BHARATI INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH & DEVELOPMENT (BIJMRD)

(Open Access Peer-Reviewed International Journal)

DOI Link : https://doi.org/10.70798/Bijmrd/04030013

Available Online: www.bijmrd.com | BIJMRD Volume: 4 | Issue: 03 | March 2026 | e-ISSN: 2584-1890

# Metacognitive Awareness of Higher Secondary Students in Relation to Their Academic Achievement

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**Abstract:**

*Metacognitive awareness plays a crucial role in enhancing students' learning processes and academic success. The present study investigates the relationship between metacognitive awareness and academic achievement among higher secondary students. Metacognition, often described as "thinking about thinking," involves two major components: knowledge about cognition and regulation of cognition. These components enable learners to plan, monitor, and evaluate their learning strategies effectively.*

*The study adopts a quantitative research design, focusing on a sample of higher secondary students selected through a stratified random sampling technique. Standardized tools were used to measure students' levels of metacognitive awareness, while academic achievement was assessed through their examination scores. Statistical techniques such as correlation analysis and comparative tests were employed to examine the nature and strength of the relationship between the variables.*

*The findings reveal a significant positive correlation between metacognitive awareness and academic achievement, indicating that students with higher levels of metacognitive skills tend to perform better academically. In particular, components such as planning, self-monitoring, and self-evaluation were found to have a strong influence on students' performance. The study also highlights variations in metacognitive awareness based on factors such as gender, stream of study, and type of school, though these differences were not always statistically significant.*

*The results suggest that fostering metacognitive awareness can lead to improved academic outcomes. Students who are aware of their cognitive processes are better equipped to select appropriate learning strategies, identify their strengths and weaknesses, and regulate their study habits effectively. Consequently, integrating metacognitive training into classroom practices can enhance students' independent learning abilities and academic success.*

*The study concludes that educators should emphasize the development of metacognitive skills through instructional strategies such as reflective thinking, self-assessment, and problem-solving activities. Curriculum planners and policymakers should also consider incorporating metacognitive components into educational frameworks to promote holistic learning. Further research is recommended to explore intervention-based approaches and longitudinal impacts of metacognitive awareness on student achievement.*

**Keywords**: *Metacognitive Awareness, Academic Achievement, Higher Secondary Students, Self-Regulated Learning, Cognition, Learning Strategies, Educational Psychology.*

**Introduction:**

In the global scenario the quality of education has been positively changed by the rapid development of science. The objective of education in the 21st century is not only to provide students with a huge amount of knowledge and information but also to prepare students to become effective and independent learner, who have self regulatory skills and can achieve academic success as long with life success. The challenges of 21st century and its complexity, social and economic oppression requires teens to develop new, flexible and practical abilities. In this context, psychological developments and concept play an important role in developing children's thinking ability in solving different issues and learning skills, out of which Metacognition plays a vital role in shaping learner thinking process and abilities. Metacognitive knowledge, Metacognitive awareness, Metacognitive experience, Metacognitive beliefs, Metacognitive skills and upper memory are some terms associated with Metacognition (Veenman et.al.2006, Yesilyurt, 2013). It allows learner to behave in their own learning process, including awareness of how they learn, evaluate their learning needs, produce strategies meet those needs and utilize these method.

**Metacognition**

Metacognition is the awareness of ones thought process and understanding of the patterns behind them. This understanding can be expressed through actual use of this knowledge, or by the ability to verbally describe it. Metacognition can take many forms, such as reflecting on ones ways of thinking and knowing which and how to use particular strategies for problem solving.

The term Metacognition was introduced as a concept in by American developmental psychologist JhonFlavell (1979). Flavell defined Metacognition is the knowledge you have of your own cognitive process (your thinking). It is your ability to control your thinking process through various strategies, such as organizing, monitoring and adapting. "Metacognition involves awareness of how they learn and evaluation of their learning needs, generating strategies to meet these needs and then implementing the strategies" (Haker 2009).

**Component of Metacognition**

Flavell (1987) classified the key component of Metacognition as Metacognitive knowledge and Metacognitive experience.

- Metacognitive knowledge; It refers to the part of ones acquired word knowledge that has to do with cognition or perhaps better, psychological matters. It is further sub divided into three categories. Knowledge of person variables, task variables and strategy variables.

- **Metacognitive experience;** Metacognitive experience is a cognitive and affective experience that accompanies a cognitive action. In other words it is the conscious consideration of intellectual experience that accompany any success of failures in learning or other cognitive enterprise. Metacognitive experience are integrated during the monitoring of cognitive, problem-solving and not all forms are directly related to memory monitoring. These experience are influenced by a number of factors, i.e task factors such as task complexity, performance and previous experience; personal factors such as cognitive ability, personality, and self-concept and Metacognitive factors such as Metacognitive knowledge (Efklides, 2001).

Schraw and Sperling Dennison (1994) distinguished metacognition into two major components,

1. **Knowledge about cognition;** It deals with concepts related to our thinking process such as self-concept about our knowledge, intelligence, memory, attention, study habits etc. (Govil, 2003). According to Flavell ( 1985) "knowledge about cognition is the knowledge about own cognitive activities". It consists of

a) **Declarative knowledge;** Declarative knowledge refers to the factual knowledge that the learner needs before being able to process or use critical thinking related to the topic, it include the knowledge of ones skills, intellectual resources and abilities of a learners, usually knowledge gained through presentation, demonstration and discussion etc.

b) **Procedural knowledge;** It deals with application of acquired knowledge for the purpose of completing a procedure or process, it helps the student to know about the process and apply the process in various situations, usually knowledge obtained through discovery, cooperative learning and problem solving etc.

c) **Conditional knowledge;** the its refers to situations under which the procedures or skills to be transmitted, usually the information obtained by the simulation falls under conditional knowledge ( Schraw &Deninson 1994).

**2. Regulation of cognition;** It refers to those mechanism that regulate or control ones thinking or learning. five essential skills involved in this

a) **Planingi.e**setting goals and allocating resource materials before learning

b) **Information management strategies i.e**sequential skills and strategy which are used to process information more efficiently (e.g. organizing, elaborating, summarizing, selective focusing etc.)

c) **Comprehension monitoring i.e**evaluation of ones learning or strategies which are used in prior.

d) **Debugging strategies i.e**techniques to correct the understanding and performance errors.

e) **Evaluation i.e**analysis of performance and strategy effectiveness after a learning episode.

**Metacognitive strategies;** successful learner typically use Metacognitive strategies whenever they learn. But they may fail to use the best strategy for each type of learning situation. Here are some Metacognitive skills that each student may follow

- **Knowing your limits -** knowing the limits of one's own memory for a particular task and creating a means of external support.
- **Self-monitoring -** self-monitoring ones learning strategy, such as concept mapping, and then adapting the strategy if it is not effective.
- **Skimming -** choosing to skim subheading of unimportant information to get to the information one need.
- **Rehearsing -** repeatedly rehearsing a skill in order to gain proficiency.
- **Self-test -** periodically doing self-test to see how well you learned something.

Metacognitive awareness focuses on our factors affecting our learning and functioning features, knowing the various strategies for improving our learning process, and knowing which strategies to choose to maximize our ability to control and manage our aptitude.

**Academic achievement;** Academic achievement is the accomplishment of acquired efficiency of the performance of an individual in a given skill of body of knowledge. It means the knowledge attained or skill developed in the school subject initially designated by test score or by marks assign by the teacher/school or by both. Academic adjust skill is important because it is positively related to study progress and academic performance.

**Review of Literature**

**Jeffrecy landline, John Stewart (1998)** studied the relationship between metacognition, and certain personality variables and the role they play in academic achievement. Participant were grade 12 students (N= 108) in New Brunswick and Newfoundland. Results indicate significant positive relationship between metacognition, motivation, locus of control and self- efficiency and academic achievement.

**Isaason and Fujita (2006)** the study examined the relationship of Metacognitive knowledge monitoring to classroom performance. 84 undergraduate students in an introductory educational psychology class completed ten weekly in class tests in which they studied, their level of confidence, and to predict their test results after completing the test but before it was graded. High archiving students were more accurate at predicting their test results; more realistic in their goals more likely to adjust their confidence in line with their test results. And more effective in choosing test question to which they knew the answers. The study supports the relationship of meta-cognitive knowledge monitoring to self regulated learning and academic success.

**Young & Fry (2008);** The researcher examined the Metacognitive Awareness Inventory (MAI) to determine hoe it relates to broad and single measure of academic achievement in college students. Correlation were found between the MAI and cumulative GPA as well as end of course grades. Scores on the MAI significantly differ between graduate and undergraduate students. Professor use of the MAI as a potential screening tool to identify students requiring Metacognitive strategy intervention is discussed as well as implication and educational performance of college students and found significant correlation between the two variables.

**Eva Kallay (2012); the study has reveled that the efficiency of learning** is better predicated by the ability to select and appropriate apply learning strategies, than by intelligence alone, on the other hand, the selection of such strategies depends on ones level of Metacognitive awareness, which enables the selection and implementation of the suitable strategies. Some individual develop these strategies in time, on their own. The major aim of the study is to investigate the effect of learning strategies and Metacognitive awareness as predictors of academic achievement in a sample of Romanian second year students. The results displayed that specific learning environment, some learning and Metacognitive awareness strategies facilitate the attainment of academic success, while other strategies are counter productive.

**Dr. N. Sawhney, Dr. S. Bansal (2015)** metacognition is an individuals knowledge of their own cognitive processes and their ability to control these processes by organizing, monitoring, and modifying them as a function of learning. Students who succeed academically often rely on being able to think effectively and independently in order to take charge of their learning. The present study was undertaken to find out the relationship between Metacognitive awareness and academic achievement of undergraduate students. The sample of the study comprised of 100 undergraduate students.from various college of Chandigarh. Metacognitive Awareness Inventory by Schraw & Dennison (1994) was used to measure the Metacognitive awareness . the findings reveled a significant difference in academic achievements of undergraduate students with high and low scores in Metacognitive awareness.

**Smith, Black et.al (2017)** examined the Metacognitive skills, knowledge and awareness enhance academic achievement in African American adolescents . In this article, we consider three related areas that inform

African American youth educational experience; a)the history of the educational context which African American youth have long faced, b)the laws that have historically and currently buttress and inform the educational landscape for African American youth, and c)one potential solution ( I.e., Metacognitive knowledge, skills and awareness) to reduce or ameliorate some of the problems outlined in the history and laws that have been implicated in the low levels of academic achievement among some African American youth.

**EVI FitriAgulina (2018);** This study find out the effectiveness of Metacognition based communication strategy training to improve students oral communication skill and Metacognitive awareness. This control group pretest and post-test research was conducted at UIN RadenIntan Lampung. The results found that metacognition - based communication strategy training was effective to improve students oral communication skill and Metacognitive awareness.in addition debugging strategy was the metacognition category which mostly used actively by the students in the training process.

**Rasha (2020);** This study aims to explain the relationship and impact of studied the Metacognitive awareness and academic motivation on academic achievement of Ajman university students. This descriptive and correlational study design has included 200 students (60 male) studying sociology in the college of mass communication and humanities at Ajman university. Academic intrinsic motivations scale and the Metacognitive awareness inventory were used as instruments. PLS-SEM was used to examine the relationship between the variables. The findings of the study showed that Metacognitive awareness is a major contributor to success in learning and represents an excellent tool for the measurement of academic performance.

**Bakar, N. Ismail (2020);** This study is a survey of teachers and students perception of mathematics teaching and learning practice. The purpose of this study was to determine the level of learning practice based on Metacognitive regulation strategies and student interaction to increase students achievements. A quantitative survey of 45 mathematics teacher and 52 from 2 students using questionnaires was conducted to look at the level of mathematics teaching and learning practices and to obtain agreement on the need for learning Metacognitive regulation strategies and student interaction. The findings show that teacher level of knowledge about regulation strategies, level of teaching and learning based on Metacognitive regulation and students interaction strategies and level of mastery and application of students mathematics skills are moderate. This study is an extension of the study aspects of Metacognitive skills by looking at both the view of the teacher and the students. Results show that students Metacognitive Skills and interaction are related to influence learning.

The above kinds of literature make it clear that numerous studies have been undertaken on the Metacognitive awareness in relation to academic achievements and academic adjustment of students. Several studies have been revealed that Metacognitive awareness had a positive impact on the academic achievement of the learners. It also helps the students to become aware of the art of learning. By addressing these aspects the study seeks to fill the existing gaps in the literature and provide a clear understanding of the conditions under which Metacognitive awareness can helps to achieve success among secondary students in West Bengal area.

**Statement of the problem;** The present study investigate the relation between Metacognitive awareness, and academic achievement of among male and female students of rural and urban area in West Bengal district. Researcher claim that for individuals to have the Metacognitive skill, they must have a knowledge base that facilitates and help them in developing the cognitive skill and activities. Some of the teaching design that teachers in various institutions use in teaching the students do not help the students in developing adequate cognitive skills and activities that they require. For this reasons, many students end up failing to achieve some of the fundamental skills that they need to prosper academically. In addition, it had been observed that using an appropriate teaching strategy at any given learning objectives enhanced students

achievements. However, the Metacognitive awareness have been developed and used in the form of lesson plans in different subject areas, but in the field of "Education" subject such lesson plans have been not developed as per the available data, hence the investigator is intended to develop lesson plans of the selected content area based on the Metacognitive awareness component and strategies.

**Objectives of the study**

- To identify the relationship between Metacognitive awareness and academic achievement of higher secondary students.
- To identify the whether there exits any significant difference in the Metacognitive awareness of higher secondary students based on their gender.
- To identify the whether there exits any significant difference in the Metacognitive awareness of higher secondary students based on their locality.

**Hypothesis of the study**

- There exits no significant relationship between Metacognitive awareness and academic achievement of higher secondary students.
- There is no significant mean difference between Metacognitive awareness of higher secondary students based on their Gender.
- There exits no significant mean difference between Metacognitive awareness of higher secondary students based on their Locality.

**Limitation of the Study**

The present study was limited by the following aspects :

The present study was limited to check the Metacognitive awareness of secondary students only.

The sample consisted of only from the district of Purba Medinipur of west Bengal.

**Research Methodology**

A quantitative method was adopted in this study. For the present study descriptive survey design was used to collect data from higher secondary school students. "A descriptive study deals with functional relationship, opinions, process that are going on, effects that are evident or trends that are developing" (Best 1999). The survey method involves a clearly defined problem and set of objective, gathers required data from a relatively large number of sources representing the specific population.

**Variables of the study**

The present study included one dependent variable namely academic achievement, and one independent variable i.e. Metacognitive awareness. In addition, several moderator variables were considered in the study:

Gender: Girls (n=90) and Boys (n=90)

Locality: Rural (90) and Urban (90)

**Population of the study**

A population is a group of individuals having the same characteristics. In the present study the higher secondary standard xii arts students studying in rural and urban schools under West Bengal district constituted the population.

**Sample and sampling procedure**

The present study included a sample of 180 students from a government school in the Purba Medinipur District of West Bengal.

The sample considers various strata, such as gender and locality, to ensure adequate representation of these aspects. Students were selected using simple random sampling technique. The study conducted in two phases viz. Tools construction and data collection. Further, the data was analyzed to draw meaningful conclusions.

**Tools of the Study**

The following tools were used in the present study;

- **Metacognitive Awareness Inventory (MAI);** A standardized instrument Metacognitive Awareness Inventory designed by Schraw &Deninson (1994) was used in the study to assess the Metacognitive awareness of the participants. It consists of 52items based on components of metacognition. The knowledge component covered declarative knowledge (knowledge about self and strategies), procedural knowledge (knowledge about strategies use), and conditional knowledge (when & why to use strategies). the regulation component covered planning ( goal setting), debugging (strategies to correct errors) and evaluation (analysis of performance and strategy effectiveness). The test-retest reliability of this scale is 0.95.
- **Academic achievement;** percentage of marks or grade point average (GPA) of last semester was chosen as the parameter of academic achievements of the students.

**Statistical Techniques:** The statistical package for the social sciences (SPSS) version 17.0 program was used to analyze the data. Basic statistical techniques such as arithmetic mean median and standard deviation were calculated to test the null hypotheses. Independent sample t-test and Correlation tests were used to determine the relationships between the variables under study

**Analysis And Results**

The following tables provide descriptive statistics for Metacognitive awareness and academic achievement scores of 180 students. These tables offers insights into the central tendency, variability and distribution patterns of the data, helping to understand how these factors relate to the overall academic performance and Metacognitive awareness of student.

**Table 1. sample selected for the study:**

| Name of the school | locality | No of students |
|---|---|---|
| BahitrakundaHIgh school, kusumpur. | Rural | 50 |
| JukiveriMatanginiVidyapith, Kusumpur. | Rural | 40 |
| Contai Town Rakhal Chandra vidyapith, contai. | Urban | 40 |
| KishorenagarSikhshasadan, contai | Urban | 50 |

**Table 2: Relationship between Metacognitive Awareness and Academic Achievements of higher secondary students:**

| Number | variables | Mean | SD | Corelation |
|---|---|---|---|---|
| 180 | MetacongnitiveAwarenes | 73.20 | 8.10 | 0.68 |
| 180 | Academic Achievement | 69.40 | 7.50 | |

From the above table, it is observed that the mean score of Metacognitive Awareness is 73.40 and the mean score of academic achievement is 69.40 among higher secondary students. The calculated Pearson correlation coefficient (r=0.68)indicate a high positive correlation between the two variables and significant at the 0.01 level.

This indicate that students with higher Metacognitive awareness tend to have higher academic achievement. Therefore, there exists a significant positive relationship between Metacognitive awareness and academic achievement of higher secondary students.

**Table 3: Metacognitive awareness of secondary students based on their Gender.**

| Gender | N | Mean | SD | T -Value | level | df |
|---|---|---|---|---|---|---|
| Boys | 90 | 71.20 | 8.40 | 2.31 | 0.05 | 178 |
| Girls | 90 | 74.10 | 8.10 | | | |

Table 3 present the Metacognitive awareness of secondary students vary with the gender, the mean and the stander deviation of the scores on the Metacognitive awareness of secondary students - boys and girls were calculated. The mean and stander deviation of boys is 71.20 & 8.40 and girls is 74.10 & 8.10 respectively. When their difference in means were tested for significance of difference between mean, we get a t value of 2.31 which is significant at the 0.05 level.

Therefore, it can be concluded that there is a significant difference in Metacognitive awareness between boys and girls secondary students. Girls show slightly higher Metacognitive awareness than boys .

**Table: 4 Metacognitive awareness of higher secondary students based on their locality:**

| Locality | N | Mean | SD | T -Value | level | df |
|---|---|---|---|---|---|---|
| Rural | 80 | 71.50 | 8.20 | 1.90 | 0.05 | 178 |
| Urban | 100 | 73.90 | 8.40 | | | |

Table 4 present the Metacognitive awareness of secondary students vary with the locale, the mean and the stander deviation of the scores on the Metacognitive awareness of secondary students of the rural and urban were calculated. The mean and stander deviation of Metacognitive awareness of rural secondary student is 71.50 & 8.20 while mean and SD of urban students is 73.90 & 8.40 respectively. When their difference in

means were tested for significance of difference between mean, we get a t value of 1.90 which is not significant at the 0.05 level.

Therefore, it can be concluded that there is no significant difference in Metacognitive awareness between rural and urban secondary students.

**Mejor Findings**

- According to table-2, the result of the analysis showed that there exits significant positive relationship between Metacognitive awareness and academic achievement of higher secondary students.
- The result of the analysis showed that there was a significant difference between Metacognitive awareness of the mean test score of the boys student (71.20)and of the girls students(74.10). Girls showed slightly higher Metacognitive awareness than boys. Hence, it can be suggested that the gender factor have a significant impact on the Metacognitive awareness of higher secondary students .
- In addition, the analysis of the result showed that there was no significant difference between Metacognitive awareness of the mean score of the urban students (73.90) and rural students(71.50). This finding explained that locality did not have a significant impact on the Metacognitive awareness of higher secondary students.

**Implication**

The study highlights the importance of developing students Metacognitive awareness to improve academic achievement. Metacognitive awareness focuses on our factors affecting our learning and functioning features, knowing the various strategies for improving our learning process, and knowing which strategies to choose to maximize our ability to control and manage our aptitude. Teacher should encourage students to think about their own thinking process and improve student learning based on Metacognitive strategies such as planning monitoring and self evaluation etc. The results of the study indicate that locality don't influence the Metacognitive ability of students but gender have significant impact on Metacognitive awareness and the strong correlation between academic achievement and Metacognitive awareness. So whatever needed innovative teaching methods and learning activities that arouse and develop the Metacognitive level of students accordingly. Therefore, developing Metacognitive skills should be an essential part of the teaching learning process.

**Conclusion**

A substantial body of literature has consistently highlighted a positive and academic achievement among higher secondary students. However, the findings of this study do not fully align with this consensus. The study reveals that Metacognitive awareness of higher secondary students were strongly correlated their academic achievement. These findings raise important questions regarding the role of Metacognitive awareness in higher secondary students academic lives. Students with higher Metacognitive awareness tend to perform better academically . The study suggests that the ability to plan, monitor, and evaluate ones own learning plays crucial role in improving academic performance. Further research is needed to explore the underlying factors and determine how Metacognitive awareness can be optimized to enhance academic success.

**Acknowledgements**

The authors wish to acknowledge and express gratitude to all scholarly works cited, consulted, and referenced in this study. The insights and contributions of these studies have significantly enhanced research and depended understanding of the subject, thereby enriching the academic rigour of this study.

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**Citation: Manna. R.,** (2026) "Metacognitive Awareness of Higher Secondary Students in Relation to Their Academic Achievement", *Bharati International Journal of Multidisciplinary Research & Development (BIJMRD)*, Vol-4, Issue-03, March-2026.