



A Comparative Study on the Problem-Solving Ability of Students Taught Using Conventional and Vedic Teaching Methods in Mathematics

Jyoti Jha

Research Scholar, Mahatma Gandhi Kashi Vidyapith, Varanasi

Abstract :

The term Vedic Mathematics is related to the ancient Indian mathematical system that was rediscovered in the early 1900s from the Atharvaveda, an ancient Indian text. In terms of students' mathematical Problem-Solving Ability, the study aimed to compare the effectiveness of teaching mathematics using a conventional and Vedic method. 70 students from government aided school were chosen for each group in this experimental study, which used a pretest-posttest non-equivalent group design. The primary subjects of the UP Basic Education Board class VII mathematics curriculum—addition, subtraction, multiplication, division and simultaneous square and square-root, were covered in the study. Mean, standard deviation, t-test were used for analyzing the data collected through the Problem-Solving Ability Test created by L.N. Dubey and C.P. Mathur (2017), is a tool for assessing a person's capacity for problem-solving as pretest and posttest. Students' Problem-Solving Ability 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 is found highly effective for enhancing the students' Problem-Solving Ability in mathematics as well as that of male and female students equally.

Keywords: Vedic Mathematics, Problem-Solving Ability.

Introduction

One crucial component for the enhancement of human behaviour is education. As a result, the goal of education in every society has remained to support a child's personality development. In a way that makes him or her a better student, a better person, and a better citizen—not just in terms of theoretical knowledge and quantity, but also in terms of values and motivations that

give life purpose and significance and enable the members of society to meet the challenges that are lying ahead. There is a variety of factors influence students' performance (Water and Marzano, 2006).

It is well-known that the study of mathematics fosters critical thinking, logical reasoning, and methodical problem-solving abilities. It has a significant impact on students' cognitive development at the school level, establishing the foundation for higher-order thinking and practical decision-making. However, despite its importance, a lot of students find it difficult to solve mathematical problems because of conventional teaching approaches that frequently prioritise memorisation over conceptual understanding. The conventional teaching method, which is commonly used in classrooms, is mostly concerned with rule-based instruction and procedural learning. Although this method helps students in practicing standardised methods, it might restrict their capacity for original thought and the application of ideas in novel situations. However, an alternate method that encourages mental quickness, agility, and adaptable problem-solving techniques is provided by Vedic Mathematics, an old Indian system founded on 16 sutras (formulas). This Vedic-based approach streamlines intricate computations and promotes intuitive reasoning, which can boost students' self-assurance and effectiveness when tackling mathematical issues. It is very simpler compared to conventional methods. Its techniques are interconnected and unified, making problem-solving easier and helps with quick calculations, including squares, square roots, reciprocals, and complex equations. It provides a new approach to learning Mathematics, making Arithmetic and Algebra simpler and more flexible. Vedic Mathematics can benefit students and helping them develop confidence and a better understanding of the subject. Vedic Mathematics can be a lifesaver when it comes to student's schoolwork. It can help students to solve homework problems quickly and prepare for exams with ease. Vedic sutras are interrelated and help students to think more deeply. With these sutras, students can solve complicated mathematics problems in just a few steps. An accessible and clear-cut approach encourages students' confidence in mathematics. Vedic mathematics also helps students to overcome their fear of math.

In this regard, the current study compares the problem-solving ability of students who were taught Vedic mathematics methods versus those who were taught conventional methods. The research aims to offer insights into alternative teaching methods that can improve students' problem solving ability by assessing the efficacy of vedic teaching method. Problem-solving, pattern-making, figure interpretation, geometric construction, theorem proof, and more are all related to mathematics. The ability of students to solve problems demonstrates that learning mathematics was intended to enhance their cognitive and affective domains, which can support the ability to solve problems. This is why effective mathematics instruction is so important. Consequently, a researcher was employed to ascertain the ground realities entitled as “A Comparative Study on the Problem-Solving Ability of Students Taught Using Conventional and Vedic Teaching Methods in Mathematics.”

Need and Importance of the Study

Mathematics is not only a study of numbers and formulas, but also a discipline that develops logical reasoning, critical thinking, and problem-solving ability among students. The ability to solve mathematical problems effectively has become a critical educational goal in the modern era, where analytical abilities and creativity are highly prized. However, rote memorisation and procedural learning are frequently emphasised in conventional mathematics teaching methods, which may not always promote deeper comprehension or autonomous problem-solving abilities. On the other hand, Vedic mathematics, offers straightforward, adaptable, and quicker methods for addressing mathematical issues. It is based on the ancient Indian knowledge system. It provides a different strategy that might work well for improving students' problem-solving ability by fostering mental ability, creativity, and confidence in them. The need for this study arises from the increasing demand to improve students' mathematical problem solving ability and to adopt teaching methods that go beyond conventional practices. Since problem-solving is an essential life skill, exploring innovative and learner-friendly strategies becomes necessary.

Review of related literature

Behera (2021) was conducting a study named “A Study on the Effectiveness of the Vedic method on Multiplication for Sixth graders.” All sixth graders at Government Primary School in the Mayurbhanj district of Odisha represent the study's population. 58 students, both boys and girls, from four upper primary schools in the Rural Block in the Mayurbhanj district of Odisha served as the sample for the purpose of this research. Purposive sampling was used to choose the schools. Additionally, each school's students were split into two groups at random (using the blindfold method): the Control group and the Experimental group. The researcher used two self-made achievement tests on multiplication (Multiplication Test) have been used, one test was before they tried any new methods (Pre-test), and the other was after (Post-test). Both tests had 20 questions having the same difficulty level and almost in the same pattern. The content validity was found satisfactory by a group of experts consisting of teacher educators and mathematics primary school teachers. The reliability was found 0.71. The scoring keys of both the multiplication tests were simple, for every right answer, it obtain one mark, and for every wrong answer, it obtain zero. The data was analysed using the t-test. According to the study's findings, the Vedic method of multiplication outperforms the traditional method in terms of students' performance on the post-test. Students who used the Vedic method produced better, more accurate results and made fewer mistakes. The Vedic method of multiplication did not allow for gender to be a factor. The experimental group's boys and girls performed well on the post-test, and there was no discernible difference between the two means.

Chauhan & Ali (2021) conducted research on the “Difference between Vedic Mathematics and Modern Mathematics in Multiplication Algorithm.” In this study, the researcher considered six sutras of Vedic Mathematics and how they can help students, especially those at a basic level. The sutras are also useful for finding out squares, cubes, linear equations, factorisation, and

calculus. In the present study, the researchers considered simple tricks and special formulas from Vedic Mathematics to make calculations easier and more logical. According to the study, the students like Vedic methods in solving problems as compared to the modern methods taught in textbooks. The study revealed that using Vedic Mathematics in the multiplication algorithm has more abilities for improving the mind power, and it also helps them in solving problems faster and more accurately during examinations.

Gupta et al. (2015) did a study called *“Effect of Problem-Solving Ability on Academic Achievement of High School Students: A Comparative Study.”* This study was designed to see how well problem-solving skills affect students' achievement in school. The study used the descriptive method. The group studied was made up of 250 students, with 165 males and 85 females, who were in the 10th grade in high schools connected to CBSE in the Rohtak district. They were chosen using a random sampling technique. Dr. L. N. Dubey developed the Problem-Solving Ability Test (2006) to gauge students' proficiency in solving mathematical problems. The ninth-grade students' grades served as a representation of their academic achievement. The data was analysed using a t-test and an ANOVA. The study discovered that students' academic performance was significantly impacted by their problem-solving skills. Additionally, it demonstrated that female students outperformed male students. Nevertheless, there was no combined impact of gender and problem-solving skills on high school students' academic achievement. The study also demonstrated a positive correlation between high school students' problem-solving skills and their mathematical achievement.

Ghatak and Mittal (2019) The study was entitled *“A Review-Based Study on Problem-Solving Ability of School Students in Relation to Their Academic Achievement.”* The purpose of this study was to determine the relationship between students' grades and their ability to solve problems. The findings demonstrated a significant, favourable correlation between students' academic achievement and their ability to solve problems. According to the study, boys are substantially better at solving problems than girls. Furthermore, the study discovered positive relationships between personality, study habits, learning style, scientific attitude, intellectual capacity, and test anxiety; these factors have a greater impact on schoolchildren's academic performance and problem-solving skills.

Hooda and Devi (2018) did a work called *“The effect of problem-solving ability on mathematics achievement among secondary school students.”* The study had two main goals: to observe the impact of problem-solving abilities on secondary school students' mathematical achievement and to comprehend the combined effects of gender and problem-solving abilities on students' mathematical performance. 400 secondary students made up the study's sample, and they were chosen using a multistage sampling technique. To measure how well students could solve problems, Dubey created and tested the ‘Problem-Solving Ability Test’ in 2011, and the ‘mathematics achievement test’ (MAT) created by Singh, P., and Jaika, M. L. in 2015 was used. The information gathered was analysed using TWO-WAY ANOVA with a 3x2 factorial design.

Additionally, the groups' levels of variation for the ANOVA test were examined using Levene's Test of Homogeneity of Variance. The study found that the ability to solve problems and gender had a noteworthy impact on how well high school students did in achievement of mathematics.

Statement of the problem

In this research, a study has been done on the Class VII students studying in middle schools in varanasi district to check the effectiveness of Vedic teaching method in mathematics based on their gender and Problem-Solving Ability. The title is “*A Comparative Study on the Problem-Solving Ability of Students Taught Using Conventional and Vedic Teaching Methods in Mathematics.*”

Objectives of the study

1. To check the effectiveness of the Vedic teaching method on the problem-solving ability in mathematics of Class VII students.
2. To check the effectiveness of the Vedic teaching method on the problem-solving ability in mathematics of Class VII male and female students.

Hypotheses of the study

1. There is no significant difference between the mean scores of the problem-solving ability in mathematics among the students of Class VII after learning through the Vedic teaching method and the Conventional teaching method.
2. There is no significant difference between the mean scores of the problem-solving ability in mathematics among the male students of Class VII after learning through the Vedic teaching method and the Conventional teaching method.
3. There is no significant difference between the mean scores of the problem-solving ability in mathematics among the female students of Class VII after learning through the Vedic teaching method and the Conventional teaching method.
4. There is no significant difference between the mean scores of the problem-solving ability in mathematics among the male and female students of Class VII after learning through the Vedic teaching method.

Population and Sample Selection

The present study will be carried out in Varansi district. Hence, the population consisted of Class VII students enrolled in *government-aided schools* in the Varanasi district of the state of Uttar Pradesh. In the present study, “*Random Sampling for sample selection, followed by Purposive sampling for Assignment to experimental and control groups*”.

There were 140 students in the sample. In which, there were 70 students in the experimental group and 70 in the control group.

Variable of the Study

The variables of the present study are as follows:

1) Dependent Variable

Students' problem-solving ability in mathematics

2) Independent Variable

Vedic Mathematics

Conventional teaching method

3) Intervening Variables

General Mental Ability

Academic Ability of the students in Mathematics

Enthusiasm and Interest towards the subject

Other's help

Novelty of the study

Research Method and Planning of Experimental Program

The researcher has used the experimental research method. First of all, the students on both groups were given a L.N.Dubey problem solving ability test as pre-test. The experimental group and the control group were then matched based on their mathematical Addition & Subtraction, multiplication, square and square root scores. The two groups were determined to be equal. As a result, both groups could receive the intended intervention. Out of the two groups chosen for this study, the experimental group received instruction in a few mathematics topics using the Vedic Teaching Method, while the control group received instruction in the same topic using the Conventional Teaching Method of Instruction. After the treatment, a common posttest was given to both groups, and their effect was measured. In this study to check the effectiveness of the Vedic mathematics based on the concept of Addition, Subtraction, multiplication, square and square root of Mathematics syllabus of the class VII school students.

Research Tool

For testing the problem-solving ability in mathematics, the researcher used L.N. Dubey and C.P. Mathur (2017) test.

Method of Data Collection and Analysis

The students were being taught addition, subtraction, multiplication, square and square root by the researcher using the Vedic teaching method in experimental group and Conventional teaching method in control group. This process continued till 10 days. Then the group of students was given the post test and they were told to give their responses on it. Then the filled tests were collected back from the students. The scores of students post test were entered into M. S. Office Excel and all the numerical calculations were done using M. S. Office Excel. Then based on the students' scores of the test, the effects of independent variables on their problem-solving ability test were checked by average, standard deviation, and t-value.

Result and Discussion

Based on the students' scores of the control and experimental group, the effects of independent variables on their problem solving ability were checked and mean, standard deviation, variance and t-value were calculated.

Hypothesis 1: There is no significant difference between the mean scores of the problem-solving ability in mathematics among the students of Class VII after learning through the Vedic teaching method and the Conventional teaching method.

Table No. 1

Difference in Students' Mathematics Problem-Solving Ability Between Experimental and Control Groups

Group	N	Mean	S.D	df	Calculated t-value	Tabulated t-value	P-value	Result
Experimental	70	13.31	1.32	138	11.45	1.97	0.0001< 0.05	S*
Control	70	9.8	2.19					

S* = Significant at 0.05 level of significance

The values shown in the Table No 4.1, the means of Experimental and Control group are 13.31 and 9.8 respectively and the standard deviations (S.D) of Experimental and Control group are 1.32 and 2.19 respectively. The Calculated t-value has been found 11.45 which is greater than the tabulated t-value 1.97 at 0.05 level of significance and 138 degree of freedom(df). Therefore, it can be inferred that the difference between the means of experimental and control group is actual and the P-value 0.00001, which is less than 0.05. The results confirmed that the difference was statistically significant. Hence, the null hypothesis "There is no significant difference between the mean scores of the problem-solving ability in mathematics among the students of Class VII after learning through the Vedic teaching method and the Conventional teaching method" was rejected and the alternative hypothesis "There is a significant difference between the mean scores of the problem-solving ability in mathematics among the students of Class VII after learning through the Vedic teaching method and the Conventional teaching method" was accepted. The above finding comes to the conclusion that there is a difference between mean score of the experimental and control groups. So, the experimental group has a higher mean score than the control group. As a result, the experimental group outperformed the control group in students' problem solving ability in mathematics.

Hypothesis 2: There is no significant difference between the mean scores of the problem-solving ability in mathematics among the male students of Class VII after learning through the Vedic teaching method and the Conventional teaching method.

Table No. 2

Difference in Male Students' Mathematics Problem-Solving Ability Between Experimental and Control Groups

Group	N	Mean	S.D	df	Calculated t-value	Tabulated t-value	P-value	Result
Experimental	41	13.34	1.36	77	9.31	1.99	0.0001< 0.05	S*
Control	38	9.53	2.23					

S* = Significant at 0.05 level of significance

The values shown in the *Table No. 2*, the means of Experimental and Control group are 13.34 and 9.53 respectively and the standard deviation (S.D) of Experimental and Control group are 1.36 and 2.23 respectively. The calculated t-value has been found 9.31 which is greater than the tabulated t-value 1.99 at 0.05 level of significance and 77 degree of freedom(df). Therefore, it can be inferred that the difference between the means of experimental and control group is actual and the P-value 0.0001, which is less than 0.05. The results confirmed that the difference was statistically significant. Hence, the null hypothesis “*There is no significant difference between the mean scores of the problem-solving ability in mathematics among the male students of Class VII after learning through the Vedic teaching method and the Conventional teaching method*” was rejected and the alternative hypothesis “*There is a significant difference between the mean scores of the problem-solving ability in mathematics among the male students of Class VII after learning through the Vedic teaching method and the Conventional teaching method*” was accepted. The above finding comes to the conclusion that there is a difference between mean score of the experimental and control groups. So, the experimental group has a higher mean score than the control group. As a result, the experimental group outperformed the control group in male students’ problem solving ability in mathematics.

Hypothesis 3: There is no significant difference between the mean scores of the problem-solving ability in mathematics among the female students of Class VII after learning through the Vedic teaching method and the Conventional teaching method.

Table No. 3

Difference in Female Students' Mathematics Problem-Solving Ability Between Experimental and Control Groups

Group	N	Mean	S.D	df	Calculated t-value	Tabulated t-value	P-value	Result
Experimental	29	13.17	1.31	59	6.98	1.99	0.0001 < 0.05	S*
Control	32	9.78	2.29					

S* = Significant at 0.05 level of significance

The values shown in the *Table No.3*, the means of Experimental and Control group are 13.17 and 9.78 respectively and the standard deviation (S.D) of Experimental and Control group are 1.31 and 2.29 respectively. The calculated t-value has been found 6.98 which is greater than the tabulated t-value 1.99 at 0.05 level of significance and 77 degree of freedom(df). Therefore, it can be inferred that the difference between the means of experimental and control group is actual and the P-value 0.0001, which is less than 0.05. The results confirmed that the difference was statistically significant. Hence, the null hypothesis “*There is no significant difference between the mean scores of the problem-solving ability in mathematics among the male students of Class VII after learning through the Vedic teaching method and the Conventional teaching method*” was rejected and the alternative hypothesis “*There is a significant difference between the mean scores of the problem-solving ability in mathematics among the male students of Class VII after learning*

through the Vedic teaching method and the Conventional teaching method” was accepted. The above finding comes to the conclusion that there is a difference between mean score of the experimental and control groups. So, the experimental group has a higher mean score than the control group. As a result, the experimental group outperformed the control group in male students’ problem solving ability in mathematics.

Hypothesis 4: There is no significant difference between the mean scores of the problem-solving ability in mathematics among the male and female students of Class VII after learning through the Vedic teaching method.

Table No. 4

Difference Between Male and Female Students' Mathematics Problem Solving Ability in Experimental Group

Group	N	Mean	S.D	df	Calculated t-value	Tabulated t-value	P-value	Result
Male	41	13.34	1.36	68	0.525	2.00	0.6007 > 0.05	NS*
Female	29	13.17	1.31					

NS* = Not Significant at 0.05 level of significance

The values shown in the Table No 4.14, the means of male and female students are 13.34 and 13.17 respectively and the standard deviations (S.D) of male and female students are 1.36 and 1.31 respectively. The calculated t-value has been found 0.5 25 which is less than the tabulated t-value 2.00 at 0.05 level of significance and 68 degree of freedom(df). Therefore it can be inferred that the difference between means of male and female students are by chance not actual and the P-value 0.6007 is greater than 0.05, which confirming that the difference is not statistically significant. Hence, the null hypothesis “There is no significant difference between the mean scores of the problem-solving ability in mathematics among the male and female students of Class VII after learning through the Vedic teaching method” was not rejected and the alternative hypothesis “There is a significant difference between the mean scores of the problem-solving ability in mathematics among the male and female students of Class VII after learning through the Vedic teaching method” was rejected. The above finding comes to the conclusion that there is no difference between mean score of male and female students. Therefore, it can be concluded that the Vedic teaching method had an equal impact on male and female students.

Conclusion

The present study investigated the role of Vedic Mathematics in enhancing mathematics problem-solving ability among middle-level students. The analysis of data revealed that students who were taught using Vedic Mathematics showed significant improvement in their mathematics problem-solving ability compared to those who were taught through conventional methods. The findings are consistent with previous studies which suggest that Vedic Mathematics, with its simplified and logical sutras, reduces the complexity of mathematical calculations and enhances problem-solving ability among students. It was observed that students exposed to Vedic methods

developed greater interest, confidence, and accuracy in solving mathematical problems. Furthermore, the comparison between the experimental and control groups indicated that the integration of Vedic Mathematics methods had a statistically significant positive effect on students' problem-solving ability. This may be attributed to the fact that Vedic Mathematics enables mental calculations, promotes innovative thinking, and makes mathematics more engaging and less intimidating.

Educational Implications

- The findings of the research can benefit educational boards and curriculum designers in thinking about incorporating aspects of Vedic mathematics into regular instruction in mathematics.
- When implementing valuable elements of Vedic mathematics, students may improve their calculation skills, accuracy, and confidence.
- The study supports the use of Vedic Mathematics as a tool for students to develop higher-order thinking and analytical skills because it places an emphasis on pattern recognition, logical structure, and ability to think quickly.

References

- Behera, A. K. (2021). A study on the effectiveness of the Vedic method on multiplication for sixth-graders. *International Journal of Creative Research Thoughts*, 9(3).
- Chauhan, K. S., & Ali, M. F. (2021). Difference between Vedic mathematics and modern mathematics in multiplication algorithm. *International Journal of Engineering Research in Current Trends*, 3(3).
- Gupta, M., Kavita, & Pasrija, P. (2015). Effect of problem-solving ability on academic achievement of high school students: A comparative study. *Bhartiyam International Journal of Education & Research*, 4(2), 45–59.
- Ghatak, A., & Mittal, K. (2019). A review-based study on problem-solving ability of school students in relation to their academic achievement. *International Journal of Scientific Research in Science and Technology*, 6(2), 644–649.
- Hooda, M., & Devi, R. (2018). Effect of problem-solving ability on mathematics achievement among secondary school students: An empirical study. *International Journal of Research in Engineering, IT and Social Sciences*, 8(9), 147–150.
- Jakhar, L., & Singh, S. (2017). Problem solving ability of the adolescents in relation to their interest in science. *Educational Quest – An International Journal of Education and Applied Social Sciences*, 8(1), 61–65.
- <https://doi.org/10.5958/2230-7311.2017.00011.3>
- Jyothi, V. (2019). *A study on secondary school students 'attitude towards mathematics and their problem-solving ability* (Doctoral dissertation, Sri Padmavati Mahila Visvavidyalayam Tirupati). Shodhganga.

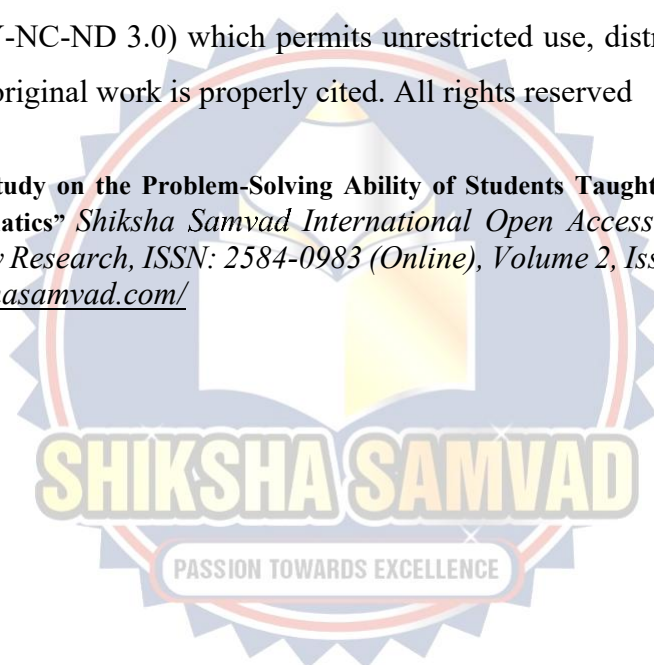
- <http://hdl.handle.net/10603/314699>
- Jakhar, L., & Singh, S. (2017). Problem solving ability of the adolescents in relation to their interest in science. *Educational Quest – An International Journal of Education and Applied Social Sciences*, 8(1), 61–65.
- <https://doi.org/10.5958/2230-7311.2017.00011.3>
- Katgeri, A. V. (2017). Effectiveness of Vedic mathematics in the classrooms. *Scholarly Research Journal for Interdisciplinary Studies*, 4(36).
- <https://doi.org/10.21922/srjis.v4i36.10016>
- Maheswari, V., & Benjamin, E. W. (2015). Problem solving ability and academic achievement in mathematics of VII standard students in Madurai district. *Indian Journal of Applied Research*, 5(2), 166–168. <https://doi.org/10.15373/2249555X/FEB2015/58>



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Cite this Article:

Jyoti Jha, “A Comparative Study on the Problem-Solving Ability of Students Taught Using Conventional and Vedic Teaching Methods in Mathematics” *Shiksha Samvad International Open Access Peer-Reviewed & Refereed Journal of Multidisciplinary Research*, ISSN: 2584-0983 (Online), Volume 2, Issue 4, pp.234-244, June 2025. Journal URL: <https://shikshasamvad.com/>





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Published in ‘Shiksha Samvad’ Peer-Reviewed and Refereed Research Journal and E-ISSN: 2584-0983(Online), Volume-02, Issue-04, Month June 2025, Impact-Factor, RPRI-3.87.

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