

A Comparative Study On Problem-Solving Ability In Mathematics Among Secondary School Students Through Traditional (Offline) Teaching And Online Modes Of Teaching

Lisheetha P.V
Dr. Vasumathi. T
Dr. Aruna. P.K

Senior Research Fellow, Department Of Education. University Of Calicut
Assistant Professor, Department Of Education. University Of Calicut
Professor, Department Of Education. University Of Calicut

Abstract:

Almost every academic topic is connected to the study of mathematics and how it manifested in Kerala secondary school pupils' aptitude for problem-solving ability. The best possible strategy for the efficient transfer of knowledge must be chosen to raise the standard of education. The current state of our learners must be understood to choose the most effective approach. Therefore, it is important to assess how well secondary school pupil's problem-solving ability in mathematics is when taught using traditional (offline) versus online methods. A sample of 250 secondary school students in the Kozhikode district participated in the survey. The survey approach was used. Data were gathered using the Test of Problem-Solving Ability in Mathematics (Aruna & Lisheetha, 2018). Tests evaluating the significance of the difference between means and percentage analysis were the statistical methods utilized for data analysis and interpretation. The study's conclusions showed that secondary school pupils in Kerala varied significantly in their capacity of problem-solving ability in mathematics.

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Education is the process of fostering growth in a person's intellectual, emotional, and sensory-motor domains; reading, writing, and math development are the key areas of focus. Thus, mathematics holds an important place in education. Almost every academic field has connections to mathematics. It is more than just a subject; it is also a language. Mathematical language provides a useful symbolism for the idea's concise and accurate expression. So, a major portion of the school curriculum is devoted to mathematics, dubbed "the queen of all sciences." The development of talents, knowledge, and skills that transfer to tasks not specifically included in the curriculum is the main objective of all education. In the teaching of mathematics, the capacity for problem-solving is vital. This is where mathematics differs from other disciplines taught in schools: it offers a broad range of problem-solving opportunities that challenge students' and instructors' critical thinking.

On 10th March 2020, Kerala's schools were closed owing to the pandemic situation. Mobility has been impacted by the epidemic and social life has essentially come to a complete halt. Children are compelled to develop new behaviors in such an odd setting. The pandemic's expansion has compelled the State Department of Education to organize fresh programs to address the unheard-of circumstances. Kerala's government decided to give students access to an online platform starting on 1st June 2020. To do this, the government launched the "FIRST BELL" online education program, which aired on the VICTERS education channel and included online instruction from teachers. How the pupils are taught is not meant to make up for the required minimum number of instructional days in a school year. This study compares secondary school students in Kerala who received their instruction from teachers using the traditional method before the COVID pandemic with those who received their instruction online to see how the online mode of teaching affected the students' problem-solving ability in mathematics. Comparing the mathematical problem-solving abilities of secondary school students who received instruction from teachers via traditional and online modes is important to determine the most appropriate and suitable method for efficiently transferring content to enhance the quality of mathematics education.

I. Objectives Of The Study

The following are the objectives formulated for the present study.

1. To find out the level of problem-solving ability in mathematics among secondary school students in Kozhikode district who got instructions from teachers through traditional (offline) teaching and online teaching.
2. To find out whether there exists any significant difference in the mean scores of problem-solving ability in mathematics who got instructions from teachers through traditional (offline) teaching and online teaching.

Hypotheses of the Study

The following are the hypotheses formulated for the present study

1. There will be significant difference in the mean scores of problem-solving ability in mathematics. who got instructions from teachers through traditional (offline) teaching and online teaching.

Methodology

The descriptive survey approach is used in this study since it is the most suitable for determining the situation.

Sample of the Study

The investigators in the current study selected a sample of 250 secondary school students from the Kozhikode district using the stratified random sampling approach.

Tools Used

To achieve the objectives of the study the investigator used –

Test of Problem-Solving Ability in Mathematics for Standard IX Pupils (Aruna & Lishetha, 2018)

The current test uses items related to application, cause-and-effect linkages, and inductive reasoning. Forty-five multiple-choice made up the final test that the investigator created. The test had a set duration of forty-five minutes. For the chosen themes, the content was given weightage. The researcher employed content validity to guarantee the reliability of the Mathematics Problem-Solving Ability Test. To determine the test's reliability, the investigator employed the test-retest method.

Statistical Techniques Used

The collected data were analyzed by using; Preliminary tests (Mean, Median, Mode, Skewness, and Kurtosis). Test of significance of difference between means to accept or reject the hypotheses.

II. Results And Discussion

Level of Problem-Solving Ability in Mathematics of Secondary School Students through Traditional (offline) method of Teaching.

In this section, the percentage of problem-solving ability in Mathematics is found out for the total sample through the traditional (offline) methods of teaching and is given in Table 1

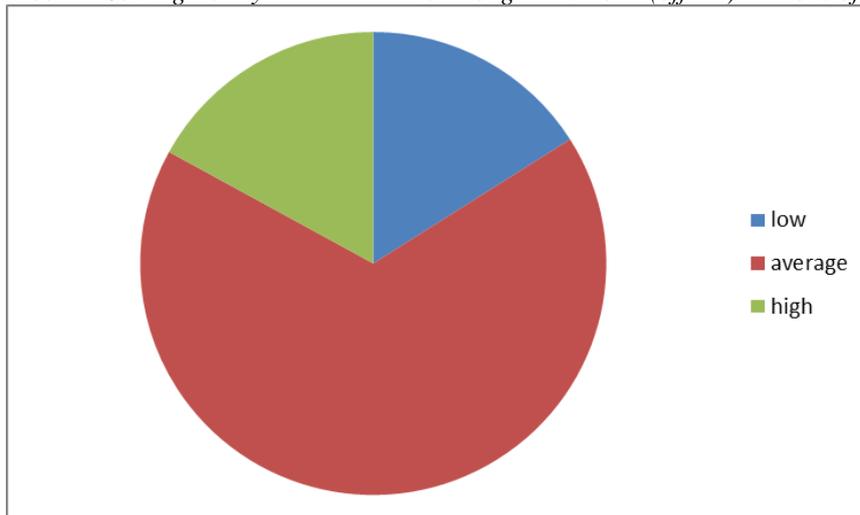
Table 1
Details of Level of Problem-Solving Ability in Mathematics among Secondary School Students for the Total Sample through traditional (offline) method of teaching.

Variable	Number of total students	Level of scores	Students number	% of students
Problem-solving ability in mathematics (Traditional (offline) method of teaching)	125	Low	20	16%
		Average	84	67%
		High	21	17%

Table 1 shows that, for the total sample, 16 percent of students have low problem-solving ability in Mathematics and 17 percent of students have high problem-solving ability in mathematics. Then 67 percent of the students have average problem-solving ability in Mathematics through traditional (offline) methods of teaching.

Figure 1

Level of Problem-Solving Ability in Mathematics through traditional(offline) methods of teaching.



Level of Problem-Solving Ability in Mathematics of Secondary School Students through online mode of teaching.

The data and results of different levels regarding problem-solving ability in mathematics of secondary school students through online mode of teaching are given in Table 2.

Table 2

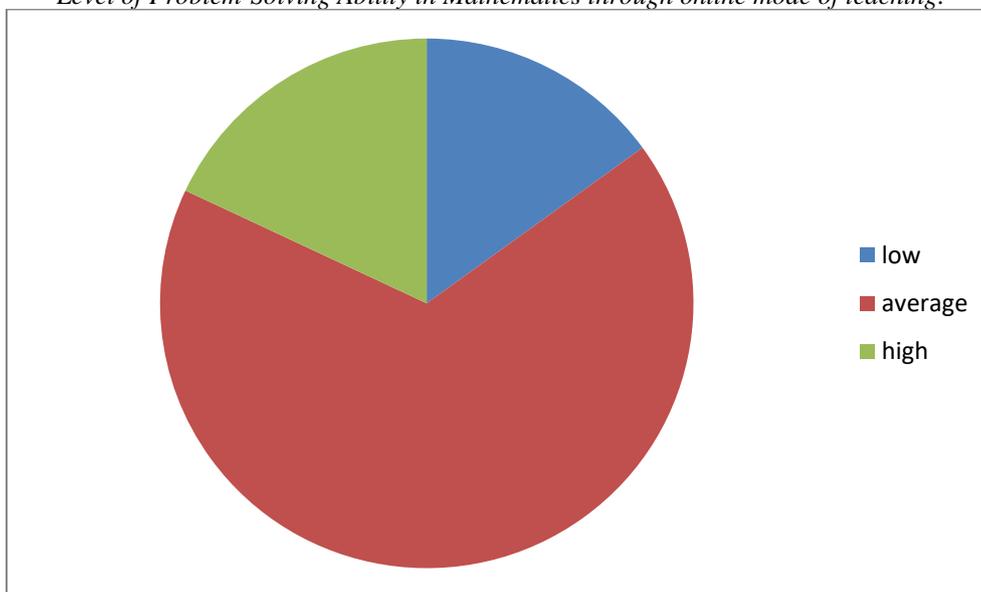
Details of Level of Problem-Solving Ability in Mathematics among Secondary School Students for the Total Sample through online mode of teaching.

Variable	Number of total students	Level of scores	Students number	% of students
Problem-solving ability in mathematics (online mode of teaching)	125	Low	19	15%
		Average	84	67%
		High	22	18%

Table 2 shows that, for the total sample, 15 percent of students have low problem-solving ability in Mathematics, and 18 percent of students have high problem-solving ability in mathematics. Then 67 percent of the students have average problem-solving ability in Mathematics through online mode of teaching.

Figure 2

Level of Problem-Solving Ability in Mathematics through online mode of teaching.



Comparison of Mean Scores

Comparison of Mean Scores of Problem-Solving Ability in Mathematics for the Total Sample: Traditional(offline) method and online mode of teaching.

The investigation revealed that secondary school pupils' mean scores on the ability to solve mathematical problems varied. For this reason, the two-tailed test of the significance of the difference between means and outcomes analyzed is used to the secondary school students' mathematical problem-solving ability through both traditional (offline) and online modes of instruction.

The data and results of 't' tests for the mean scores of problem-solving ability in mathematics for the total samples through traditional (offline) and online modes of teaching are presented in Table 5

Table 5

The Data and Results of Comparison of Mean Scores of Problem-Solving Ability in Mathematics for the Total Samples Traditional(offline) teaching and Online mode of teaching.

Variable	Number of samples	Mean	Standard Deviation	Critical Ratio
Problem-solving ability in mathematics (Traditional (offline)method of teaching.)	125	30.53	5.33230	22.177**
Problem-solving ability in mathematics (Online mode of teaching)	125	17.16	5.64384	

** significant at 0.01 level

The critical ratio for the variable problem-solving ability in mathematics acquired through traditional and online forms of instruction is 22.17762, as seen in the above table. This value is higher than the 2.58 table value needed for significance at the 0.01 level. This demonstrates that the capacity to solve mathematical problems using traditional (offline) and online education methods differs significantly. The ability to solve mathematical problems using the Traditional (offline) technique is linked to the high mean scores. This indicates that secondary school students who received training via traditional (offline) techniques are more adept at problem-solving ability than those who received instruction online.

III. Major Findings Of The Study

There exists a significant difference in problem-solving ability in mathematics among secondary school students using traditional (offline) techniques and online learning environments. The secondary school students who received instruction through traditional (offline) methods received teaching via conventional (offline) techniques are more adept and have higher problem-solving ability than the secondary school students who received instruction through Online mode.

IV. Conclusion

This leads to the conclusion that there are notable differences in secondary school pupils' capacity for problem-solving ability in mathematics using traditional (offline) methods and online learning environments. Compared to secondary school pupils who received teaching online, those who received instruction through the conventional (offline) technique had a greater level of problem-solving ability.

V. Educational Implication Of The Study

1. This comparison research will assist in determining which approach is better for math instruction and learning.
2. This study will be helpful to understand the learner's ability to acquire and apply knowledge, information and skills will be better understood due to this study, which will also aid with secondary curriculum development.
3. This research will contribute to the development of innovative techniques and approaches, such as blended learning classrooms, for the efficient transfer of mathematical material.

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