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Metacognitive Thinking and Academic Achievement of Higher Secondary Students

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ABSTRACT

Metacognitive thinking is increasingly recognized as a key factor influencing academic achievement. Here Researcher worked with two variables Metacognitive Thinking and Academic Achievement. The study aimed to explore overall metacognitive thinking with respect to gender, locality, and type of school. Additionally, the researcher sought to identify the correlation between metacognitive thinking and academic achievement among higher secondary students. A random sample of 200 Higher Secondary students were taken from Saraswati Trust School and Bedibhawan Rabitirtha Vidyalaya in Nadia West Bengal was selected for this research. To collect data, the researcher developed one questionnaire based on a five-point Likert scale. These research tools were standardized with the help of experts to ensure their validity. Various statistical techniques, including Mean, Standard Deviation, t-test, and Pearson's product-moment correlation, were employed for data analysis. Each technique served a specific purpose in analyzing and interpreting the data. The study revealed a significant difference in metacognitive thinking about gender, locality, and type of school. Additionally, the researcher found a positive but low correlation between metacognitive thinking and academic achievement.

Keywords: Academic Achievement, Higher Secondary, Metacognitive Thinking.

1. INTRODUCTION

John Flavell introduced the concept of Metacognition in 1970, commonly defined as "thinking about thinking," which refers to the awareness and regulation of one's cognitive processes. Metacognition is a component of effective learning because it enables individuals to adapt their cognitive strategies to improve understanding and problem-solving. Two components of metacognition are -

i. **Metacognitive Knowledge:** This involves understanding one's cognitive abilities and the strategies that can be used to manage them. It includes knowledge of an Individual's strengths and weaknesses in learning. Understanding the nature and demands of different tasks. Knowing which strategies are effective for which types of tasks.

ii. **Metacognitive Regulation:** This refers to the processes used to control cognitive activities. planning, monitoring, and evaluating are three fundamental components of metacognitive regulation.

2. OPERATIONAL DEFINITION OF THE KEY TERMS

2.1. Metacognitive Thinking

Metacognitive thinking is the awareness and understanding of one's own thought processes. It involves thinking about one's thinking and includes planning, monitoring, and evaluating cognitive activities.

2.2. Academic Achievement

Academic achievement, or performance, measures how well educational goals are met by students, teachers, or institutions. It can be assessed through benchmarks like completing diplomas or degrees, standardized test scores, grades, and other indicators of progress and competence.

2.3. Higher Secondary

Higher Secondary, also called Senior Secondary in some regions, refers to education in the eleventh and twelfth grades. Schools offering these grades are known as Higher Secondary schools.

3. REVIEW OF RELATED LITERATURE

The Researcher had completed 30 reviews, some of which are presented here.

1) Acharya.S (2021). Studied "*Metacognitive Skills and Academic Achievement of Higher Secondary School Students*"

The objective was to study higher secondary school students' metacognitive skills and academic achievement.

A random sample of 200 higher secondary school students was surveyed using a Metacognitive Skills Scale standardized by Gupta and Suman (2017).

The obtained scores were statistically correlated with their academic achievement scores. The results indicate a strong correlation between the chosen variables, highlighting the importance of developing metacognitive awareness and skills to enhance learning outcomes in adolescent learners.

2) Aljaberi N.M (2015). The study. titled "*University Students' Level of Metacognitive Thinking and Their Ability to Solve Problems*" aimed to explore the relationship between metacognitive thinking and the ability to solve mathematical and scientific problems among university students. The study involved 172 students and utilized two key instruments: a metacognition awareness inventory and a researcher-developed test for solving mathematical and scientific problems.

The findings revealed that university students exhibited a medium level of metacognitive thinking. Additionally, factors such as gender, faculty, high school background, and current year of study did not influence their level of metacognitive thinking. However, the study also highlighted that student generally struggled with solving mathematical and scientific problems, and no significant correlation was found between their overall level of metacognitive thinking and their problem-solving abilities.

3) Ayodele S.C (2022). a study titled "*META-COGNITIVE ABILITY AND STUDENTS' ACADEMIC PERFORMANCE*"

This study investigated the relationship between the components of metacognitive ability and students' performance in Mathematics. It also determined whether metacognitive ability variables would contribute to the performance of students in Mathematics.

The descriptive research of the survey design was used for this study while the population for the study consisted of 77,937 Junior Secondary students in all public schools in Ogun State, Nigeria. Secondary school students were selected through a multistage sampling procedure.

The findings revealed that a significant and strong relationship between metacognitive variables and students' performance in Mathematics was established.

4) Bansal. S (2015). (2015) conducted a study titled "*Metacognitive Awareness of Undergraduate Students in Relation to Their Academic Achievement,*" which explored the connection between metacognitive awareness and academic performance among undergraduates. The research involved a sample of 100 undergraduate students from various colleges in Chandigarh. To assess metacognitive awareness, the study utilized the Metacognitive Awareness Inventory (MAI) developed by Schraw & Dennison in 1994. The findings indicated a significant difference in the academic achievement of students with high and low levels of metacognitive awareness.

5) Beri. N (2019). conducted a study titled "*Academic Achievement among Secondary School Students about Meta-Cognitive Skills*," which examined the connection between metacognitive skills and academic performance among secondary school students.

The research explored the levels of academic achievement and metacognitive skills, focusing on differences related to gender and locality. The findings revealed that there were no significant differences in academic achievement or metacognitive skills based on gender and locality. However, a significant positive relationship was found between metacognitive skills and academic achievement among secondary school students.

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6) Coskum. Y (2018). Coskum, Y. (2018) conducted a study titled "*A Study on Metacognitive Thinking Skills of University Students,*" aiming to explore the metacognitive thinking skills of university students.
The research was descriptive in nature and involved 407 students selected through convenience sampling. Data were gathered using a 'Personal Information Form' and the 'Metacognitive Thinking Skills Scale'. The findings revealed that university students exhibit high levels of metacognitive thinking abilities.
7) Gaseem.Al (2020). a study titled "*Metacognitive thinking skills among talented science education students*"
The purpose of this research was to examine the level of metacognitive thinking skills among talented science education students.
A purposeful sample of 77 was used to achieve this goal. Metacognitive Thinking Scale which consists of 42 items distributed into three domains: Knowledge of cognition, regulation of cognition, and cognitive processing.
The results indicated that talented science education students possessed a high level of Metacognitive thinking skills.

4. RESEARCH GAP

While reviewing the literature, it became evident that numerous researchers have explored various aspects of metacognition, including metacognitive knowledge, awareness, skills, reading and study strategies, and thinking, both in India and internationally. Some studies have examined the relationship between metacognition or metacognitive skills and academic achievement. However, no research appears to have specifically addressed the connection between metacognitive thinking and the academic achievement of higher secondary students. Additionally, the researcher could not locate any studies on this topic conducted in the North 24 Parganas district of West Bengal.

5. STATEMENT OF THE PROBLEM

Metacognitive thinking and academic achievement are essential factors influencing educational success. This study aims to investigate the levels of metacognitive thinking among higher secondary students, with a focus on variables such as gender, location, and type of school (private versus government). Furthermore, it seeks to explore the relationship between metacognitive thinking and academic achievement. The proposed study is titled:
"Metacognitive Thinking and Academic Achievement of Higher Secondary Students."

6. OBJECTIVES OF THE STUDY

The objectives of this work are outlined below

- To Find out the metacognitive thinking level of higher secondary school students (total sample of the researcher's), in Nadia, West Bengal.
- To Find out the difference in Metacognitive Thinking in terms of gender (Girls and boys) in Higher Secondary students, in Nadia, West Bengal.
- To Find out the difference in Metacognitive Thinking in terms of Locality (Urban and rural) Higher Secondary students, in Nadia, West Bengal.
- To Find out the difference in Metacognitive Thinking in terms of the type of school (Government and Private H.S. school) of Higher Secondary Students, In Nadia, West Bengal.
- To Find out the correlation between Metacognitive thinking and Academic Achievement of Higher Secondary students, in Nadia, West Bengal.

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7. HYPOTHESIS OF THE STUDY

Researcher framed some hypothesis that are outlined below

H_{01} There is no significant difference in Metacognitive Thinking in terms of gender (Girls and boys) in Higher Secondary students, in Nadia, West Bengal.

H_{02} There is no significant difference in Metacognitive Thinking in terms of locality (Urban Girls and Urban Boys) in Higher Secondary students, in Nadia, West Bengal.

H_{03} There is no significant difference in Metacognitive Thinking in terms of locality (Rural Girls and Rural Boys) in Higher Secondary students, in Nadia, West Bengal.

H_{04} There is no significant difference in Metacognitive Thinking in terms of the type of school (Government and Private H.S. school) of Higher Secondary Students, In Nadia, West Bengal.

H_{05} There is no significant correlation between Metacognitive thinking and Academic Achievement of Higher Secondary students, in Nadia, West Bengal.

8. DELIMITATION OF THE STUDY

i. The study is delimited to the geographical area of district Nadia of West Bengal.

ii. The Study is delimited to the Higher Secondary Schools under WBCHSE (West Bengal Council of Higher Secondary Education).

iii. The present study focuses on three categorical variables
   A. Gender (Boys and Girls)
   B. Locality (Urban and Rural)
   C. Type of school (Government and Private)

9. RESEARCH METHODOLOGY

This study employs a quantitative approach utilizing survey research.

9.1. Population

The population for this study included all students from government and private Higher Secondary schools in Nadia, West Bengal.

9.2. Sample

For the current study, the researcher randomly selected 200 students as the sample. The data was collected from students in classes eleven and twelve at two schools: the government-run Saraswati Trust Higher Secondary School and the private Bedibhawan Rabitirtha Vidyalaya.

Nature of sample

Table 1. Research Data

Girls Students		**Boys Students**	
Urban	Rural	Urban	Rural
47	57	44	52
N=104		N=96	
N=200			

9.3. Variables

Here categorical variables will be used by the researcher along with the main variables.

Table 2.Nature of Variables

No	Name of Variables	Name of Levels	No. of Level
1	Main Variables	Metacognitive Thinking	1
		Academic Achievement	1
2	Categorical Variables	Gender (girls and boys students)	2
		Locality (Urban and Rural)	2
		Type of School (Government & Private School)	2

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9.4. Tools

For the present research work, a Likert model metacognitive thinking scale will be developed by the researcher, which will be standardized by the expert.

Table 3. Likert model metacognitive thinking scale

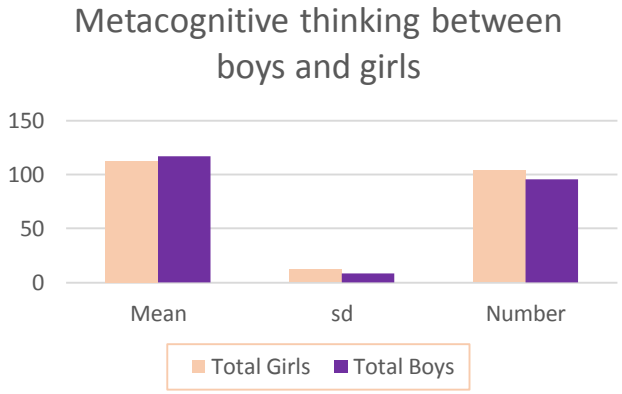
For Positive Questions	Strongly Agree	Agree	Don't know	Dis Agree	Strongly Disagree
	5	4	3	2	1
For Negative Questions	1	2	3	4	5

10. ANALYSIS OF DATA

H_{01} There is no significant difference in Metacognitive Thinking in terms of gender (Girls and boys) in Higher Secondary students, in Nadia, West Bengal.

Table 4 Metacognitive Thinking

Group	Number	Mean	Standard Deviation	t Value
Girls	104	112.42	11.84	3.19
Boys	96	117.07	8.24	
Statistically significant at 0.01 level				

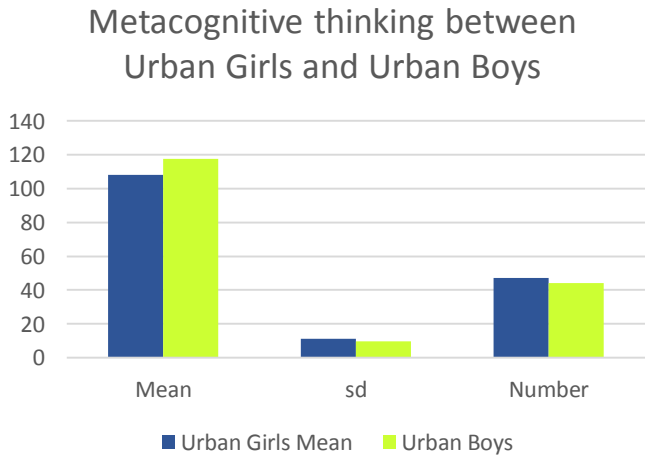


The researcher used a t-test to compare the mean scores of the two groups. The resulting t-value of 3.19 was significant at 0.01 levels, leading to the rejection of the null hypothesis. This indicates a significant difference in metacognitive thinking between boys and girls among Higher Secondary students in Nadia, West Bengal.

H_{02} There is no significant difference in Metacognitive Thinking in terms of locality (Urban girls and Urban boys) in Higher Secondary students, in Nadia, West Bengal.

Table 5 t-test to compare the mean scores

Group	Number	Mean	Standard Deviation	t Value
Urban Girls	47	108	11	4.31
Urban Boys	44	117.39	9.64	
Statistically significant at 0.01 level				



The researcher used a t-test to compare the mean scores of the two groups. The resulting t-value of 4.31 was significant at 0.01 level, leading to the rejection of the null hypothesis. This indicates a significant difference in metacognitive thinking between urban girls and urban boys Higher Secondary students in Nadia, West Bengal.

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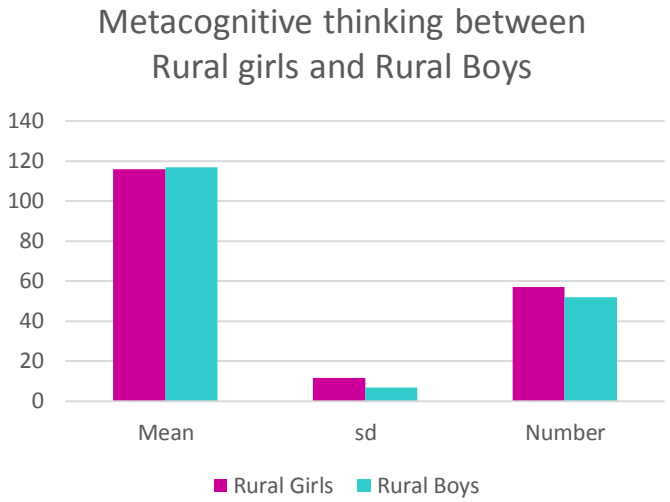
H_{03} There is no significant difference in Metacognitive Thinking in terms of locality (Rural Girls and Rural Boys) in Higher Secondary students, in Nadia, West Bengal.

Table 6 Metacognitive Thinking in terms of locality

Group	Number	Mean	Standard Deviation	t Value
Rural Girls	57	115.91	11.65	0.47
Rural Boys	52	116.78	6.79	
Statistically insignificant at both the 0.05 and 0.01 levels				

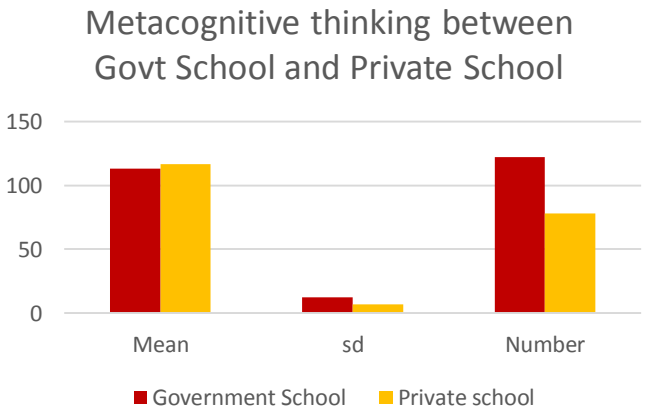


The researcher used a t-test to compare the mean scores of the two groups. The resulting t-value of 0.47 was insignificant at both the 0.05 and 0.01 levels, leading to the acceptance of the null hypothesis. This indicates no significant difference in metacognitive thinking between Rural girls and Rural Boys Higher Secondary students in Nadia, West Bengal.

H_{04} There is no significant difference in Metacognitive Thinking in terms of the type of school (Government and Private H.S. school) of Higher Secondary Students, In Nadia, West Bengal.

Table 7 Metacognitive Thinking in terms of the type of school

Type of School	Number	Mean	Standard Deviation	t Value
Government School	122	113.35	12.26	2.21
Private School	78	116.69	6.48	
Statistically significant at 0.05 level				



The researcher used a t-test to compare the mean scores of the two groups. The resulting t-value of 2.21 was significant at 0.05 level, leading to rejecting the null hypothesis. This indicates a significant difference in metacognitive thinking between Government School and Private School of Higher Secondary students in Nadia, West Bengal.

H_{05} There is no significant correlation between Metacognitive thinking and Academic Achievement of Higher Secondary students, in Nadia, West Bengal.

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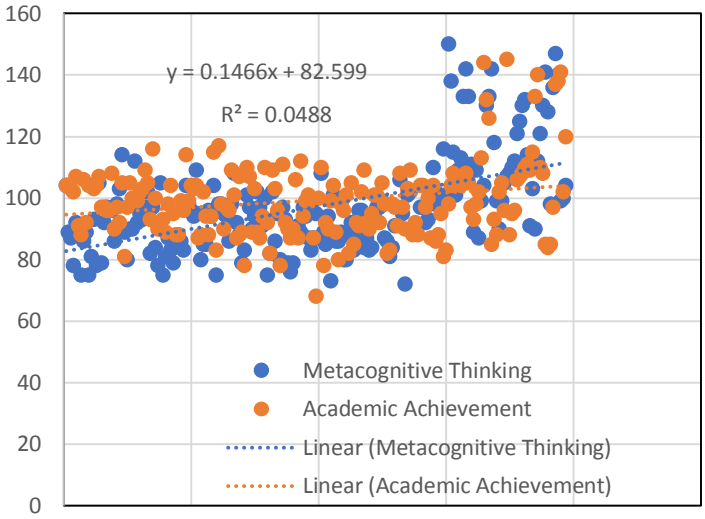
Table 8 Metacognitive thinking and Academic Achievement

Group	Number	Mean	Standard Deviation	r value
Metacognitive Thinking	200	97.11	15.62	0.37
Academic Achievement	200	99.36	12.30	

Scatter Diagram



The researcher applied Pearson's r to examine the correlation between metacognitive thinking and academic achievement. The resulting r-value of 0.37 indicates a low but positive correlation between the two variables. Consequently, the alternative hypothesis was accepted, leading to the rejection of the null hypothesis. This finding suggests a significant, albeit low, positive correlation between metacognitive thinking and academic achievement among higher secondary students in Nadia, West Bengal.

11. RESULT DISCUSSION

In the first objective, the researcher aimed to assess the overall metacognitive thinking level among higher secondary school students. A questionnaire with 32 items was used, with a maximum possible score of 160 (32 items x 5 points each). From the sample, one student achieved the highest score of 150. The mean score for the 200 students was 114.5. Out of the total, 110 students scored above the mean, while 90 students scored below it. Based on these findings, it can be concluded that the metacognitive thinking level among higher secondary students in Nadia, West Bengal, was generally good. In the second objective, the researcher identified a significant difference in metacognitive thinking between girls and boys students. The researcher identified a considerable difference in metacognitive thinking based on locality (Urban girls and Urban boys only). The researcher collected data from two different schools—Saraswati Trust (a government school) and Bedibhawan Rabitirtha Vidyalaya (a private school)—and found a significant difference in metacognitive thinking among higher secondary students. In the last objective Researcher found a low but Positive correlation between Metacognitive Thinking and Academic achievement.

Understanding the link between metacognitive thinking and academic achievement is essential in high school education. Metacognitive thinking, which involves students' awareness and regulation of their learning, significantly impacts academic success. This research can guide educators in integrating metacognitive strategies into teaching to boost student performance. High school is a crucial time when students face greater academic challenges and need to develop advanced thinking skills. Metacognitive thinking helps students manage their learning better, leading to higher achievement and better preparation for future educational demands.

This study explores the metacognitive practices linked to higher academic achievement in high school students. The findings will inform educators, curriculum developers, and policymakers about the role of metacognition in learning. Ultimately, this research aims to help students become more effective and independent learners.

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