

A Study of Metacognitive Awareness of Secondary School Students of High, Average and Low Achievers

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Abstract

The present study intends to study the metacognitive awareness of secondary school students of high, average and low achievers. Metacognition is a broadly defined concept incorporating cognitive process that refer to monitors or controls any aspect of cognition. It is now seen as a secondary contributor to many aspects of cognition including memory, attention, communication, problem solving and intelligence with important application education. Metacognitive assessment - engaging in a genuine interest in understanding students thinking - offers a novel way, through dialogue, of getting inside of student. The researcher has reviewed previous studies which were related to present study. The present study consist of 500 samples which were selected from the secondary school by using stratified random sampling technique. The present study is a type of survey method of research. The study reveals that the different student achievers (High, Average and Low) have different meta cognitive awareness scores and the different student achievers (High, Average and Low) have different meta knowledge scores. The present study has high significant contribution to the students community interms of improving the metacognitive awareness of secondary school students of high, average and low achievers.

INTRODUCTION

One of the hallmarks of psychological and educational theories and researches on learning is the emphasis on helping students to become more knowledgeable and responsible for their own cognition. Researchers agree that while growing student's become aware of their own thinking as well as more knowledgeable about cognition in general. Furthermore, as they act on this awareness they tend to learn better. The labels for this general developmental trend vary from theory to theory, but they include the development of metacognitive knowledge, metacognitive awareness, self-regulation etc.

COGNITIVE PROCESS

Cognition with refers to the higher processes involved in understanding and dealing with the world around us in the foundation on which all the experiences of the child have to be built(Gourgey,19980. Cognition can be defined as the process of information that the environment that is received through the senses cognition refers to mental activity and behavioural through which knowledge of the world is attained and processes includes perception, memory andthinking.

Metacognition is a broadly defined concept incorporating cognitive process that refer to monitors or controls any aspect of cognition. It is now seen as a secondary contributor to many aspects of cognition

including memory, attention, communication, problem solving and intelligence with important application education

DEFINITIONS OF METACOGNITION

Ormord, (2006): A recent definition describes metacognition as one's knowledge and beliefs about one's own cognitive processes and one's resulting attempts to regulate those cognitive processes to maximize learning and memory.

An individual's awareness of where they are in the learning process, their content knowledge, personal learning strategies, and what has been done and needs to be done (Wilson, 1999). Being aware of our thinking as we perform a specific task and then using this awareness to control what we are doing (**Town, 2002**).

Definition of Terms

- **Metacognition** - Thinking about thinking (Fogarty, 1994), or knowing about knowing (Metcalfe & Shimamura, 1994).
- **Metacognitive awareness** - Relates to an individual's awareness of where they are in the learning process, their knowledge about content knowledge, personal learning strategies, and what has been done and needs to be done (Wilson, 1999). Metacognitive awareness, for the purposes of this study, is defined as the ability to be a self-reflective and self-regulated learner who considers and comprehends her cognitive processes (Day, 1994). She is able to understand and use self-knowledge about cognitive strengths and weaknesses to develop additional skills and move towards intellectual maturity. She builds the ability to think about and comprehend how she approaches learning as well as the ability to plan, monitor, and evaluate her learning. These skills aid students in reading comprehension, writing, memory, problem solving, and related areas of education (Joseph, 2006).

ASSESSMENT OF METACOGNITION

Metacognitive assessment - engaging in a genuine interest in understanding students thinking - offers a novel way, through dialogue, of getting inside of student. The activities of strategy selection and application include those concerned with an on-going attempt to plan, check, monitor, select, revise, evaluate etc. Metacognition is stable in that learner initial decision derives from the pertinent fact about their cognition through years of learning experience. It is also situated in the sense that it depends on learner's familiarity with the task, motivation, emotion and so forth. To enhance learning to the fullest and students acquire integrate learning skills, learners to be aware of themselves as vibrant self-regulatory organisms who can consistently and deliberately achieve specific goals (**Kluwe, 1982**).

Need of the Study:

A few studies have attempted to measure metacognition in a way that is more connected to in-school learning. For example, **Hennessey (1999)** studied metacognition in the context of school science. Students working

in collaborative groups were taught to represent their science conceptions graphically, and were expected to be able to perform the following skills:

- State their own beliefs about the topic
- Consider the reasoning used to support their beliefs
- Look for consistency among their views
- Explore the implications of their views over a wide range of activities while looking for commonalities
- Explore abstract concepts, propositions, or theories by constructing physical representations of their views
- Distinguish between plausible, intelligible, and fruitful (grades 4-6) or distinguish between understanding an idea and believing it to be true (grades 1-3)
- Explicitly talk about the status of their conceptions (grades 4-6)
- Explicitly refer to their own thinking or learning

REVIEW OF RELATED LITERATURE

Studies Conducted Abroad

Schmitt (1995) developed the Meta comprehension Strategy Index to determine the student's levels of strategy awareness namely: predicting, verifying, previewing purpose setting, self-questioning, Drawing from back ground knowledge, summarizing and applying fix-up strategies. The results shown that there was lack of significant difference in the categories as a whole: there were a few questions that revealed differences between the children who had successfully completed Reading Recovery and the cohort sample group with respect knowledge about less effective or item oriented strategies.

McLain, Gridley, & McIntosh (1997) had evaluated metacognitive reading awareness inventory named Index of Reading Awareness prepared by Jacobs & Paris in 1987, for the students belong to grade 3 to 5. Subscales of the scale were Evaluation, Planning, Regulation and Conditional Knowledge. The results indicated that the scale should be used cautiously as a measure of metacognition in reading. Thomas (2003) had developed the metacognition orientation learning environment scale-Science, for the students of age group of 14 years to 17 years. Subscales of the MOLES-S were 1) Metacognitive demands, 2) Student discourse, 3) Student-Teacher discourse, 4) Student voice, 5) Distributed control, 6) Teacher encouragement and Support, 7) Emotional Support.

Maqsud (1997) studied effects of metacognitive skills and nonverbal ability on academic achievement of high school pupils. The study reports the findings of two experiments conducted with South African senior high school students to examine the relationships of metacognitive strategies and nonverbal reasoning ability to test performance in mathematics and English comprehension. The study suggests that teaching

metacognitive strategies to students who lack such skills may improve their academic performance.

Cetinkaya&Erktin (2008) showed that awareness and cognitive strategies subscales of the inventory were significantly and positively correlated with reading comprehension. Self-checking and evaluation subscales of the inventory were significantly and positively correlated with science course grades of the gifted students. No significant correlations were found between the metacognition scores and the achievement in the Turkish, Science and Mathematics courses.

Mokhatari&Reichard (2009) had developed an inventory to assess student's metacognitive awareness of reading strategies for the students of grade 6 to 12. Subscales of the inventory were Global Reading Strategies, Problem Solving Strategies and Support Reading Strategies.

Wu and Tsai (2009) conducted a study, "Development of elementary school students' cognitive structures and information processing strategies under long-term constructivist-oriented science instruction". The main purpose of this study was to explore the effects of long-term constructivist-oriented science instruction on elementary school students' process of constructing cognitive structures. Furthermore, such effects on different science achievers were also investigated. The subjects of this study were 69 fifth graders in Taiwan, while they were assigned to either a constructivist-oriented instruction group or a traditional teaching group. The research treatment was conducted for 5 months.

Cook (2010) stated that the literature on metacognition indicated that metacognitive awareness is frequently related to better performance. He questioned, however, whether students were aware that they were consciously monitoring their performance, or even using metacognitive strategies to solve problems. He conducted two studies. The first study showed that student reading performance was faster and more accurate when students used such discrimination strategies as re-reading and focusing on specific semantic features during the initial reading. The second study showed that students were, indeed, aware of their strategies, and frequently focused on and evaluated their solutions to problem solving.

Andrew (2010) undertook a study on the Influence of cognitive and metacognitive strategies on deep learning and concluded that metacognitive strategies help children of all ages to develop highly critical cognitive functioning ability, which results in deep understanding and develop problem solving skills.

Abdolhossini (2012) reported the effects of cognitive and meta-cognitive methods of teaching mathematics subject for high school students. The results showed that cognitive and meta-cognitive methods of teaching had positive effects on educational progress of male and female students. Nevertheless, no positive relation was observed between the boys' and girls' average grades.

JirapaAbhakorn (2014) conducted a study on investigating the use of student portfolios to develop students' metacognition in English as foreign language learning. The results indicated that the understanding of metacognition development through a mediated tool in language learning, and suggest EFL teachers and language educators to be aware of the importance of metacognition and reflective skills training in order to reach the full potential of the portfolio approach in language learning to be realized.

Studies Conducted In India

Narang and Saini (2013) conducted a study, "Metacognition and Academic Performance of Rural Adolescents". The present study was undertaken to study the impact of metacognition on academic performance of rural adolescents (13-16 years). The study was carried out in rural schools of block-I, Ludhiana District. The sample comprised of 240 rural adolescents equally distributed over four grades (7th, 8th, 9th and 10th grade), two sexes and two socio-economic groups i.e. middle and low socio-economic group. Metacognitive skills of the subjects were assessed using a self-structured Questionnaire adapted from Metacognition Inventory and Metacognitive Awareness Inventory. To assess the academic performance of the subjects, the aggregate percentage of marks obtained by them in the last school examination was procured from the concerned teachers. Results revealed that the major proportion of subjects with high level of metacognition also performed above average in academics. Further, analysis depicted that both the components of metacognition viz. „Knowledge of Cognition“ and „Regulation of Cognition“ significantly contributed towards the academic performance of the adolescents.

Rani and Punita (2015) conducted a study, "Metacognition and Its Correlates: A Study". The present study attempts to investigate correlates of metacognition of undergraduate students. The study explored the relationship of metacognition of undergraduate students with demographic variables like gender, place of living, academic achievement and parents' education. The study was conducted on the sample of 313 undergraduate students of Aligarh District. The metacognitive inventory (MCI) developed by Dr. Punita Govil has been used as a measure of metacognition of students. „t“ test and analysis of variance have been employed to analyze the data. The findings of the study reveal that gender has no significant impact on the metacognition of undergraduate students on the other hand the metacognitive level of urban students differs significantly from their rural counterparts. The high and low achieving undergraduate students differ significantly on their metacognitive level. Moreover, fathers' educational qualification found to have no significant impact on metacognition of the students under study while mothers' education has significant impact on it. This study suggests learners to understand and regulate their own thinking process to resolve the real life complexities. Further the present study also recommends some strategies for parents and teachers to facilitate learning among students at college level.

Sindhvani and Sharma (2015) conducted a study, "Metacognitive Learning Skills." They pointed out that to become self-directed learners, students must learn to assess the demands of the task, evaluate their own knowledge and skills, plan their approach, monitor their progress and adjust their strategies as needed. Students must be able to accurately reflect on what they do and don't know and how they would approach solving new organisation problems. Studies have shown that once a child is able to come up with his own way of organising items for study, he will achieve far greater results on tests (in reading, writing, math, science, bilingual education, test prediction, etc.). It is therefore imperative that effective study skills, with metacognition as the goal, be taught and monitored to children so that they may become more facile with finding unique problem-solving strategies in future. Unfortunately, these metacognitive skills tend to fall outside the content area of most courses and consequently they are often neglected in instruction.

OVERVIEW

studies related to the metacognitive awareness about the Strategy Index to determine the student's levels of strategy awareness, reading awareness inventory named Index of Reading Awareness, skills and nonverbal ability on academic achievement of high school pupils., awareness is frequently related to better performance, student portfolios to develop students' metacognition in English as foreign language learning. Maximum no of Studies not conducted more about secondary school students on High achievers, average achievers and Low achievers

Thus, it is evident the number of researches on adolescent students, in relation to variables like metacognition, problem solving ability and self-esteem is meagre Therefore the investigator undertook this study on metacognition among adolescent students in relation to their problem solving ability and self-esteem. The present survey of related literature has been definitely useful in designing the study and interpretation of the results which appear in the following chapters. The investigator has made a humble attempt to fill up the research gap by undertaking the present study. that way the present studies identify the problem and define.

Objectives of the study

To study whether there is significance difference between different achievers (High, Average and Low) of secondary school students with meta cognitive awareness and its dimensions (i.e. meta knowledge, self-planning, self-monitoring, self-evaluation and self-regulation).

Hypothesis: There is no significance difference between different achievers (High, Average and Low) of secondary school students with meta cognitive awareness and its dimensions (i.e. meta knowledge, self-planning, self-monitoring, self-evaluation and self-regulation).

Method of research used for the study : Survey method is used to conduct study

Tools used for the study

The descriptive tools used for the study

Limitations of the study

- The study was conducted in Kodagu district of the Karnataka
- The study has conducted only on High achievers, average achievers and low achievers in secondary school level of English medium only

Sample of the study;

The sample of this study is 500 students in secondary schools of kodagu districts

Statistical used for the data analysis

ANNOVA and "test used for the study To test the hypothesis one-way ANOVA and t-test was applied and the results are presented.

Data Analysis and Interpretation

Hypothesis: There is no significance difference between different achievers (High, Average and Low) of secondary school students with meta cognitive awareness and its dimensions (i.e. meta knowledge, self-planning, self-monitoring, self-evaluation and self-regulation).

To achieve this hypothesis, the one-way ANOVA test was applied and the results are presented in the following table

Table 1: Results of one-way ANOVA test between different achievers (High, Average and Low) with respect to meta cognitive awareness and its dimensions scores

Variable	Sources of variation	Degrees of freedom	Sum of squares	Mean sum of squares	F-value	P-value	Signi.
Meta cognitive awareness	Between achievers	2	6425.59	3212.7956	801.1996	0.0001	<0.05, S
	Within achievers	497	1992.96	4.0100			
	Total	499	8418.55				
Meta knowledge	Between achievers	2	364.90	182.4519	61.3399	0.0001	<0.05, S
	Within achievers	497	1478.30	2.9744			
	Total	499	1843.20				

Self-planning	Between achievers	2	315.14	157.567	70.4647	0.0001	<0.05, S
	Within achievers	497	1111.35	2.2361			
	Total	499	1426.49				
Self-monitoring	Between achievers	2	35.04	17.5205	17.7416	0.0001	<0.05, S
	Within achievers	497	490.81	0.9875			
	Total	499	525.85				
Self-evaluation	Between achievers	2	358.43	179.215	54.6658	0.0001	<0.05, S
	Within achievers	497	1629.36	3.2784			
	Total	499	1987.79				
Self-regulation	Between achievers	2	377.68	188.84	50.0541	0.0001	<0.05, S
	Within achievers	497	1875.05	3.77			
	Total	499	2252.73				

From the results of the above table, we seen clearly that,

- A significant difference was observed between different student achievers (High, Average and Low) with respect to meta cognitive awareness scores ($F=801.1996$, $p<0.05$) at 5% level of significance. Hence, the null hypothesis is rejected and alternative hypothesis is accepted. It means that, the different student achievers (High, Average and Low) have different meta cognitive awareness scores.
- A significant difference was observed between different student achievers (High, Average and Low) with respect to meta knowledge scores ($F=61.3399$, $p<0.05$) at 5% level of significance. Hence, the null hypothesis is rejected and alternative hypothesis is accepted. It means that, the different student achievers (High, Average and Low) have different meta knowledge scores.
- A significant difference was observed between different student achievers (High, Average and Low) with respect to self planning ($F=70.4647$, $p<0.05$) at 5% level of significance. Hence, the null

hypothesis is rejected and alternative hypothesis is accepted. It means that, the different student achievers (High, Average and Low) have different self planning.

- A significant difference was observed between different student achievers (High, Average and Low) with respect to self monitoring ($F=17.7416$, $p<0.05$) at 5% level of significance. Hence, the null hypothesis is rejected and alternative hypothesis is accepted. It means that, the different student achievers (High, Average and Low) have different self monitoring.
- A significant difference was observed between different student achievers (High, Average and Low) with respect to self evaluation ($F=54.6658$, $p<0.05$) at 5% level of significance. Hence, the null hypothesis is rejected and alternative hypothesis is accepted. It means that, the different student achievers (High, Average and Low) have different self evaluation.
- A significant difference was observed between different student achievers (High, Average and Low) with respect to self regulation ($F=50.0541$, $p<0.05$) at 5% level of significance. Hence, the null hypothesis is rejected and alternative hypothesis is accepted. It means that, the different student achievers (High, Average and Low) have different self regulation.

Table 2: Pair wise comparison of different student achievers (High, Average and Low) with respect to personality and its dimensions scores by Tukeys multiple posthoc procedures

Variable	Achievers	Low achievers	Average achievers	High achievers
Meta cognitive awareness	Mean	30.24	34.97	39.99
	Low achievers	-		
	Average achievers	$P=0.0001^*$	-	
	High achievers	$P=0.0001^*$	$P=0.0001^*$	-
Meta knowledge	Mean	3.73	4.89	6.06
	Low achievers	-		
	Average achievers	$P=0.0001^*$	-	
	High achievers	$P=0.0001^*$	$P=0.0001^*$	-
Self planning	Mean	4.54	5.53	6.70
	Low achievers	-		
	Average achievers	$P=0.0001^*$	-	
	High achievers	$P=0.0001^*$	$P=0.0001^*$	-
Self monitoring	Mean	4.33	4.44	5.00
	Low achievers	-		

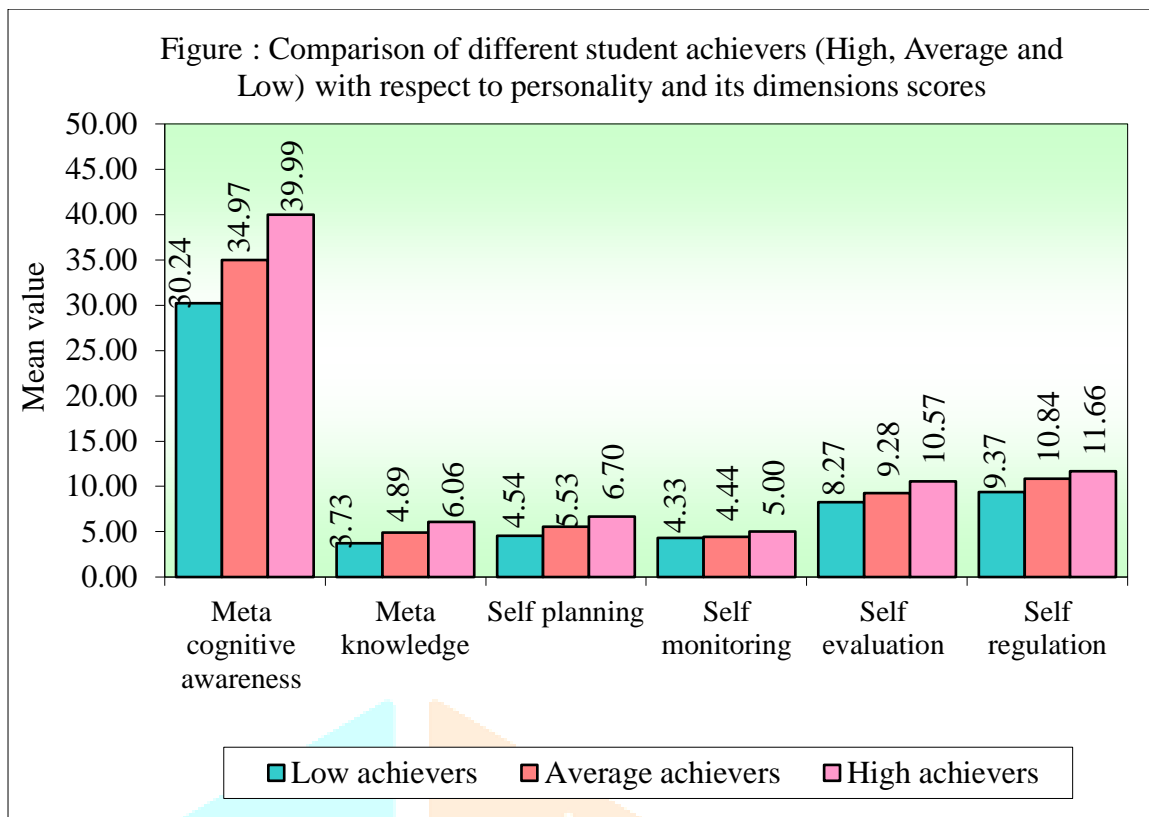
	Average achievers	P=0.0001*	-	
	High achievers	P=0.0001*	P=0.0001*	-
Self evaluation	Mean	8.27	9.28	10.57
	Low achievers	-		
	Average achievers	P=0.0001*	-	
	High achievers	P=0.0001*	P=0.0001*	-
Self regulation	Mean	9.37	10.84	11.66
	Low achievers	-		
	Average achievers	P=0.0001*	-	
	High achievers	P=0.0001*	P=0.0001*	-

*p<0.05

From the results of the above table, we seen clearly that,

- A significant difference was observed between low and average achievers with respect to meta cognitive awareness scores at 5% level of significance. It means that, the average achievers have significant higher meta cognitive awareness scores as compared to low achievers.
- A significant difference was observed between low and high achievers with respect to meta cognitive awareness scores at 5% level of significance. It means that, the high achievers have significant higher meta cognitive awareness scores as compared to low achievers.
- A significant difference was observed between average and high achievers with respect to meta cognitive awareness scores at 5% level of significance. It means that, the high achievers have significant higher meta cognitive awareness scores as compared to average achievers.
- A significant difference was observed between low and average achievers with respect to meta knowledge scores at 5% level of significance. It means that, the average achievers have significant higher meta knowledge scores as compared to low achievers.
- A significant difference was observed between low and high achievers with respect to meta knowledge scores at 5% level of significance. It means that, the high achievers have significant higher meta knowledge scores as compared to low achievers.
- A significant difference was observed between average and high achievers with respect to meta knowledge scores at 5% level of significance. It means that, the high achievers have significant higher meta knowledge scores as compared to average achievers.
- A significant difference was observed between low and average achievers with respect to self planning at 5% level of significance. It means that, the average achievers have significant higher self planning as compared to low achievers.
- A significant difference was observed between low and high achievers with respect to self planning at 5% level of significance. It means that, the high achievers have significant higher self planning as compared to low achievers.

- A significant difference was observed between average and high achievers with respect to self planning at 5% level of significance. It means that, the high achievers have significant higher self planning as compared to average achievers.
- A significant difference was observed between low and average achievers with respect to self monitoring scores at 5% level of significance. It means that, the average achievers have significant higher self monitoring as compared to low achievers.
- A significant difference was observed between low and high achievers with respect to self monitoring at 5% level of significance. It means that, the high achievers have significant higher self monitoring as compared to low achievers.
- A significant difference was observed between average and high achievers with respect to self monitoring scores at 5% level of significance. It means that, the high achievers have significant higher self monitoring scores as compared to average achievers.
- A significant difference was observed between low and average achievers with respect to self evaluation at 5% level of significance. It means that, the average achievers have significant higher self evaluation as compared to low achievers.
- A significant difference was observed between low and high achievers with respect to self evaluation at 5% level of significance. It means that, the high achievers have significant higher self evaluation as compared to low achievers.
- A significant difference was observed between average and high achievers with respect to self evaluation at 5% level of significance. It means that, the high achievers have significant higher self evaluation as compared to average achievers.
- A significant difference was observed between low and average achievers with respect to self regulation at 5% level of significance. It means that, the average achievers have significant higher self regulation as compared to low achievers.
- A significant difference was observed between low and high achievers with respect to self regulation at 5% level of significance. It means that, the high achievers have significant higher self regulation as compared to low achievers.
- A significant difference was observed between average and high achievers with respect to self regulation at 5% level of significance. It means that, the high achievers have significant higher self regulation as compared to average achievers. The mean scores are also presented in the following figure.



Findings of the study:

From the results of the above table, we observe clearly that,

- the different student achievers (High, Average and Low) have different meta cognitive awareness scores.
- the different student achievers (High, Average and Low) have different meta knowledge scores.
- the different student achievers (High, Average and Low) have different self planning scores.
- the different student achievers (High, Average and Low) have different self monitoring scores.
- the different student achievers (High, Average and Low) have different self evaluation scores.
- the different student achievers (High, Average and Low) have different self regulation scores.
- the average achievers have significant higher meta cognitive awareness scores as compared to low achievers.
- the high achievers have significant higher meta cognitive awareness scores as compared to low achievers.
- the high achievers have significant higher meta cognitive awareness scores as compared to average achievers.
- the average achievers have significant higher meta knowledge scores as compared to low achievers.
- the high achievers have significant higher meta knowledge scores as compared to low achievers.
- the high achievers have significant higher meta knowledge scores as compared to average achievers.
- the average achievers have significant higher self planning scores as compared to low achievers.

- the high achievers have significant higher self planning scores as compared to low achievers.
- the high achievers have significant higher self planning scores as compared to average achievers.
- the average achievers have significant higher self monitoring scores as compared to low achievers.
- the high achievers have significant higher self monitoring scores as compared to low achievers.
- the high achievers have significant higher self monitoring scores as compared to average achievers.
- the average achievers have significant higher self evaluations as compared to low achievers.
- the high achievers have significant higher self evaluations as compared to low achievers.
- the high achievers have significant higher self evaluations as compared to average achievers.
- the average achievers have significant higher self regulations as compared to low achievers.
- the high achievers have significant higher self-regulation as compared to low achievers.
- the high achievers have significant higher self-regulation as compared to average achievers. The mean scores are also presented in the following figure.

Educational Implications

The findings of the present study have very many clear and significant implications for parents, teachers, guidance workers and counsellor and educational administrators. It is scientifically proved that the success of individual's work is 80 per cent depend on emotional intelligence and only 20 per cent on metacognitive awareness.

The purpose of the study is to find out factors influencing the academic achievement of secondary school students, thereby give scope to the management of the schools to plan and implement appropriate programme. So that the student performs better in their scholastic achievement. The study is aimed to study the factors metacognitive awareness in meta-memory, meta-monitoring, met planning, meta-evaluation, meta regulation are associated with academic achievements of the secondary school students. The factors are contributing factors with academic achievement. He study may be usefull to students to faster the metacognitive awareness, meta memory meta planning, meta monitoring, meta regulation, meta evaluation, in turns it helps in improving the academic achievement of leaners. From the study, it is found that independent variables are influencing the academic achievement of students of secondary schools. hence the students should be given training and awareness programme through co-curricular and curricular experiences to improve their metacognitive awareness which are major contributing factors to academic achievement of secondary school students. The students should also be encouraged and motivated to take up

all school subjects confidently. They should be taught to imbibe good study habits and favourable attitude towards school in turn which promotes their metacognitive awareness.

Based on the personal teaching experience of the researcher, findings of the present study, the students should be counselled to overcome the examination fear and general phobia about the different school subjects. Student should be made active participation in teaching learning process and not nearly passive listeners and students should be made to understand clearly the objectives of the different school subjects.

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Cook (2010) stated that the literature on metacognition indicated that metacognitive awareness is frequently related to better performance.

Martin (2008) in the study on the use of cognitive strategies by high school social studies students reveals that cognitive strategy increases student's knowledge and motivation.

Andrew (2010) undertook a study on the Influence of cognitive and metacognitive strategies on deep learning and concluded that metacognitive strategies help children of all ages to develop highly critical cognitive functioning ability, which results in deep understanding and develop problem solving skills.

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