND INTERPRETATION OF DATA

In analysis the collected data were tabulated and statistical techniques were employed as per research design of the study. All the hypotheses were tested at 0.05 level of significance.

TESTING THE HYPOTHESIS HO_1

The null hypotheses No. 1 was that there was no significant difference in the mean scores of experimental and control group on posttest. This hypothesis was tested by calculating means, standard deviation and *t*-value. The means, standard deviation and *t*-value are given in the table below:

TABLE 1

Groups	N	MEAN	SD	t – ratio	Null Hypothesis
Control	32	2.31	2.2	3.58	Rejected
Experimental	32	4.15	1.9		

The null-hypothesis was rejected and the research hypothesis was accepted on the basis of the Table 1, i.e. it can be seen that the difference in the means of students' achievement in mathematics from Control Group and Experimental Group is significant. Thus Vedic mathematics techniques is effective over the conventional method of teaching mathematics in terms of students' achievement in mathematics.

TESTING THE HYPOTHESIS HO_2

The null hypothesis No.2 was that there was no significant difference in the mean scores of male and female students of the control group on posttest. This hypothesis was tested by calculating means, standard deviation and *t*-value. The means, standard deviation and *t*-value are given in the table below:

TABLE 2

Groups	N	MEAN	SD	t – ratio	Null Hypothesis
Male	18	5.98	1.97	0.31	Select
Female	14	6.14	2.05		

From the Table 2, it can be seen that the difference in the achievement in mathematics of the male and female students from control group is not significant therefore the null hypothesis was failed to reject. This indicates the achievement in mathematics of male and female students from control group were same on posttest.

TESTING THE HYPOTHESIS HO_3

The null hypothesis No. 3 was that there was no significant difference in the mean scores of male and female students of the experimental group on posttest. This hypothesis was tested by calculating means, standard deviation and *t*-value. The means, standard deviation and *t*-value are given in the table below:

TABLE 3

Groups	N	MEAN	SD	t – ratio	Null Hypothesis
Male	16	7.92	1.82	0.57	Select
Female	16	8.32	2.15		

From the Table 3, it can be seen that the difference in the achievement in mathematics of the male and female students from experimental group is not significant therefore, the null hypothesis was failed to reject. This indicates that the achievement in mathematics of male and female students from experimental group were same on posttest.

DISCUSSION OF THE RESULTS

In this study, the control and experimental group were found equivalent in the terms of their achievement in mathematics at the time of starting the treatment. So there is no need to use analysis of covariance (ANCOVA) in the study (Best & Kahn, 2006). Vedic mathematics technique is found effective over the conventional method of teaching mathematics in terms of students' achievement in mathematics. Whereas in the study, the Vedic mathematics technique is found effective over the conventional approach of teaching mathematics covering the experiment on the major topics viz., cube, cube-root, factorization of algebraic expressions. Conventional as well as Vedic mathematics technique of teaching mathematics produce similar results on male and female students' achievement, i.e. Vedic mathematics is equally effective for male and female students.

Thus we can say that the Vedic mathematics technique is highly effective for enhancing the students' achievement in mathematics.

In this context, every teacher should inculcate the habit of reading books related to Vedic mathematics; at least 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 through joyful teaching-learning approaches.

Many further studies may be conducted at higher level of education through qualitative or mixed approach of the study, as the case may be; for testing the effectiveness of Vedic mathematics in other various terms viz., attitude towards mathematics, interest in mathematics, motivation level, speed and accuracy in a particular time phase using various Vedic sutras

REFERENCES

1. Best, J.W. and Kahn, J.V. 2006. *Research in Education* (10th ed.). New Delhi: PHI Learning Private Limited.

2. Kothari, D.S. 1966. *Report of the education commission 1964-1966 (Education and National Development)*. Delhi: Ministry of Education, GoI. Retrieved January 12, 2017 from https://archive.org/details/ReportOfTheEducation Commissi on1964-66D.S.KothariReport

3. Sharma, A. 2014. A comparative study of multiplication operation. *Bharatiya Shiksha Shodh Patrika*, **33**(1): 28-32.

4. M.H.R.D. 1986. *National Policy on Education 1986*. Delhi.

5. Maharaja, B.K.T. 2009. *Vedic mathematics*. Delhi: Motilal Banarasidas Publishers Pvt. Ltd.