
Effect Of Multi-Sensory Teaching Strategies In Enhancing Problem Solving Abilities Of Higher Secondary Students In Mathematics

Introduction

The use of educational technology has been emphasized in both the national policy of education, 1986 and revised NPE, 1992 to improve both the quality and quantity of education for the first time in the history of Indian education. No earlier document of national significance had pointed out the importance of educational technology so clearly and as strongly as it has been done by the NPE, 1986. Spelling out its deployment, the NPE, 1986 has observed, "educational technology will be employed in the spread of useful information, the training and retraining of teachers, to improve the quality, sharpen awareness of art and culture, include abiding values etc. both in the formal and non-formal sections".

Mathematics is a form of reasoning. Thinking mathematically consists of thinking in a logical manner, formulating and testing conjectures, making sense of things, and forming and justifying judgments, inferences, and conclusions. We demonstrate mathematical behaviour when we recognize and describe patterns, construct physical and conceptual models of phenomena, create symbol systems to help us represent, manipulate, and reflect on ideas, and invent procedures to solve problems (Battista, 1999).

Title Of The Problem

The proposed study entitled as 'Effect of Multi-sensory Teaching Strategies in Enhancing Problem Solving Abilities of Higher Secondary Students in Mathematics'

Need And Significance Of The Study

All students can benefit from multisensory lessons, including students who don't have learning and attention issues. If a student learns something using more than one sense, the information is more likely to stay with him. But multisensory learning can be particularly helpful for learning and attention issues. Using multiple senses gives these students more ways to connect with what they're learning. This type of hands-on learning can make it easier for students to collect information, make connections between new information and what they already know, understand and work through problems, use nonverbal problem-solving skills. Multisensory instruction helps students tap into their learning strengths to make connections and form memories. And it allows them to use a wider range of ways to show what they've learned. Multisensory teaching takes into account that different learn in different ways. It helps meet the varying needs of all students learning and attention issues. And by providing multiple ways to learn, it gives every student in the class a chance to succeed.

Hence, the researcher felt a need of finding out the effect of multisensory strategy in learning Mathematical Concepts by the children with hearing impairment. Multisensory Strategies was

selected to make learning active, interesting, and concrete and above all activity centred.

Teaching students different strategies helps them transition between paper and pencil calculations and mental calculations. Most math problems can be figured out in our heads, even the really hard ones, if we can hold all the numbers there. Students will find strategies that work for them. We just need to teach multiple strategies so students can find the ones that resonate for them. Ideally, we want students to be flexible mathematical thinkers. We want them to be good at math and feel confident about their ability to “do” math. In order to do that, teach students different ways to solve problems in the hope that one of the ways will resonate with each student.

Individuals differ in their ability to solve problems. The difference in working memory skills underlies differences in problem-solving ability. Understanding the problem, devising a plan to solve the problem, implementing the plan, and reflecting on the problem and learning other problem-solving strategies will enable students to deal more effectively and successfully with most types of problems. These problem-solving processes could be very useful in education, mathematics, science, social sciences and other subjects. Students should be encouraged to develop and discover their own problem-solving strategies and become adept at using them for problem-solving.

Objectives of the Study

- To identify the difficult areas in higher secondary mathematics curriculum.
- To prepare a list of mathematics content leads to develop problem solving abilities among higher secondary students.
- To develop an instrument (pre-test) to measure the previous problem solving abilities of higher secondary mathematics students.
- To find out the previous problem solving ability of higher secondary students through administration of a pre-test.
- To find out the significant differences, if any, in the problem solving ability of higher secondary mathematics students due to variations of selected intervening variables.
- To prepare and develop a package/module based on multi-sensory teaching strategies to enhance higher secondary mathematics students' problem solving ability.
- To implement the developed intervention programme to enhance the problem solving ability of higher secondary mathematics students.
- To find out the effect of the developed intervention programme on problem solving ability of higher secondary mathematics students after implementing the developed intervention programme through administration of a post-test.
- To find out the significant differences, if any, between the problem solving abilities of higher secondary mathematics students before and after adopting the developed intervention programme based on multi-sensory teaching strategies.
- To find out the significant differences, if any, in the problem solving abilities of higher secondary mathematics students due to the variations in selected intervening variables after adopting the developed intervention programme based on multi-sensory teaching strategies.
- To find out the retention scores of developed intervention programme based on multi-sensory teaching to enhance problem solving abilities of higher secondary mathematics students.

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- To find out the opinion of higher secondary mathematics students towards the intervention programme based on multi-sensory teaching strategies to enhance problem solving abilities of higher secondary mathematics students.

Hypotheses of the study

- There is significant difference between the previous problem-solving ability of higher secondary students through the administration of a pre-test.
- There is a significant difference, if any, in the problem-solving ability of higher secondary mathematics students due to variations of selected intervening variables.
- There is significance difference between the implementing the developed intervention program to enhance the problem solving ability of higher secondary mathematics students
- There is significance difference between the effect of the developed intervention program on the problem-solving ability of higher secondary mathematics students after implementing the developed intervention program through administration of a post-test.
- There is significant differences, if any, between the problem-solving abilities of higher secondary mathematics students before and after adopting the developed intervention program based on multi-sensory teaching strategies.
- There is significant differences, if any, in the problem-solving abilities of higher secondary mathematics students due to the variations in selected intervening variables after adopting the developed intervention program based on multi-sensory teaching strategies.
- There is significant difference between the retention scores of a developed intervention programme based on multi-sensory teaching strategies to enhance the problem-solving abilities of higher secondary mathematics students.
- There is signfance difference between the opinion of higher secondary mathematics students towards the intervention programme based on multi-sensory teaching strategies to enhance the problem-solving abilities of higher secondary mathematics students.

Quasi-Experimental Parallel Group Design

Independent

Variable

- multi-sensory teaching strategies

Dependent Variable

- Problem Solving Ability

Intervening

Variables

- a) Gender

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- b) Locality of students
 - c) Nature of stay
 - d) Availability of computer in home

3 Higher Secondary schools at Dharmapuri District, Tamil Nadu (Approximately 40 to 50 students will be selected from each school – 3 Classrooms for Control Group and 3 classrooms for Experimental Group))

Sampling

Technique

Systematic random sampling

- Check list to prepare the list of mathematics content which lead to develop problem solving ability among higher secondary students.
- Problem solving ability test (For pre-test and post-test)
- Intervention Programme Package/Module based on multi-sensory teaching strategies to improve problem solving abilities of higher secondary mathematics students.
- Opinionnaire to find out the students' views towards the intervention programme.

The statistical techniques to be employed to analyse the data will be decided after checking the normality of the data.

Scoring Procedure

The final format of the achievement test will be scrutinized through Pilot study, the test will be given to 10 high school teachers and Professors of Mathematics for establishing the reliability and validity. Mathematics related concept consists of multiple choice items which cover four points type. The high school teachers were asked to put a tick (✓) mark against each question in any one of the columns. Item Analysis will be conducted and then reliability will be found out for the achievement test. Likewise the content validity is checked in Mathematics by the Professors of Mathematics and experts in Education Technology.

Educational Implications of the Proposed Study

The researcher also indicates that integration occurs when teachers know how and when to use technology to help students learn. Due to effective time management the students can learn in their own pace through this multi-sensory teaching strategy on problem-solving ability in Mathematics. It helps in development of higher order thinking skills. And it helps in developing group and interpersonal skills. Multi-sensory teaching strategies can be used to think effectively, practice problem solving and decision making. It enables students to represent information using several different media. It allows for self-paced learning and discovery, students can take the time they need and choose the path of learning in a meaningful way. It can be encouraged to be implemented to use in adult education.

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