

10.5281/zenodo.22275020

A STUDY ON MATHEMATICAL THINKING SKILLS OF HIGHER SECONDARY SCHOOL STUDENTS WITH RESPECT TO SOME SELECTED VARIABLES

R. Rajalakshmi^{1*}, R. Padmapriya² and K. Velu³

¹Research Supervisor, Assistant Professor, Department of Value Education, Tamil Nadu Teachers Education University, Chennai – 97, Email: rajamtnteu@gmail.com

²M. Ed Scholar, Tamil Nadu Teachers Education University, Chennai, Email: danyasripriya@gmail.com

³Assistant Professor, Jayalakshmi Narayanasami College of Education, Chennai Email: kvelu.jk@gmail.com

Received: 02/04/2026

Accepted: 27/04/2026

Corresponding Author: R. Rajalakshmi
(rajamtnteu@gmail.com)

ABSTRACT

The present study was undertaken to investigate the mathematical thinking skills of higher secondary school students. Mathematical thinking skills are essential for developing logical reasoning, critical thinking, problem-solving ability, creativity, and decision-making skills among students. These skills enable learners to understand mathematical concepts effectively and apply them in academic and real-life situations. The study adopted the descriptive survey method. A sample of 200 higher secondary school students was selected from various schools in Chennai District, Tamil Nadu. The Mathematical Thinking Skills Scale was used for data collection. The study aimed to determine the mathematical thinking skills among the higher secondary school students and to identify differences in mathematical thinking skills with respect to gender, class of study and medium of instruction. The collected data were analyzed using appropriate statistical techniques such as Mean, Standard Deviation, and t-test. The findings revealed that differences were observed between male and female students as well as between XI and XII standard students and medium of instruction in certain dimensions of mathematical thinking skills. The study highlights the importance of providing suitable learning experiences that encourage reasoning, analysis, creativity, and problem-solving among students.

KEYWORDS: Mathematical Thinking Skills, Higher Secondary Education.

1. INTRODUCTION

Education is an important process in man's life. It begins from birth and continues till death, and thus it is never ending process. It is through education that child develops his thinking and reasoning, problem solving and creativity, intelligence and aptitude, positive sentiment and skills, good values and attitudes. Education helps the child in making adjustment with his own self and other members of society. Education deals with inculcating the norms, values, skills, attitudes and traditions for survival as a healthy social being. An education of good quality must understand the past, be relevant to the present and to have a view to the future, addressing development needs and aspirations of the individual as well as the nations. Education holds the treasure of knowledge, but this knowledge should be practically applicable. Traditionally viewed as a subject focused on calculations and formulas, mathematics is now recognised as a broader framework for logical reasoning and analytical thinking (Robinson Kp 2026). Thinking is required in this process in order to make solid judgments, behave morally, and be able to adapt to changes in any situation (Varsha Tripathi & Shruti Tiwari (2024). Therefore, education should impart skills and qualities to empower one for the future.

1.1. Statement of the Problem

Thinking skills are widely recognized as an important determinant of individual's behavior. It is believed that an individual student thinking about problem solving, as it facilitates one's performance of academic achievement. The thinking potential varies from one student to the other student. Problem solving has a special importance in the study of mathematics as it develops the ability to solve variety of mathematical problems and this leads to favorable achievement of the students. Students' ability to think and solve problems independently for better adjustment in a future complex society. This study investigated Higher secondary School students Mathematical thinking skills along with some selected demographic variables.

1.2. Need And Significance of the Study

Thinking skill can be developed through a process of mathematics learning because mathematics has a structure and a strong and clear connectivity between its concepts to students, with mathematical open-ended problems and contextual problem will challenge students to solve the problem up to encourage students to mathematical thinking. Efforts should be made on an ongoing basis using various

methods and appropriate learning methods in developing the thinking skills. Most of the teachers use the textbooks only that involve low-level thinking skills such as memorizing facts. Therefore, there is necessary learning material covering complex issues to support the development of mathematical thinking skills in the classroom. So, the investigator attempts to find out the mathematical thinking of higher secondary school students.

1.3. Objectives

1. To find out the significance of difference in the Mathematical Thinking Skills of higher secondary school students with respect to their Class of Study.
2. To find out the significance of difference in the Mathematical Thinking Skills of higher secondary school students with respect to their Gender.
3. To find out the significance of difference in the Mathematical Thinking Skills of higher secondary school students with respect to their Medium of Instruction.

1.4. Hypotheses

1. There is no significant difference in the Mathematical Thinking Skills of higher secondary school students with respect to their Class of Study.
2. There is no significant difference in the Mathematical Thinking Skills of higher secondary school students with respect to their gender.
3. There is no significant difference in the Mathematical Thinking Skills of higher secondary school students with respect to their Medium of Instruction.

2. METHODOLOGY

The present study is the investigation of Mathematical thinking skills of higher secondary school students. The investigator has adopted descriptive survey method. A total sample of 200 was collected from a Government, Government-aided and Private higher secondary schools randomly. Mathematical thinking skills questionnaire was used to collect data which was constructed and validated by the investigator. Reliability of the tool is 0.9 and so it is highly reliable to conduct the study. The collected data were statistically analysed using Mean, Standard Deviation, 't' test and 'f' test with the support of spss.

2.1. Delimitations Of the Study

1. The study was confined only to the Higher Secondary School Students.
2. The study was conducted in selected schools located in Chennai District, Tamil Nadu.
3. The sample of the study consisted of 200 students studying in XI and XII standards.

2.2. Hypotheses Testing

1. There is no significant difference in the Mathematical Thinking Skills of higher secondary school students with respect to their Class of Study.

Table 1: Mathematical Thinking Skills of Higher Secondary School Students with Respect to Their Class of Study.

Class of Study	N	Mean	SD	't' Value	Level of Significance at 0.05%
11	68	151.49	18.19	3.90	Significant
12	132	142.14	14.81		

Table 1 shows that the obtained 't' value is 3.90 at 0.05 level of significance is less than the critical values (1.96). Hence there exists a significant difference in the Mathematical Thinking Skills of higher secondary school students with respect to their class

of study. Therefore, the null hypothesis that there is no significant difference in the Mathematical Thinking Skills of higher secondary school students with respect to their Class of Study is not accepted.

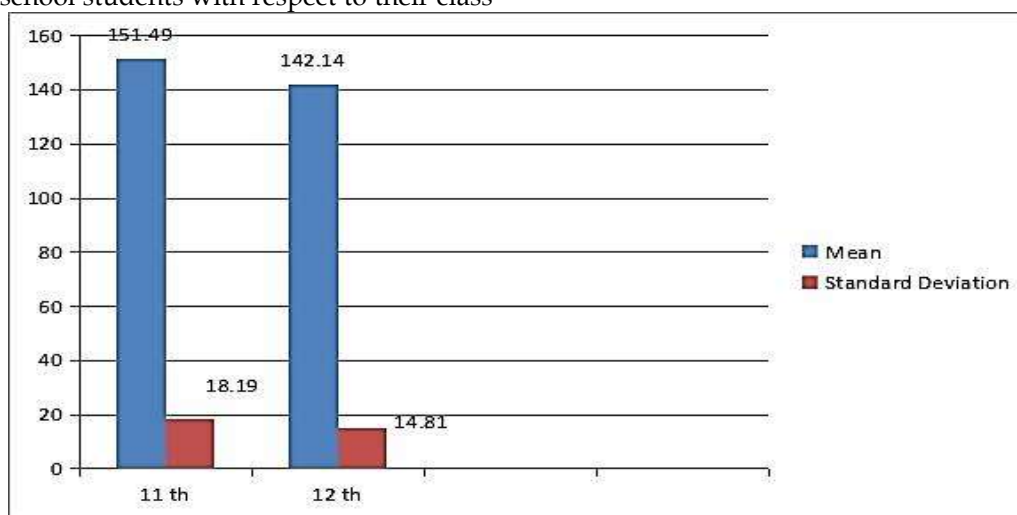


Figure:

2. There is no significant difference in the Mathematical Thinking Skills of higher

secondary school students with respect to their gender.

Table 2: Mathematical Thinking Skills of Higher Secondary School Students with Respect to Their Gender.

Gender	N	Mean	SD	't' Value	Level of Significance at 0.05%
Male	101	141.61	15.14	3.261	Significant
Female	99	149.09	17.23		

Table 2 shows that the obtained 't' value is 3.261 at 0.05 level of significance is more than the critical values (1.96). Hence there exists a significant difference in the Mathematical Thinking Skills of higher secondary school students with respect to

their gender. Therefore, the null hypothesis that there is no significant difference in the Mathematical Thinking Skills of higher secondary school students with respect to their gender is not accepted.

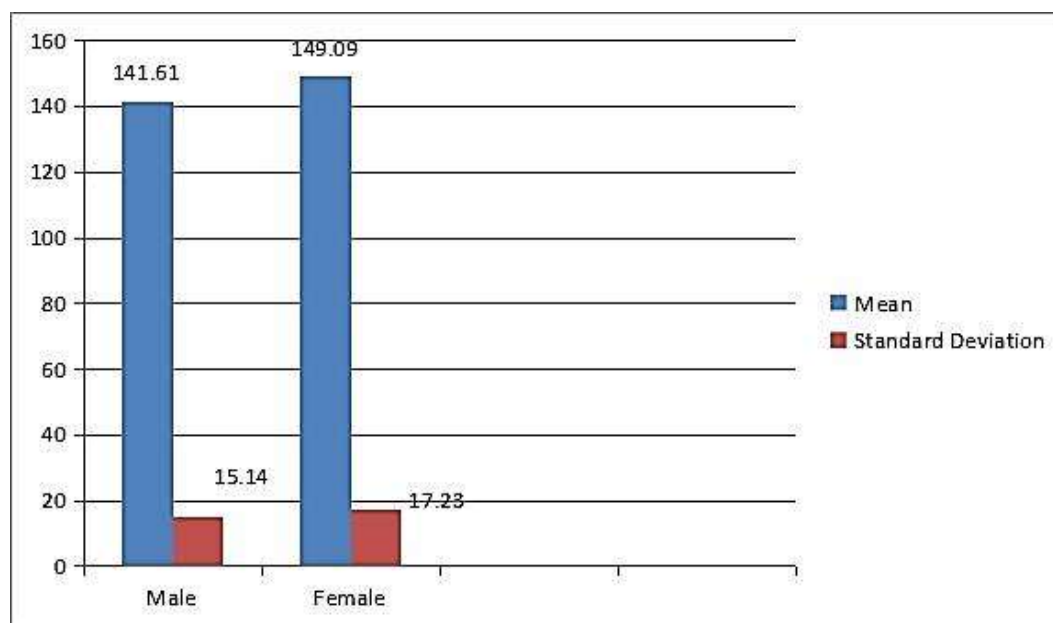


Figure:

3. There is no significant difference in the Mathematical Thinking Skills of higher

secondary school students in relation to their Medium of Instruction.

Table 3: Mathematical Thinking Skills of Higher Secondary School Students with Respect to Their Medium of Instruction.

Medium of Instruction	N	Mean	SD	't' Value	Level of Significance at 0.05%
Tamil	171	143.42	16.28	4.082	Significant
English	29	156.52	14.01		

Table 3 shows that the obtained 't' value is 4.082 at 0.05 level of significance is more than the critical values (1.96). Hence there exists a significant difference in the Mathematical Thinking Skills of higher secondary school students with respect to

their Medium of Instruction. Therefore, the null hypothesis that there is no significant difference in the Mathematical Thinking Skills of higher secondary school students with respect to their Medium of Instruction is not accepted.

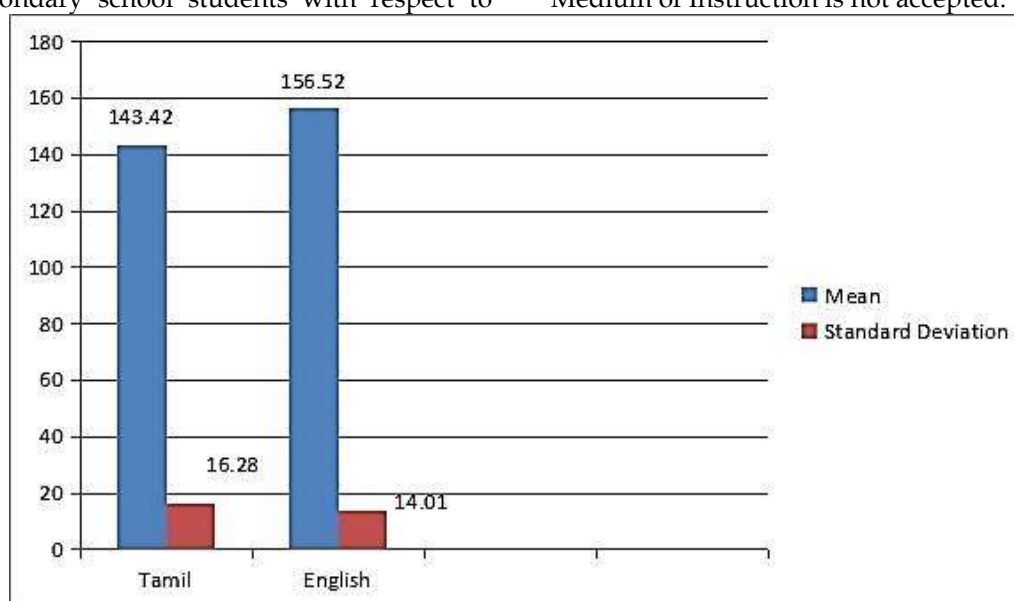


Figure:

3. FINDINGS OF THE STUDY

1. There exists a significant difference in the Mathematical Thinking Skills of higher secondary school students with respect to their class of study.
2. There exists a significant difference in the Mathematical Thinking Skills of higher secondary school students with respect to their gender.
3. There exists a significant difference in the Mathematical Thinking Skills of higher secondary school students with respect to their Medium of Instruction

4. DISCUSSION

The present study was undertaken to investigate the mathematical thinking skills of higher secondary school students. Mathematical thinking skills are essential for developing logical reasoning, critical thinking, problem-solving ability, creativity, and decision-making skills among students. These skills enable learners to understand mathematical concepts effectively and apply them in academic and real-life situations. The findings revealed that differences were observed between male and female students as well as between XI and XII standard students and medium of instruction in certain dimensions of mathematical thinking skills. The study highlights the importance of providing suitable learning experiences that encourage reasoning, analysis, creativity, and problem-solving among students.

5. EDUCATIONAL IMPLICATIONS

1. Mathematics teachers should provide opportunities for students to engage in problem-solving and logical reasoning activities.

2. Classroom teaching should emphasize analytical thinking and mathematical reasoning rather than rote memorization.
3. Schools should organize mathematics clubs, quizzes, and enrichment programmed to develop Mathematical Thinking Skills.
4. Curriculum planners should include more activities that promote higher-order thinking skills.

6. CONCLUSION

The findings of the study revealed that Mathematical Thinking Skills play an important role in the academic development of students. Significant differences were observed in Mathematical Thinking Skills with respect to variables such as gender, class of study and medium of instruction. Mathematics develops logical reasoning, analytical thinking, data interpretation, and problem-solving abilities that are essential for the academic performance of the students. In the modern knowledge economy, the ability to analyse information critically and conduct evidence-based inquiry is increasingly valuable and which is highly essential for the students. Therefore, education systems must move beyond rote learning and promote integrated approaches that combine mathematical understanding with practical research experience. Thinking has to be incorporated and prioritized in the curriculum while teaching mathematics in schools so that students may acquire the skills and use them to enhance their performance and reasoning ability. Thus, the study emphasizes the need for innovative instructional strategies and enriched learning experiences to foster Mathematical Thinking Skills among Higher Secondary School Students and thereby improve their Academic Achievement.

REFERENCES

- Balaji, V. Rajalakshmi, R. (2025). A Study on Mathematical Thinking Skills of High School Students with respect to certain selected variables, *Education Today*, 17 (10), 1-8.
- Kp, Robinson (2026). Mathematical Skills of High School Students and their Correlation with Research Capabilities. Retrieved on 10.08.2026 from <https://www.researchgate.net/publication/405327352>
- Varsha Tripathi, Shruti Tiwari (2024). A Study on Effects of Thinking Skill on Performance of School Students in Mathematics at Secondary Level. *SGVU International Journal of Convergence of Technology and Management*, 10 (1), 37-41 Retrieved on 10.08.2026 from https://www.gyanvihar.org/journals/wpcontent/uploads/2024/Page_37_to_41.pdf
- Balaji, V. (2025). A Study on Mathematical Thinking Skills Logic and Problem-Solving Skills of High School Students in relation to School Environment. Ph.D Thesis submitted to Tamil Nadu Teachers Education University, Chennai, TN.