ISSN: 2584-0231(Online)
International Journal of Multidisciplinary Research in Arts, Science and Technology
© IJMRAST | Vol. 3 | Issue 8 | August 2025
Available online at: https://ijmrast.com
https://doi.org/10.61778/ijmrast.v3i8.164

A study on Metacognitive skills of class 10th students of Kamrup Metropolitan District

Pribilina Champramary[1], Prof. Kaberi Saha[2]
[1]Research Scholar, Department of Education, Gauhati University
Email: pribichampramary@gmail.com
[2]Professor, Department of Education, Gauhati University
Email: drsahakaberi@gauhati.ac.in

ABSTRACT

This study examines the correlation between the metacognitive skills of Assamese medium Class 10 students belonging to Guwahati Educational Block of Kamrup (M) district in Assam. With the use of descriptive survey method, a study sample comprising of 100 students (50 boys and 50 girls) was chosen through simple random sampling. The Metacognitive Skills Scale by Madhu Gupta and Suman (2017) which was both adapted and translated to Assamese, provided the data needed for this study. For the analysis, descriptive statistics, and inferential statistics like t-tests was used. Findings revealed that 68% of students demonstrated at and above average levels on both metacognitive skills ($M = 150.73$, $SD = 16.98$) A significant gender difference was found in, metacognitive skills, with girls outperforming boys ($p < 0.001$) The findings of this study support the importance of metacognitive skill among learners. The study suggests that teachers should incorporate explicit instruction of metacognitive strategies within the curriculum frameworks in classes.

Keywords: *Metacognitive Skills, Class 10 students, Gender differences, Assamese medium, Kamrup(M)*

INTRODUCTION

Education today is giving importance to constructivist education. There is a paradigm shift from the traditional method of teaching to a constructivist approach to teaching and learning and this approach gives priority to the cultivation of higher-order cognitive abilities such as analysis, synthesis, evaluation, and creativity (Bransford, Brown, & Cocking, 2000). This shift wants the students to stay updated with a necessary skill set for solving complex problems and lifelong learning. Such education makes the students the centre of Education and is believed to improve the quality of education drastically (Fosnot, 2013). John Flavell, first coined the term "Metacognition" in the year 1976, Metacognition means the awareness and understanding that individuals have about their cognitive processes and outcomes (Flavell, 1979; Schraw & Moshman, 1995). It represents a stored knowledge segment and in it cognitive structures present and interact

with different task goals and actions (Brown, 1987). In Metacognition, one can know which strategies will work for them and regulate which strategies will work best for themselves (Pintrich, 2002). It comprises the ability to plan, closely observe, and evaluate one's learning strategies, which also enables one to modify approaches concerning the self-assessed level of understanding and progress (Zimmerman, 2002). In this study Metacognitive skill is operationalised as the ability to reflect on one's own knowledge, understand cognitive processes, control and regulate own learning progress. Under this study four dimension have been considered-planning, implementation, monitoring and evaluation. It is the score found on the Modified Metacognitive skills scale which was prepared by (Gupta and Suman, 2017).

Vani (2016) in her study clarifies the importance of cultivating metacognitive awareness to improve educational outcomes for students at all achievement levels. Again, in a study by (Jagals & Walt, 2016) it was sated that metacognitive reflection is integral to the regulatory process and enhances metacognitive awareness. This reflection fosters awareness of the person, task, and strategies involved, particularly through planning and monitoring, thereby assembling the necessary metacognitive skills for effective learning. Mir, A. A., & Peerzada, N. (2022) the study results indicate no significant difference in metacognition scores between male and female students, while a positive correlation between metacognition and academic achievement was established among the participants. In the study of Das (2023) it revealed that there is significant positive correlation between metacognitive ability and academic achievement, suggesting that students who engage in higher levels of metacognitive awareness and regulation tend to perform better academically Priyanka. R, (2022) in her study it was found that there is difference in academic achievement between low and high meta cognitive skills. There was strong relationship between academic achievement and meta cognitive skills of government school students. Guo (2020) emphasizes how crucial it is to improve pupils' metacognition in order to achieve successful academic results. The results highlight a straightforward strategy for fostering students' metacognitive development and imply that this mediation process might be improved for even greater results. Even though there is large amount of literature exist on metacognitive skills and problem solving ability on mathematics, considering the existing literature this study specifically focuses on class 10 students of Kamrup district of Assam which is untouched in this field of research. This study try to fill up the gab by examining the correlation between metacognitive skills and problem solving ability in mathematics of class 10 students of Kamrup metro district of Assam.

Metacognitive skills

Metacognitive skills primarily stem from the interaction and integration of the following components of metacognition, like knowledge of cognition and regulation of cognition Metacognitive skills are deeply rooted in components of metacognition (Flavell, 1979; Schraw & Moshman, 1995). Metacognitive skills are the abilities to understand and assess one's own learning, particularly when it is influenced by one's educational background and prior experiences (Flavell, 1979; Brown, 1987; Schraw & Moshman, 1995). Metacognitive skills are a strategy by which one can improve their learning and ability to solve a problem. Metacognitive skills help students to keep track of their learning and help in optimizing their cognitive process (Pintrich, 2002; Zimmerman, 2002; Schraw et al., 2006).

Under this study, four dimensions have been considered planning, implementation, monitoring, and evaluation Madhu &Gupta, (2017).

1. Planning skill: It is the ability to manage self and others, analyse information, and allocate resources, including time, resources, and surrounding circumstances, to reach a specific goal.
2. Implementation skill: measures the learner's willingness to apply him or herself to attaining the set goal. It also includes the capabilities to organize and execute the required actions.
3. Monitoring skill: It refers to one's online awareness of comprehension and task fulfilment together with the ability to engage in periodic self-testing while learning. Regular monitoring informs learners about their progress, which motivates learners to continue with the monitoring activities.
4. Evaluation skill: It is the last meta-cognitive skill can be defined as the ability to assess and reflect on both the processes employed and the finished product after task completion.

Objectives of the study

1) To find out the level of Metacognitive Skills (MCS), among class 10th students.
2) To find out the difference in the level of Metacognitive Skills (MCS), among class 10th students. Based on-gender: Boys and Girls.

Hypotheses of the study

1) H(o1): There exist no significant difference in the level of metacognitive skills of class 10th school students, based on: Gender: Boys and Girls

Methodology of the study

Method

The research method was taken considering the study's objectives. Taking considerations and the feasibility of achieving the study's objectives, the Descriptive Survey Method was taken in the present study and the data is being analysed using quantitative analysis.

Population of the study

The population of this study comprised all Class 10th students enrolled in government and provincialized co-educational schools in the Guwahati Educational block of Kamrup (M) district during the academic year 2025–2026.

Sample size and sampling technique

The sample of the study comprised of 100 class students out of which 50 were male and 50 were female. The sample has been selected using simple random sampling.

Table .1. Distribution of the participants in terms of Gender

Gender	f	Percentage
Boys	50	50%
Girls	50	50%
Total	100	100

Table 1 *shows the frequency (f) and percentage (%) of the participants*

Tools used in the present study

In the present study, two tools were utilized to collect data from the sample. To better fit the comprehension levels of the participants, all three scales were modified and translated into Assamese language. The changes were made to make sure the resources were relevant, age-appropriate, and in line with the target population academic background. To measure the metacognitive skills, Metacognitive skills Scale (Dr. Madhu Gupta and Ms Suman, 2017) There are 42 items in the scale which is divided into four dimensions, I) Planning skill have 12 items, ii) Implementation skill have 9 items, iii) Monitoring skill have 11 items and iv) Evaluation skill have 10 items. There were five options in each items viz., strongly agree, agree, undecided, disagree and strongly disagree.

Delimitation of the study

The present study has been delimited to-

1. Only Guwahati Educational Block has been selected for the study.
2. Only the SEBA, Assamese medium government provincialized high schools were selected for the study.
3. Only class 10^{th} going students has been selected as population and sample of the study.

Statistical tools used in the present study.

Descriptive statistics such as mean and standard deviation were computed. Based on these metrics, inferential statistical test including the t-test, were employed to examine differences within the data.

Results and Interpretation of the data

Objective no. 1. To find out the level of Metacognitive Skills (MCS), among class 10^{th} students.

The sample Descriptive statistics has been calculated. It shows the Mean and SD of class 10^{th} school student's Metacognitive skills. The descriptive statistics of the class 10^{th} school students are shown in Table no.2.

Table No. 2: Mean and SD of Metacognitive skills

Table. 2. Mean and Standard Deviation of Metacognitive skills of Class 10 students.

	Mean	SD
Metacognitive Skills	150.73	16.989

The table no-2 shows that the mean score of Metacognitive skills of class 10 school students is 150.73 and the SD is 16.98. The levels of Metacognitive skills were assessed by determining the frequency of the data in order to determine objective no. 1. The level of Metacognitive skills was determined using z-scores and the levels of Metacognitive skills are shown in Table 4.2.

Table No. 3: Levels of Metacognitive skills of class 10th school students.

Sl. No.	Level of Metacognitive Skills	Range of Raw score	Range of Z-score	Boys	Girls	Total No.	Percentage
1	**Very High**	185 and above	+2.01& above	0	3	3	3.0%
2	**High**	173 to 184	+1.26 to + 2.00	2	5	7	7.0%
3	**Above Average**	160 to 172	+0.51 to + 1.25	8	12	20	20.0%
4	**Average**	144 to 159	-0.50 to + 0.50	16	22	38	38.0%
5	**Below Average**	130 to 143	-1.25 to -0.51	17	6	23	23.0%
6	**Low**	117 to 129	-2.00 to -1.26	5	0	5	5.0%
7	**Ver Low**	Below 117	-2.01 & below	2	2	4	4.0%
Total	**7**					100	100%

There are seven levels of metacognitive skills in the present study, and the analysis indicates that 3 students out of 100 fell into the Very High level of metacognitive skills, which is 3%. A total of 7 students out of 100

demonstrated a high level of metacognitive skills, accounting for 7%. 20 students out of 100 exhibited an Above Average degree of metacognitive skills, which is 20%. Additionally, 38 students out of 100 demonstrated an Average level of metacognitive skills, representing 38%%. 23 students out of 100 were found to be in the Below Average category which is 23% of the total sample, while 5 students fell under the Low level which is 5 %, and 4 students were in the Very Low category, comprising 4% of the total sample. This distribution shows that a majority of students (68%) fall at or above the Average level of metacognitive skills, while 32 % fall the level below average.

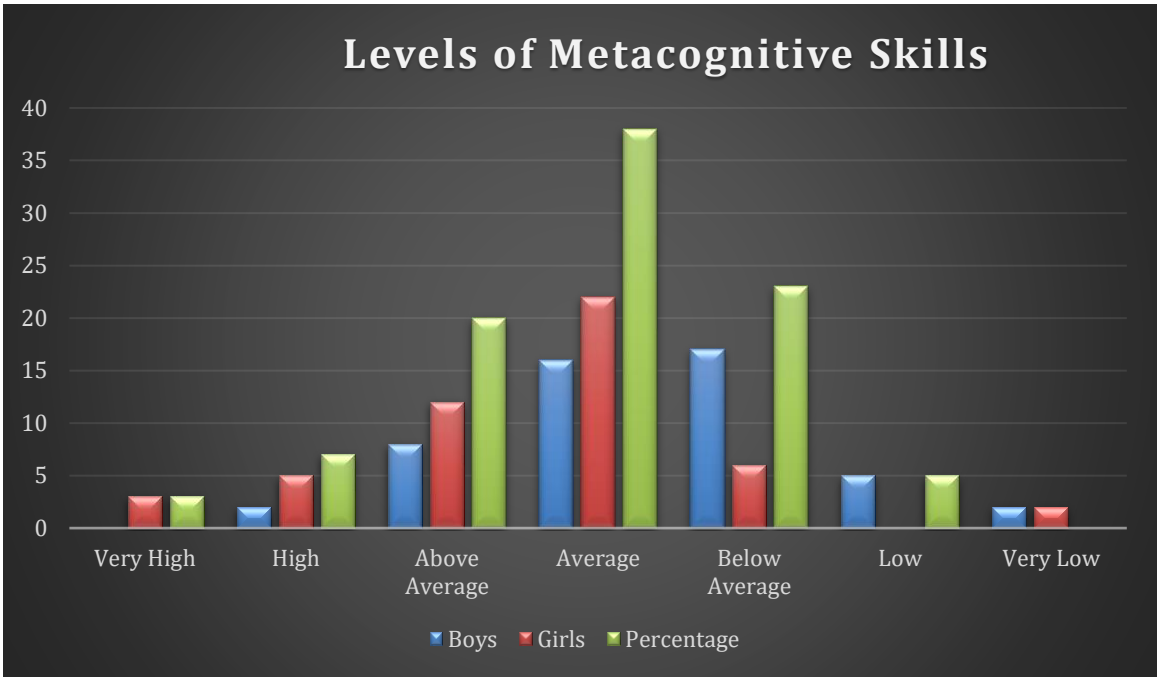


Fig. 1: Graphical Representation showing the distribution of Metacognitive Skills Levels by Gender and total percentage of class 10th school students on different levels.

2) To find out the difference in the level of Metacognitive Skills (MCS) among class 10th students. Based on-gender: Boys and Girls.

H01: There exists no significant difference in the level of metacognitive skills of class 10th school students based on: Boys and Girls.

To find out the difference between Boys and Girls Metacognitive skills, t-test was calculated.

The result of the t-test shown in the table 4.3.

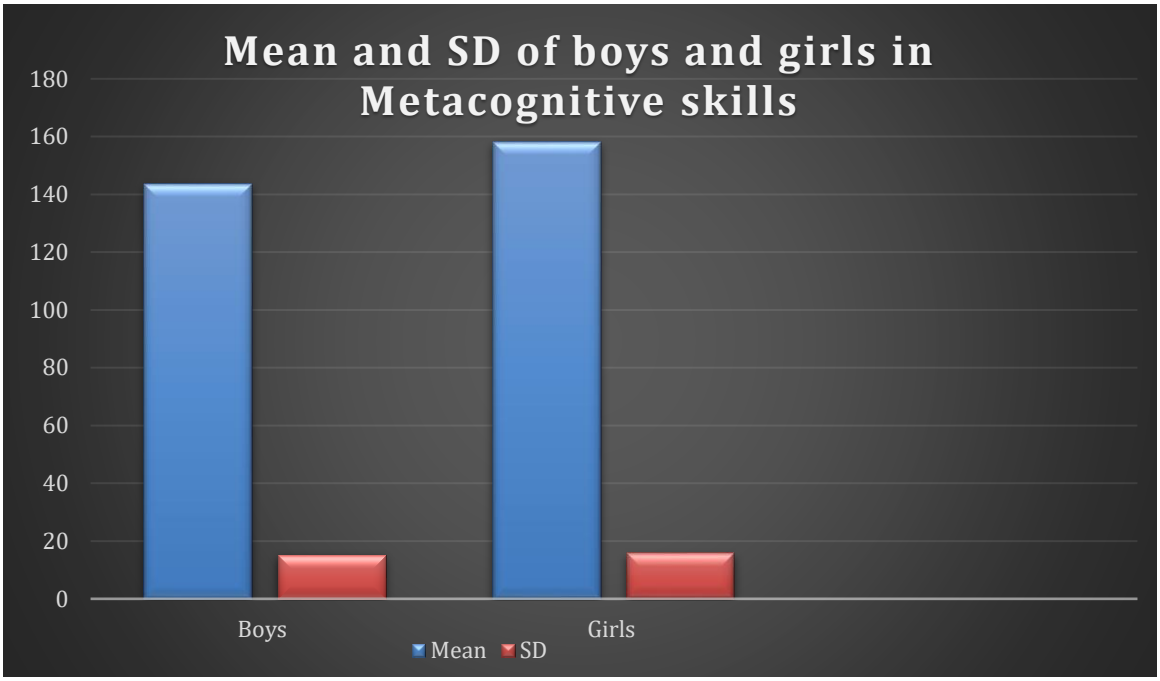
Table 4: Showing the Mean and SD of Boys and Girls class 10th school students in Metacognitive Skills.

Gender	N	Mean	SD	t-value	df	Mean difference	P-value
Boys	50	143.44	15.04	- 4.72	98	-14.58	.000
Girls	50	158.02	15.75				

A t-test for independent samples was conducted to compare the metacognitive skills of Boys and Girls. The results indicated a significant difference between Boys (M = 143.44, SD = 15.04) and Girls (M = 158.02, SD

= 15.75); t (98) = -4.72, p < .001. The mean difference was -14.58, suggesting that Girls scored higher than boys. Therefore, the null hypothesis ($H_0 1$) stating no significant difference in metacognitive skills between Boys and Girls students was rejected.

Fig 2: Graphical representation of Mean and SD of Boys and Girls class 10th school students in Metacognitive Skills.



Findings and Discussions

This research examined metacognitive skills in relation to problem-solving skills in mathematics for class 10 students in Kamrup (m) district of assam. Based on results, the mean score of metacognitive skills was 150.73(SD=16.98) which shows majority of students, 68% are at or above the average level of metacognitive skills. This indicates that students have moderate to strong metacognitive skills. This is in line with previous research(Latief, 2024) that has shown majority of the students tend to have average or above average level of metacognitive skills. Hence it reveals that majority of the class 10 students have at or above average level of metacognitive skills. In this study a substantial difference in metacognitive skills was noted between the genders. Girls (M = 158.02, SD = 15.75) significantly outperformed boys (M = 143.44, SD = 15.04). This finding is consistent with (Ciascai & Lavinia, 2011) which says there is significant gender differences and indicates that females have higher levels of metacognitive awareness compared to their male counter parts. The insights are important in the case of class 10 school students in Assam. The National Curriculum Framework (NCF, 2005) enunciates the system goals, that it is essential to cultivate critical thinking, and metacognitive strategies. Given that a large number of students continue to languish in below-average levels in both metacognitive skills, schools could implement explicit metacognitive strategy instruction during classes as proposed by (Boaler, 2016) in order to foster greater independence and reflection alongside improving problem-solving efficacy.

Conclusion

The focus of this study was to understand the correlation of metacognitive skills and problems solving ability in mathematics. The results showed that high metacognitive skills, especially in planning, monitoring, implementation, and evaluation, are strongly linked with better problem-solving results. This is in line with previous findings that metacognitive regulation improves the quality of learning, cognitive engagement, and academic achievement (Flavell, 1979; Schraw & Dennison, 1994). The findings also back the constructivist theory of learning by suggesting that learners are actively engaged in the learning process where self-regulation and reflection is crucial to learning (Bransford, Brown, & Cocking, 2000). The study highlights the need for the teaching of metacognitive skills to be integrated within the teaching and learning process. In the study by (Vani, 2016) it mentioned the importance of cultivating metacognitive awareness to improve educational outcomes for students at all achievement levels. Again, in the study by (Rajadurai & Ganapathy, 2023) it clearly mentions the importance of integrating metacognitive instructional techniques into academic frameworks to better prepare students for competitive assessments. Such teaching strategies improve problem-solving skills and help students acquire the ability to learn independently throughout their lives as they encounter complex, real-world problems.

References

[1]. Aani, M. (2016). A study of metacognitive awareness of secondary school students of high, average and low achievers. *International Journal of Creative Research Thoughts, 4*(1), 344–349. https://www.ijcrt.org

[2]. Bransford, J. D., Brown, A. L., & Cocking, R. R. (Eds.). (2000). How people learn: Brain, mind, experience, and school (Expanded ed.). Washington, DC: National Academy Press. https://doi.org/10.17226/9853

[3]. Brown, A. L. (1987). Metacognition, Executive Control, Self-Regulation, and Other More

[4]. Mysterious Mechanisms. In F. E. Weinert, & R. Kluwe (Eds.), Metacognition, Motivation, and Understanding (pp. 65-116). Hillsdale: L. Erlbaum Associates.

[5]. Das A. Relationship between Metacognitive Ability and Academic Achievement of B. Ed Students-A Study. *Int J Sci Res*. 2015;6(5):2319-7064. www.ijsr.net

[6]. Ergin Dikme, Simel Parlak, Organizational insecurity and injustice experiences of school administrator candidates, International Journal of Educational Research, Volume 122, 2023, 102249, ISSN 0883-0355, https://doi.org/10.1016/j.ijer.2023.102249.

[7]. https://www.sciencedirect.com/science/article/pii/S0883035523001131

[8]. Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive–developmental inquiry. American Psychologist, 34(10), 906–911.

[9]. Fosnot, C. T. (2013). Constructivism: Theory, Perspectives, and Practice. New York: Teachers College Press. https://doi.org/10.1037/0003-066X.34.10.906

[10]. Guo, Lina. (2020). Teachers' mediation in students' development of cognition and metacognition. Asia-Pacific Journal of Teacher Education. 50. 1-16. 10.1080/1359866X.2020.1846158.

[11]. Gupta, M. (2017). Meta-cognitive skills and learning & thinking style: Predicting academic achievement among school students. International Journal of Advanced Research in Management and Social Sciences, 6(11), 46–59.

[12]. Haiduc Șuteu, Lavinia. (2011). Gender Differences in Metacognitive Skills. A Study of the 8th Grade Pupils in Romania. Procedia - Social and Behavioral Sciences. 29. 396–401. 10.1016/j.sbspro.2011.11.255.

[13]. Latief, M. A. (2024). Metacognitive skills and their role in students' academic performance: A quantitative study. International Journal of Educational Research, 123, 102249. https://doi.org/10.1016/j.ijer.2023.102249

[14]. Mir AA, Peerzada N. A Study of Metacognition and Academic Achievement among CollegeStudents of Kashmir. 2022;2(1):266-270. doi:10.48175/568

[15]. Priyanka Rani. (2022). Effect of meta-cognitive skills, educational resilience, and parental encouragement on academic achievement of secondary school students. Department of

[16]. Education, Maharshi Dayanand University. Retrieved from Shodhganga repository: http://hdl.handle.net/10603/477899

[17]. Schraw, G., Crippen, K. J., & Hartley, K. (2006). Promoting self-regulation in science education: Metacognition as part of a broader perspective on learning. Research in Science Education, 36(1-2), 111–139. https://doi.org/10.1007/s11165-005-3917-8

[18]. Schraw, G., & Dennison, R. S. (1994). Assessing Metacognitive Awareness. Contemporary Educational Psychology, 19, 460-475. https://doi.org/10.1006/ceps.1994.1033

[19]. Schraw, G., & Moshman, D. (1995). Metacognitive theories. Educational Psychology Review, 7(4), 351–371. https://doi.org/10.1007/BF02212307

[20]. Veenman, M.V.J., Van Hout-Wolters, B.H.A.M. & Afflerbach, P. Metacognition and learning: conceptual and methodological considerations. Metacognition Learning 1, 3–14 (2006). https://doi.org/10.1007/s11409-006-6893-0

[21]. Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. Theory into Practice, 41(2), 64–70. https://doi.org/10.1207/s15430421tip4102_2 [1]

Cite this Article

***Pribilina Champramary, Prof. Kaberi Saha, "A study on Metacognitive skills of class 10th students of Kamrup Metropolitan District"**, International Journal of Multidisciplinary Research in Arts, Science and Technology (IJMRAST), **ISSN:** 2584-0231, Volume 3, Issue 8, pp. 101-109, August 2025.*

***Journal URL:** https://ijmrast.com/*

***DOI:** https://doi.org/10.61778/ijmrast.v3i8.164*