

# Effect of meta-cognition of High School Students on their Scholastic Achievement

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## **ABSTRACT**

The examiner conducted a study on to find out the effect of meta-cognition of high school students on their scholastic achievement and also find out the relationship between meta-cognition and scholastic achievement variables. This examination was followed by descriptive survey method and interprets varied kinds of numerical data obtained from the subjects. A sample of 180 high school students from 6 high schools of Bengaluru District was selected using stratified random sampling technique. Data was collected through Meta-Cognition Inventory developed by Punitha Govil (2003) along with personal details. The scholastic achievement of the subjects were obtained from office records for the year 2018-19. The collected data was analyzed utilizing 'r' test, 'F' test (One-way ANOVA) and independent 't' test and the level of significance was fixed at 0.05 confidence levels in all the cases. From the correlation result it was seen that there was significant positive relationship between Scholastic Achievement and Meta-Cognition variables and from 'F' test analysis also proved that there was a significant difference in the Scholastic Achievement of high school students having different levels of meta-cognition levels. The 't' test also confirmed that there was a significant difference in the Scholastic Achievement of high school boys and girls. The high school girls had higher achievement than other counter part. Teachers should be made aware about the role of meta-cognitive abilities in learning especially for boys, likewise, creation of meta-cognitive learning environment for students. The study highlighted the need of developing skills of planning, ability to comprehend, and evaluate own thinking as it has direct and major bearing on performance academically.

**Keywords:** Effect, Meta-cognition, High School Students, Scholastic Achievement.

## **1. INTRODUCTION**

The capacity to reflect on one's own thoughts, or meta-cognition, has been demonstrated to significantly affect academic performance. Meta-cognition becomes more crucial in high school as pupils are expected to be more accountable for their own learning. This paper will investigate how high school students' metacognition affects their academic performance.

Meta-cognitive, which derives from the Greek term 'meta,' is cognition that transcends commonplace thinking. Second order knowledge is referred to as 'meta' knowledge. Definition of meta-cognition by Flavell (1976) is 'One's knowledge concerning one's own cognitive processes and products or anything related to them. Meta-cognition refers, among other things, to the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects or data on which they bear...' Flavell (1976)

The first benefit of meta-cognition is that it can make high school students more conscious of their own learning. They can pinpoint areas where they need to improve and modify their learning tactics by taking stock of their own strengths and shortcomings. For instance, a student who has trouble with math may understand that they need to practise problems more or ask for additional guidance from a teacher or tutor. This self-awareness can result in better study habits, which will raise their grades and overall academic success.

Second, meta-cognition can encourage and engage high school students in their studying. Students are more likely to experience a feeling of ownership over their own learning when they know how they study best and can track their progress. As a result, individuals may be more motivated to study and feel more successful when they fulfil their objectives. This can then result in improved marks and general academic success.

Thirdly, high school students can improve their critical thinking abilities by engaging in metacognition. Students can improve their ability to evaluate arguments, analyse information, and make reasoned conclusions by taking time to examine their own cognitive processes. They can benefit from this in a number of areas, including science, social studies, and English. They are more likely to flourish academically and receive higher grades as they develop their critical thinking skills.

Last but not least, metacognition can aid high school pupils in acquiring a growth attitude. Students are more inclined to persist through difficulties and setbacks if they believe that their skills may be improved with work and practise. Higher levels of resilience and a desire to take on difficult academic assignments may result from this, which may ultimately boost academic accomplishment.

The capacity to reflect on one's own thought processes and keep track of one's own learning is known as meta-cognition. It entails having a clear grasp of one's own learning preferences, capabilities, and weaknesses, as well as knowing when and how to apply various learning techniques. According to research, meta-cognition and academic achievement in school-aged children are tightly related. Children are more likely to be able to control their own learning and produce higher academic results when they are able to comprehend their own learning processes.

The development of children's meta-cognitive skills is crucial for both parents and teachers since it can improve students' academic performance. This can be accomplished by assisting kids in identifying their strengths and limitations, encouraging them to set personal objectives, and asking them to reflect on their learning

## REVIEW OF RELATED LITERATURE

Performance and metacognition are closely related, according to prior study. In their study, Metacognition: Components and Relation to Academic Achievement in College, Amzil and Stine-Morrow (2013) found that meta-cognitive monitoring and control, but not meta-cognitive knowledge, are effective predictors of academic performance. Owo and Ikwut (2015) looked at the connection between secondary school students' academic achievement and meta-cognition and discovered that there is a strong correlation between the two. Nongtodu and Bhutia (2017) investigated the relationship between meta-cognition and academic success in college students. He discovered that the majority of college students had average metacognition, and that there was a strong correlation between metacognition and academic achievement, indicating that an increase in metacognition improves academic performance. Similar to Das (2017), who looked at the connection between B.Ed. students' academic success and metacognitive abilities, the study discovered a strong positive relationship between the two. Overall, it can be said that meta-cognition and academic achievement are positively correlated. Meta-cognition is the awareness and comprehension of one's own thinking and methodological practices during the teaching and learning process. Yet, research has shown that those who are personally motivated tend to be more metacognitively aware. The researcher was compelled to look into the relationship between students' academic performance and meta-cognition in this situation.

According to studies, kids who are taught to employ meta-cognitive techniques including goal-setting, tracking one's own development, and learning reflection are more likely to succeed in school. Also, children with higher levels of metacognitive awareness are more likely to use active learning techniques that have been shown to be helpful in fostering learning, such as elaboration, organising, and self-explanation.

## NEED AND IMPORTANCE OF THE STUDY

High school pupils' scholastic achievement is significantly impacted by meta-cognition. Students can raise their grades and experience greater academic success by increasing self-awareness, motivation, critical thinking abilities, and a growth mindset. High schools should promote a culture of growth and learning, as well as opportunities for reflection and self-evaluation, in order to encourage and support the development of meta-cognition in their pupils. Students in high school must master metacognition if they want to succeed academically. Students can reach their maximum potential in the classroom and beyond by establishing a growth mindset, boosting self-awareness, motivation, and critical thinking skills. It is crucial that instructors and institutions encourage and support their students' growth in metacognition. It has been shown that most students who attend school focus their studies solely on getting the grade and diploma. In this scenario, neither educational goals nor the development of metacognition will be accomplished when studying for comprehension and knowledge. These youths should be encouraged to learn about their education and to believe in themselves. This will help to create an effective person, thinker, leader, etc. Perhaps when a person is aware of what he or she is thinking, this will lead to change for the better. Pupils should be taught to look at everything deliberately and critically, enabling them to decide what is wrong or right. As a result, meta-cognition is crucial to helping someone learn more effectively, and in doing so, it can have a favorable impact on that person's academic performance.

## STATEMENT OF THE PROBLEM

The topic identified for the present investigation is 'Effect of meta-cognition of High School Students on their Scholastic Achievement.' The examiner conducted a study on to find out the effect of meta-cognition of high school students on their scholastic achievement and also find out the relationship between meta-cognition and scholastic achievement variables.

## OBJECTIVES OF THE STUDY

1. To find out the relationship between Meta-Cognition and Scholastic Achievement of high school students.
2. To find out the differences in the Scholastic Achievement of high school students having different levels of met-cognition.
3. To find out the differences in the Scholastic Achievement of high school boys and girls.

## RESEARCH HYPOTHESES

The following hypotheses guided the study:

1. There is no significant relationship between Meta-Cognition and Scholastic Achievement of high school students.
2. There is no significant difference in the Scholastic Achievement of high school students having high, moderate and low levels of meta-cognition.
3. There is no significant difference in the Scholastic Achievement of high school boys and girls.

## METHODOLOGY

The examiner conducted a study on to find out the effect of meta-cognition of high school students on their scholastic achievement and also find out the relationship between meta-cognition and scholastic achievement variables. This examination was followed by descriptive survey method and interprets varied kinds of numerical data obtained from the subjects. A sample of

180 high school students from 6 high schools of Bengaluru District was selected using stratified random sampling technique. Data was collected through Meta-Cognition Inventory developed by Punitha Govil (2003) along with personal details. The scholastic achievement of the subjects were obtained from office records for the year 2018-19. The collected data was analyzed utilizing ‘r’ test, ‘F’ test (One-way ANOVA) and independent ‘t’ test and the level of significance was fixed at 0.05 confidence levels in all the cases.

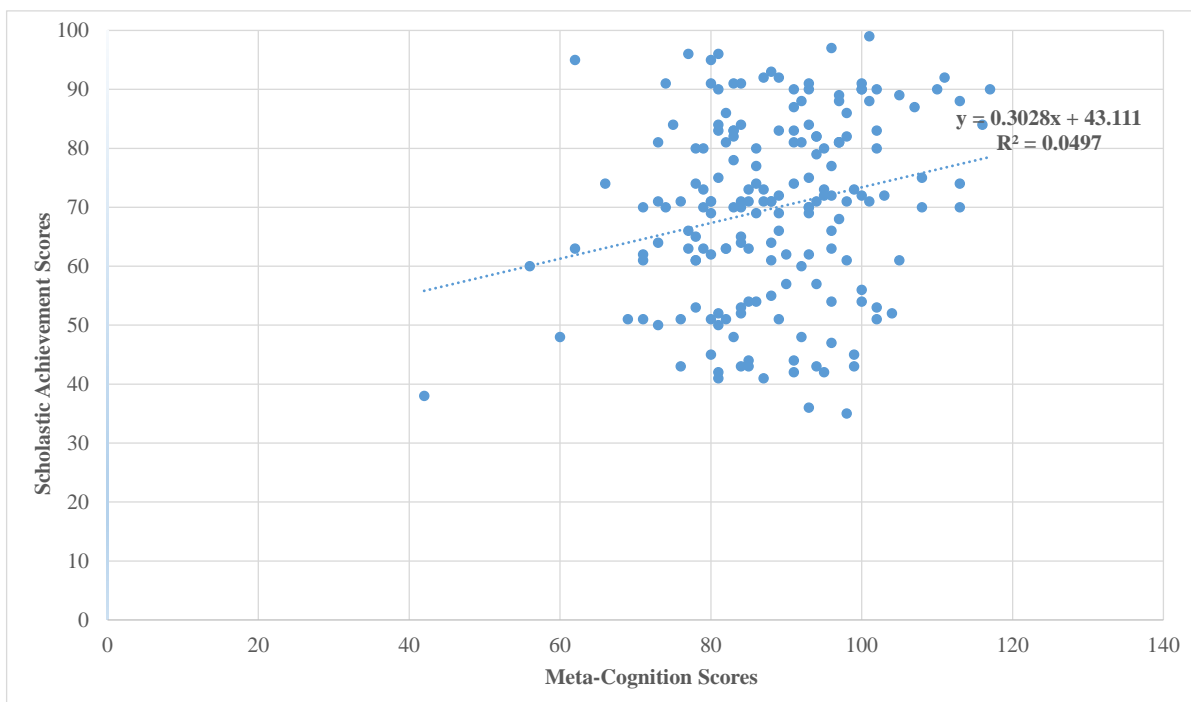
**ANALYSIS AND INTERPRETATION OF DATA**

**Table-1:** Table shows results pertaining to ‘r’ value on Scholastic Achievement and Meta-Cognition Variable scores of high school students.

Variables	Mean	Standard Deviation	‘r’ value and Sig. level
Dependent Variable: Scholastic Achievement	69.822	15.608	0.223
Independent Variable: Meta-Cognition	88.211	11.491	

\*Significant at 0.05 level (Table value of 0.159 for df 148)

Table-1 shows that correlation results between high school students’ meta cognition and scholastic achievement are given. The obtained ‘r’ value of 0.223 are higher than table valued 0.159 at 0.05 level which shows significant positive relationship between Scholastic Achievement and Meta Cognition variables. Therefore, the null hypothesis is rejected and the alternate hypothesis has been formulated that ‘there was a significant positive relationship between Scholastic Achievement and Meta-cognition of high school students.’ The result concluded that students who are having higher meta-cognition ability had higher achievement and vice versa.



**Fig.1:** Scatter diagram shows Scholastic Achievement of high school boys and girls.

**Table-2:** Shows One-way ANOVA results on Scholastic Achievement of High School Students with regard to different levels of meta-cognition levels.

Meta Cognition Levels	No.	Mean	Standard Deviation	Source group	Sum of Squares	df	Mean Squares	F Value and Sig. Level
Low	11	61.181	15.197	Between Group	2308.700	2	1154.350	4.94*
Moderate	159	69.654	15.568	Within Group	41299.611	177	233.331	
High	10	82.000	8.781	Total	43608.311	179		

Table ‘F’ Value for df 2 and 177 is 3.06 at 0.05 level

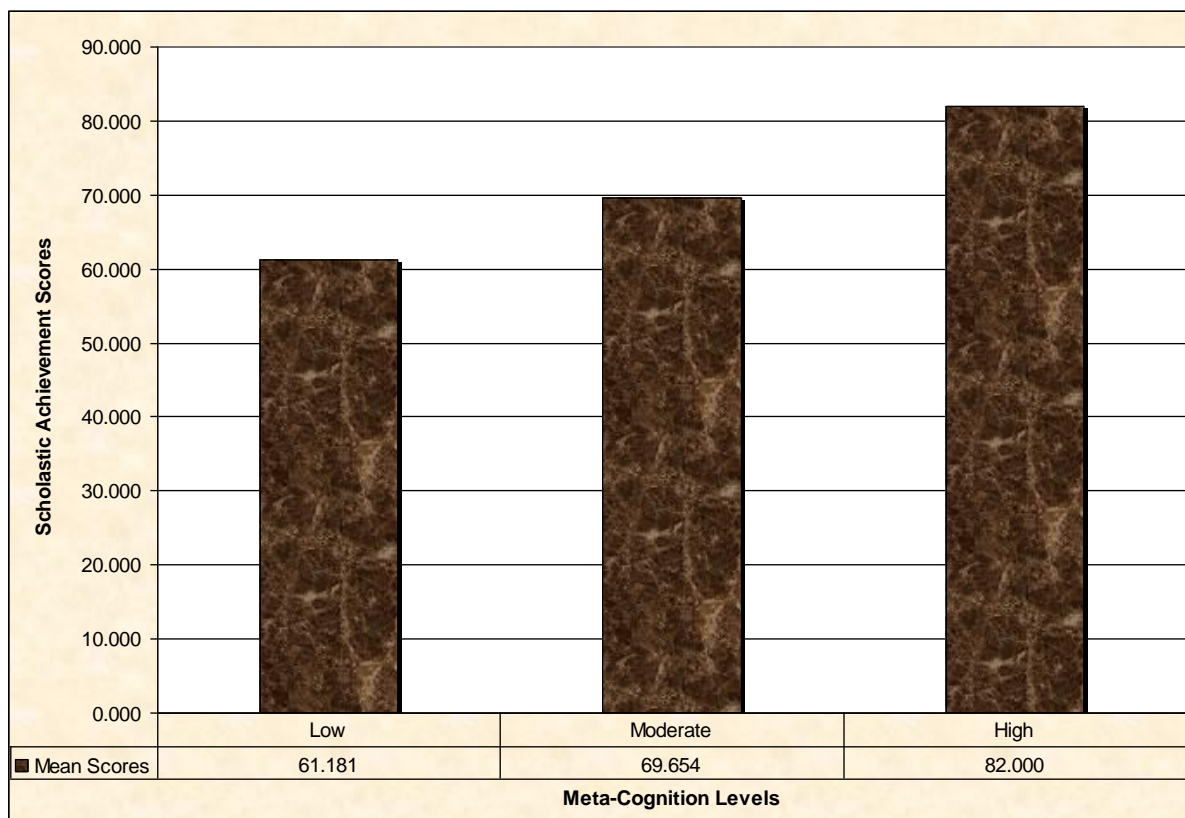
The above mentioned table shows ANOVA results related to Scholastic Achievement of high school students with regard to different levels of meta-cognition levels. The obtained 'F' value 4.94 is higher than the table value of 3.06 for df '2 and 177' demanded for significance at 0.05 level of significance. The results of the study indicated that 'there was significant change in the Scholastic Achievement of high school students having different levels of meta-cognition levels.' To determine the significant difference in the Scholastic Achievement of high school students having different levels of meta cognition levels of paired mean scores, the 'Scheffe's post hoc test was applied and the results are presented in Table-2(a).

**Table-2(a):** Scheffe's Post Hoc Analysis on Scholastic Achievement scores of high school students having different levels of meta-cognition levels.

Meta-Cognition Levels			Mean Difference
Low	Moderate	High	
61.181	69.654	-	8.473
-	69.654	82.000	12.346*
61.181	-	82.000	20.819*

\*Significant at 0.05 level.

The said table-2(a) compare the significant paired mean difference in the Scholastic Achievement of high school students having moderate & high; and low & high levels of meta-cognition levels and the mean differences are 12.346 and 20.819 respectively which was more than the critical difference value. It was concluded that 'there was a significant difference in the Scholastic Achievement of high school students' moderate & high; and low & high levels of meta-cognition levels.' The Scholastic Achievement of high school students having low and moderate levels of meta-cognition level and the mean difference of 8.473 is less than the critical difference value and it was concluded that comparison of scholastic achievement of students between low and moderate meta-cognition level was not proved statistically. The students having higher meta-cognition ability level had higher scholastic achievement when compared with students having moderate and low levels.



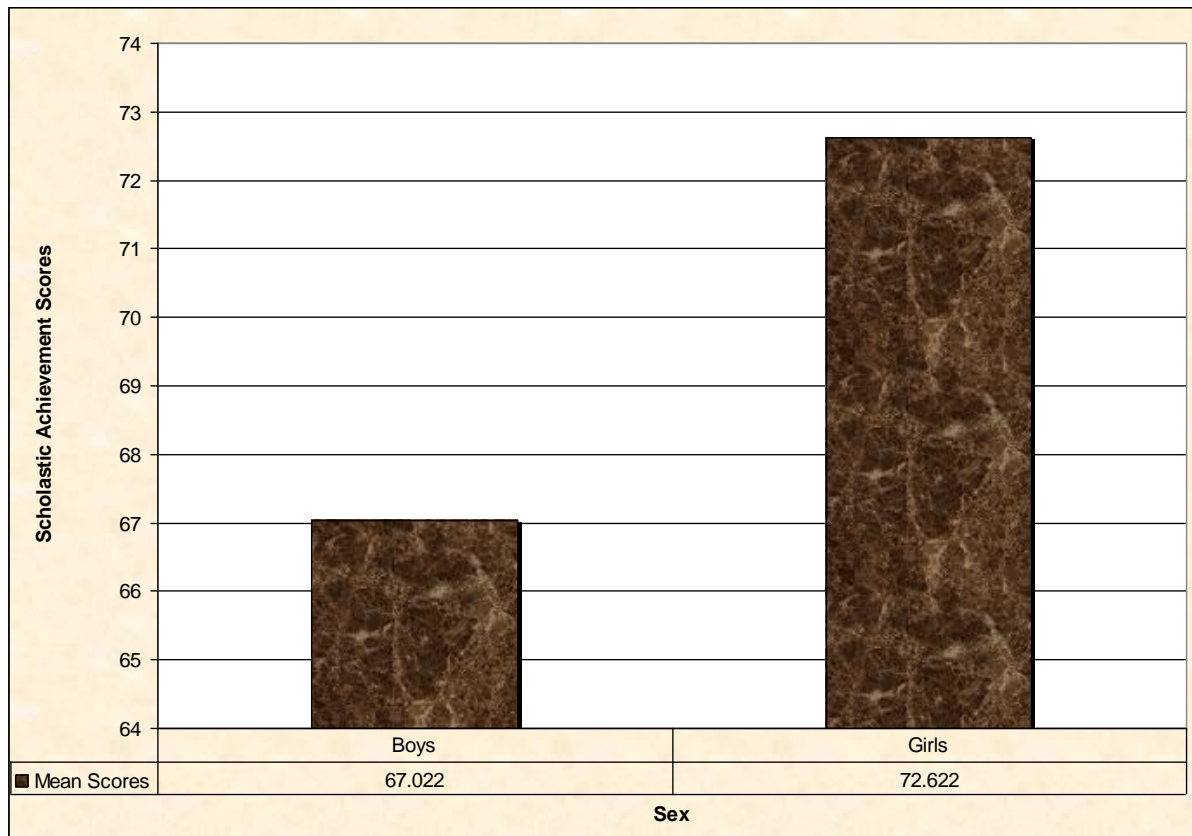
**Fig.2:** Bar graph shows comparison of Scholastic Achievement of high school students having different levels of meta-cognition.

**Table-3:** Table shows 't' test results on Scholastic Achievement Scores of high school students with regard to sex (boys and girls).

Variable	Groups	N	Mean Scores	Standard Deviation	't' Value and Sig. level
Sex	Boys	90	67.022	15.456	2.44
	Girls	90	72.622	15.337	

\*Significant at 0.01 level

From the above table-3, it can be inferred that the obtained 't' value 2.44 is greater than the table value 1.97 (df 178) at 0.05 level of significance. Hence, the null hypothesis is rejected and alternate hypothesis has been accepted that 'there was a significant difference in Scholastic Achievement of high school boys and girls.' The table further reveals that the secondary school girls (M=72.622) had higher achievement than the secondary school boys (M=67.022).



**Fig.3:** Bar graph shows comparison of Scholastic Achievement of high school boys and girls.

## RESULTS

1. There was a significant positive relationship between Scholastic Achievement and Meta-cognition of high school students.
2. There was significant difference in the Scholastic Achievement of high school students having different levels of meta-cognition levels. The students having higher meta-cognition ability level had higher scholastic achievement when compared with students having moderate and low levels.
3. There was a significant difference in Scholastic Achievement of high school boys and girls.' The secondary school girls had higher achievement than school boys.

## CONCLUSION

Academic achievement and meta-cognition variables were shown to be significantly positively correlated, and the 'F' test analysis further demonstrated that there was a substantial difference in the scholastic achievement of high school students with varying degrees of meta-cognition. It has been demonstrated that students with good meta-cognition skills performed better academically. By using meta-cognitive skills, students can better grasp and apply what they have learned in a variety of contexts. So, it is important to encourage students to use metacognitive techniques that may aid in better information management, monitoring, and goal-setting so that they may recognise their mistakes and improve their learning. The 't' test also indicated that there was a considerable gap between high school boys and girls' academic achievement. The high school girls outperformed their counterparts in terms of achievement. In addition to creating a metacognitive learning environment for students, teachers

should be made aware of the importance of metacognitive skills in learning, particularly for boys. The study emphasised the importance of planning abilities, comprehension abilities, and the capacity to assess one's own thinking because they have a direct and significant impact on academic success. The emphasis of education should be on problem solving abilities and the precise identification of issue-solving cognitive types. establishing a metacognitive atmosphere in the classrooms.

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