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## Metacognitive Skills and Academic Achievement of Higher Secondary School Students

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### ABSTRACT

John Flavell initially researched the concept of metacognition or thinking about thinking. Metacognitive awareness and skills facilitate self-regulated learning leading to better learning outcomes. Various cognitive activities such as understanding, communication, attention, retention, and problem solving are said to be regulated by metacognitive skills. The knowledge of one's cognitive processes helps the learners plan to learn activities, choose appropriate learning strategies based on their strengths and weaknesses, and constantly monitor and evaluate their learning progress. The present study examines the metacognitive skills of higher secondary school students in relation to their academic achievement. A random sample of 200 higher secondary school students was surveyed using a Metacognitive Skills Scale standardised by Gupta and Suman (2017), and the obtained scores were statistically correlated with their academic achievement scores. The results show a notable association between the selected variables implying the significance of fostering metacognitive awareness and skills for better learning outcomes among adolescent learners.

**Keywords:** Metacognitive Skills, Academic Achievement, Higher Secondary School Students.

### INTRODUCTION

Our educational system aims to attain essential knowledge, skills, competence, and attitudes among the learners for their overall development and consequently the progress and development of the nation. Education, especially formal, is a planned process intended to mould learners into befitting citizens capable of leading the nation. This is the cherished outcome of education which is more general and comprehensive. However, the directly observable, immediately attainable, and possible goal of education is nothing but students' high scholastic achievement together with co-scholastic accomplishments. Today academic achievement of the learners is the pivot around which the whole educational system revolves; the academic attainment of students became one of the major indicators of the success of any educational institution and academic programme.

The significance of academic accomplishments becomes amplified at the higher secondary stage of the educational ladder because it is a turning point in everyone's life; at this time, the learner

has to divert their studies into specialized areas following their vocational choice and interest. The proper selection of an appropriate vocation based on the awareness of one's strengths and weaknesses is of great positive consequences in their future life. The wrong choice of vocation will be dissatisfying for the individual throughout their life. Students who belong to higher secondary classes are crossing their adolescent stage of life, which is crucial for numerous reasons. As the learners at this stage have to adjust to their rapidly changing physique, emotional disturbances, varying societal expectations, and perplexities of vocational choice, it is difficult for them to overcome this transitional period safely. All such physical and emotional disorders, together with the need to achieve high grades in examinations, may throw the adolescents into a tense and somewhat depressed state or lead them to maladjustments. Heightened emotionality is common among adolescent learners. Sometimes students at this period attain lower grades or marks for their school examinations irrespective of their abilities.

There are numerous factors within the institution and outside the institution that influence the academic achievement of adolescent learners. Within the institution, the teacher-related factors such as knowledge and competence, teaching methodology and strategies, professionalism, attitude, and abilities influence the learning outcomes. Factors like infrastructure facilities, counselling and guidance services, classroom climate, etc., also affect the learning process. The other factors that influence the learners' academic achievement are family environment, attitude and interest of parents, employment opportunities, socioeconomic status of families, and so on. Besides these institutional and family-related factors, various personal and psychological factors, educational and vocational aspirations of learners, learning styles of students, etc., influence students' academic accomplishment; among the psychological factors, metacognitive skills is an important aspect.

### **Metacognitive skills**

Metacognition refers to "thinking about thinking" and was introduced as a concept by John Flavell. According to Flavell (1979), metacognition is "the knowledge that one has of his/her cognitive processes." Metacognitive skills are "the abilities used to understand and analyse one's learning especially influenced by educational background and previous experience" (Gupta & Suman, 2017). Individuals can govern and regulate their cognitive processes using appropriate strategies, namely organizing, monitoring, and adapting. Metacognitive skills allow learners to control their learning process, thereby reducing anxiety, increasing motivation in learning and instilling confidence. Metacognitive skills make one aware of their strengths and weaknesses and prompt one to behave accordingly. They will be able to manipulate their cognitive processes most appropriately.

The possession of metacognitive skills helps learners become self-regulated. Such learners can assume responsibility for their learning process and learning outcomes. Cognitive activities such as comprehension, communication, attention, retention, and problem-solving are intensely regulated by metacognitive skills.

### **Metacognitive skills and Academic Achievement**

Recent researchers advance evidence for the significance of metacognitive awareness and skills for the enhanced academic achievement of students. Eriyani (2020) noticed a positive and significant association between metacognitive skills and the achievement of students. Craig et al. (2020) also affirmed the same through their study. Similar results were reported in Arami and Wiyarsi (2020). Metacognitive awareness is a significant contributor to success in learning (Abdelrahman, 2020). The study made by Sonowal and Kalita (2019) also shows a positive association between the variables - metacognitive awareness and academic achievement. Based on quasi-experimental research, Miller and William (2019) argued that metacognitive teaching strategies positively influence students' performance. Numerous previous studies report the positive effect of metacognitive skills on learners' academic achievement (Smith et al., 2017; Nongtodu & Bhutia, 2017; Naseri et al., 2017;

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Rangannavar & Shahapur, 2018) and intrinsic motivation of students (Yildiz et al., 2018; Eskandari et al., 2019).

## **RATIONALE OF THE STUDY**

A high level of academic performance is one of the most cherished and desirable outcomes of formal education, especially at the higher secondary stage. Higher secondary education is crucial and significant in one's life as the performance influences a learner's future as it is the time for vocational decision making. However, being adolescents, learners at the higher secondary level have to manage their developmental issues and problems - physical, emotional, psychological, and social. In Erik Erikson's terms, "they generally experience the identity crisis or identity confusion" (Hall et al., 2002). Such psychological and environmental issues and social, family, and peer pressures may subsequently lead the students to deviate from adopting proper learning practices and may negatively affect their academic progress and performance.

Researchers and psychologists have already realized the significance of metacognition and self-regulated learning for success in life activities. Also, various research studies illustrate the importance of metacognition and metacognitive skills in enhancing academic performance at multiple levels of education. Presumably, there is a positive cause and effect relationship between metacognition and students' achievement. If students are more metacognitively aware and skillful, they become more strategic and perform better than less aware students. Previous studies on the relationship between metacognition and achievement show the importance of metacognition and metacognitive skills in the learning process. Knowledge about the metacognitive skills among students may help provide proper educational strategies incorporating metacognitive skills training and providing academic guidance. Knowledge of the metacognitive skills among the learners may contribute directly or indirectly towards realizing educational objectives, facilitating learning, and accomplishing better academic performance. Teachers, parents, and all stakeholders can adopt proper strategies to enhance the metacognitive skills of students and, subsequently, their academic performance. Hence a study on metacognitive skills of higher secondary school students concerning academic achievement is relevant and significant in the present educational scenario.

### **Objectives of the Study**

1. To assess the metacognitive skills of higher secondary school students in the total sample
2. To compare the metacognitive skills of higher secondary school students in the subsamples based on gender and locale
3. To study the academic achievement of higher secondary school students
4. To compare the academic achievement of higher secondary school students in the subsamples based on gender and locale
5. To find out whether there exists any significant relationship between metacognitive skills and academic achievement of higher secondary school students

### **Hypotheses of the Study**

1. The metacognitive skills of higher secondary school students differ significantly with respect to gender
2. The metacognitive skills of higher secondary school students differ significantly with respect to locale
3. The academic achievement of higher secondary school students differ significantly with respect to gender

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4. The academic achievement of higher secondary school students differ significantly with respect to locale
5. There is a significant relationship between metacognitive skills and the academic achievement of higher secondary school students.

## METHODOLOGY

The investigator followed a normative survey design for this study. The population identified for this study included students who attended higher secondary schools in Ernakulam district of Kerala state during the academic year 2019-20. A sample of 200 students was selected from four higher secondary schools of Ernakulam district, maintaining the randomness and representativeness of the sample. A Likert model metacognitive skills scale (Gupta & Suman, 2017) was administered to quantify the metacognitive skills, and in case of academic achievement, the marks secured by students in their first-year examination of the +2 courses, was taken from the school records. Descriptive and inferential statistics were utilized for the analysis of data.

## RESULTS AND DISCUSSION

### Metacognitive skills of higher secondary school students

The metacognitive skills scale consisted of 42 items in the form of statements. The response to each item was scored according to Likert's procedure. The analysis shows that the higher secondary school students possess a moderate level of metacognitive skills as the mean score ( $M=143.654$ ;  $SD=25.432$ ) exceeds the middle score of the scale 126 ( $42 \times 3$ ). Table 1 shows various levels of metacognitive skills scores among higher secondary school students.

**Table 1: Numbers and Percentage of Higher Secondary School Students Possessing Various Levels of Metacognitive Skills**

Low		Medium		High	
N	%	N	%	N	%
39	19.50	131	65.50	30	15.00

Obviously, 15.00% of higher secondary school students possess a high level of metacognitive skills, 19.50% possess a low level of metacognitive skills, and 65.50% of students have a medium level of metacognitive skills.

### Comparison of metacognitive skills of higher secondary school students based on gender

The details and results of the independent sample t-test to compare the metacognitive skills of male students and that of female students are in table 2.

**Table 2: Details of the Independent Sample t-Test for Comparison of Metacognitive Skills of Higher Secondary School Students Based on Gender**

Category	N	M	SD	t
Female	110	148.903	25.876	3.2611
Male	90	137.238	24.269	(p = .0013)

Table 2 shows that there is significant difference in metacognitive skills of male students and female students,  $t = 3.2611$ ,  $p = .0013$ ; female students ( $M = 148.903$ ,  $SD = 25.876$ ) possess high level of metacognitive skills than that of male students ( $M = 137.238$ ,  $SD = 24.269$ ). Hence it is inferred that gender is a factor that influences the metacognitive skills of higher secondary school students.

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**Comparison of metacognitive skills of higher secondary school students based on locale**

The details and results of the independent sample t-test to compare the metacognitive skills of higher secondary school students of different residential areas are in table 3.

**Table 3: Details of the Independent Sample t-Test for Comparison of Metacognitive Skills of Higher Secondary School Students Based on Locale**

Category	N	M	SD	t
Rural	100	140.783	25.023	1.6108
Urban	100	146.525	25.387	(p = .1088)

Table 3 shows that there is no significant difference in metacognitive skills of rural students and urban students,  $t = 1.6108$ ,  $p = .1088$ , even though urban students ( $M = 146.525$ ,  $SD = 25.387$ ) attained higher scores than that of rural students ( $M = 140.783$ ,  $SD = 25.023$ ). Hence it may be assumed that locale does not influence the metacognitive skills of higher secondary school students; both rural and urban students possess similar levels of metacognitive skills.

**Academic achievement of higher secondary school students**

To study the academic achievement of higher secondary school students, the total marks obtained by each respondent for the previous year final examinations were collected from the school records. The individual marks were converted into T (standard) scores considering the class average and standard deviation. The T score of each respondent was taken for further analysis. It was found that the mean and standard deviation of the academic achievement scores of higher secondary school students in the total sample are 50.381 and 10.258, respectively.

**Table 4: Numbers and Percentage of Higher Secondary School Students Possessing Various Levels of Academic achievement**

Low		Medium		High	
N	%	N	%	N	%
38	19.00	135	67.50	27	13.50

Table 4 shows that 13.50% of higher secondary school students possess high level of academic achievement, 19.00% possess low level of academic achievement and 67.50% of students have medium level of academic achievement.

**Comparison of academic achievement of higher secondary school students based on gender**

The details of the independent sample t-test carried out to compare the academic achievement of male students, and that of female students are in table 5.

**Table 5: Details of the Independent Sample t-Test for Comparison of Academic Achievement of Higher Secondary School Students Based on Gender**

Category	N	M	SD	t
Female	110	54.875	10.542	6.7995
Male	90	44.888	10.073	( $p < .0001$ )

From table 5 it is evident that there is significant difference in academic achievement of male students and female students,  $t = 6.7995$ ,  $p < .0001$ ; female students ( $M = 54.875$ ,  $SD = 10.542$ ) possess high level of academic achievement than that of male students ( $M = 44.888$ ,  $SD = 10.073$ ). Hence it can be assumed that gender is a factor that influences the academic achievement of higher secondary school students.

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**Comparison of academic achievement of higher secondary school students based on locale**

The details and results of the independent sample t-test to compare the academic achievement of higher secondary school students of different locales are in table 6.

**Table 6: Details of the Independent Sample t Test for Comparison of Academic achievement of Higher Secondary School Students Based on Locale**

Category	N	M	SD	t
Rural	100	48.951	10.154	1.4725
Urban	100	51.811	10.587	(p = .1425)

Table 6 reveals that there is no significant difference in academic achievement of rural students and urban students,  $t = 1.4725$ ,  $p = .1425$ , albeit urban students ( $M = 51.811$ ,  $SD = 10.587$ ) obtained higher achievement scores than that of rural students ( $M = 48.951$ ,  $SD = 10.154$ ). Hence it can be assumed that locale does not influence the academic achievement of higher secondary school students; both rural and urban students possess comparable levels of academic achievement.

**Relationship between metacognitive skills and academic achievement of higher secondary school students**

Pearson’s product-moment correlation test was carried out to study the extent of the relationship between metacognitive skills and academic achievement of higher secondary school students. The details are in table 7.

**Table 7: Pearson’s Correlation Test Results Showing the Relationship between Metacognitive Skills and Academic Achievement (N=200)**

Variables correlated	r	t	SEr	CI	
				Lower	Upper
Metacognitive skills and Academic achievement	.536 ( $p < .01$ )	8.934	.050	.406	.666

From the table 7, it is evident that the coefficient of correlation between metacognitive skills and academic achievement of higher secondary school students is .536 and is significant at .01 level as it exceeds the critical value .181 at 198 degrees of freedom. Further, the obtained ‘t’ value (8.934) is greater than the critical value (2.58) set at .01 level of significance. Therefore the obtained correlation is significant at .01 level. Thus it can be inferred that the relationship between the variables (metacognitive skills and academic achievement) is significant and substantial (Garrett, 1966, p. 176).

**CONCLUSION**

Metacognitive skills help learners to analyse and appreciate their learning process, facilitate effective learning, and thereby improve the performance in scholastic areas. Present study is a gaze in to the worth of metacognitive skills of learners in the process of learning. The findings show significant positive association between metacognitive skills and scholastic achievement of students at higher secondary level. The study results are in conformity with that reported in many previous studies (Eriyani, 2020; Craig et al., 2020; Arami & Wiyarsi, 2020; Sonowal & Kalita, 2019; Abdelrahman, 2020). Therefore it can be safely concluded that the possession of metacognitive abilities and skills positively influence the learning outcome of students. Educators and parents should

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seriously monitor the nature and pattern of learning followed by students especially at higher secondary level and implement appropriate strategies to enhance the metacognitive skills.

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