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Effect of the Meta-cognitive Skills on Academic Achievement among Secondary School Students

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ABSTRACT

Education is a mean to improve all the qualities of human being. It enable the individual to rise the quality of physical stamina, intellectual power, social upright, emotional balance, spiritual consciousness, morally high and culturally empowered. Meta-cognitive skills actuate and control other cognitive strategies in learning and thinking process, and make plans and decisions of other cognitive strategies to be used in future and achievement motivation provides a means of powerful and higher aim in the life of the students. Meta-cognition also thinks about one's own thinking process such as study skills, memory capabilities, and the ability to monitor learning. This concept needs to be explicitly taught along with content instruction. Meta-cognitive knowledge is about one‘s own cognitive processes and understanding of how to regulate those processes to maximize learning. Meta-cognition is the process of thinking about thinking. It is the process of developing self-awareness and the ability to self-assess. It is contemplation about one’s education and learning -- past, present, and future. On exploring the present study, effect of meta-cognitive skills on academic achievement among secondary school students, it was found that the levels of high and low meta-cognitive skills effected the academic achievement of male and female secondary school students. Male and female students having high and meta-cognitive skills do not differs significantly on academic achievement but the students having high and low meta-cognitive skills differ significantly on academic achievement .

Keywords: Meta-cognitive Skills on Academic Achievement

ISSN: 0971-1260
Vol-22-Issue-3-July-September-2019

INTRODUCTION

The world in the twenty first century will be knowledge based society with multiple opportunities and need better citizen tomorrow. Thus, the education system in the world over aim at providing responses to the emerging challenges and concerns, the objective being to make education relevant to the needs of individuals, communities and nations. The education in general and school education in particular need to be quality assured. The reason is, only quality education makes people useful, productive and prudent. It is the stage that young people should be able to decide their own future, in the light of their own testes and aptitudes and that they can acquire the abilities that will make for successful adult life.

It is accepted that the ultimate goal in education is to achieve good life. Good life is one that realizes the maximum of motivation. If education leads towards good life, then it has to make decision about how motivated a person has, about right and wrong, about better and worse, and this brings us to the issue of achievement of the goal. Meta-cognitive skills actuate and control other cognitive strategies in learning and thinking process, and make plans and decisions of other cognitive strategies to be used in future As a human concept achievement motivation involves creativity in the discovery of patterns of learning and reaching the goal.

RATIONAL OF THE STUDY

A few studies were conducted to analyze the likely effect of meta-cognition on every variable that related to learning. A great number of educational reforms in recent years have been aimed at improving student's academic achievement. The practice of Meta-cognitive Skills provides children with important cognitive resources. As Meta-cognitive Skills increase, children are better able to keep track of how successfully they are accomplishing their goals, and this allows them to modify their strategies so that they are more successful in life. The past twenty years promotes building student's Meta-cognitive Skills – planning, implementation, monitoring and evaluating one's own thinking as a means to improve their problem solving skills. Meta-cognitive Skills and help to facilitate any type of cognitive learning.

ISSN: 0971-1260
Vol-22-Issue-3-July-September-2019

META-COGNITION

Meta-cognition is defined as cognition about cognition, or knowing about knowing. It can take many forms; it includes knowledge about when and how to use particular strategies for learning or for problem solving. There are generally two components of meta-cognition: knowledge about cognition, and regulation of cognition. The evolutionary psychologists hypothesize that meta-cognition is used as a survival tool, which would make same across cultures. This concept needs to be explicitly taught along with content instruction. Meta-cognitive knowledge is about one‘s own cognitive processes and understanding of how to regulate those processes to maximize learning. Meta-cognition is what enables a student who has been taught a particular strategy in a particular problem context to retrieve and deploy that strategy in a similar but meta-cognition the new context. Meta-cognition as a multidimensional set of general, rather than domain-specific, skills. These skills are empirically distinct from general intelligence, and may even help to compensate for deficits in general intelligence and/or prior knowledge on a subject during problem solving. Identify three clusters of mental activity inherent in meta-cognition within the context of reading comprehension, including awareness, monitoring and regulating. These skills are empirically distinct from general intelligence, and may even help to compensate for deficits in general intelligence and/or prior knowledge on a subject during problem solving. Meta-cognition variously refers to the study of memory-monitoring and self regulation, meta-reasoning, consciousness/awareness and auto-consciousness/self-awareness. In practice these capacities are used to regulate one's own cognition, to maximize one's potential to think, learn and to the evaluation of proper ethical / moral rules. Meta-cognition is classified into three components:

i. Meta-cognitive knowledge (also called meta-cognitive awareness) is what individuals know about themselves and others as cognitive processors.
ii. Meta-cognitive regulation is the regulation of cognition and learning experiences through a set of activities that help people control their learning.
iii. Meta-cognitive experiences are those experiences that have something to do with the current, on-going cognitive endeavor.

Meta-cognition refers to a level of thinking that involves active control over the process of thinking that is used in learning situations. Planning the way to approach a learning task,

ISSN: 0971-1260
Vol-22-Issue-3-July-September-2019

monitoring comprehension, and evaluating the progress towards the completion of a task: these are skills that are meta-cognitive in their nature:

1. **Planning**: refers to the appropriate selection of strategies and the correct allocation of resources that affect task performance.
2. **Implementation:** refers learner's willingness to apply him or herself to attaining the set goal.
3. **Monitoring**: refers to one's awareness of comprehension and task performance
4. **Evaluating**: refers to appraising the final product of a task and the efficiency at which the task was performed. This can include re-evaluating strategies that were used. Similarly, maintaining motivation to see a task to completion is also a meta-cognitive skill. The ability to become aware of distracting stimuli – both internal and external – and sustain effort over time also involves meta-cognitive or executive functions.

- **Meta-cognitive Skills**

Meta-cognitive skills assist one in understanding or comprehending learning activities. Its purpose is to guide instructors in incorporating activities and discussions that will help learners understand how they learn, their strengths and their needs, and to better understand the learning process.

- **Academic Achievement**

Academic achievement as the level of proficiency attained in academic work or as formally acquired knowledge in school subject which is often represented by percentage of marks obtained by students in examination.

VARIABLES INVOLVED IN THE STUDY

I. Independent Variables: Meta-cognitive Skills, Gender (Male & Female).
II. Dependent Variables: Academic Achievement.

OBJECTIVES OF THE STUDY

1. To compare the academic achievement of secondary school students having high and low meta-cognitive skills.
2. To compare the academic achievement of male & female secondary school students having high meta-cognitive skills.

ISSN: 0971-1260
Vol-22-Issue-3-July-September-2019

3. To compare the academic achievement of male & female secondary school students having low meta-cognitive skills.
4. To study the relationship between the academic achievement and meta-cognitive skills of the secondary school students.

HYPOTHESES OF THE STUDY

1. There exists no significant difference between academic achievement of the secondary school students having high and low meta-cognitive skills.
2. There exists no significant difference between academic achievement of male & female secondary school students having high meta-cognitive skills.
3. There exists no significant difference between academic achievement of male & female secondary school students having low meta-cognitive skills.
4. There exists no significant relationship between the academic achievement and meta-cognitive skills of the secondary school students.

DESIGN OF THE STUDY

In the present study, descriptive method has been adopted as it is most appropriate method for such type of studies.

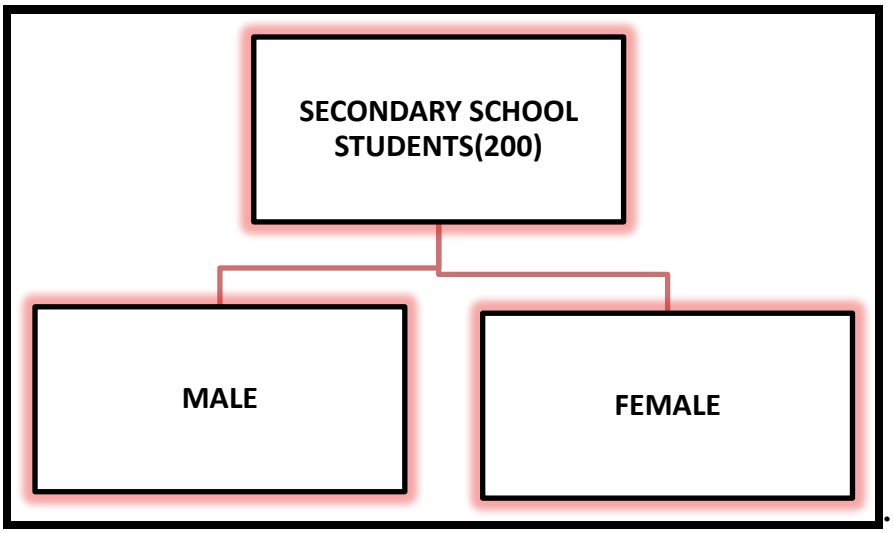
POPULATION

All the secondary class students of Bhiwani District of Haryana State constituted the population for the present study.

SAMPLE

In order to collect the relevant data, a sample of 200 students of 9^{th} class of Bhiwani District was involved. Random sampling technique was used to select the schools and students.
These were further stratified on the basis of gender and out of 200 students were male and female selected.

ISSN: 0971-1260
Vol-22-Issue-3-July-September-2019



3.3.1: Layout of the Sample selected for the study

TOOLS USED

The tools used in the present investigation:

- Meta-cognitive Skills Scale by Prof. Madhu Gupta and Dr. Suman

PROCEDURE OF THE DATA COLLECTION

As the study was conducted among the high school students of bhiwani District, the researcher had to concentrate one district at a time, Data collection had been systematically executed. The researcher with the help of the school teachers administered the tool in an effective and efficient manner. The students were given the time to work with the tools of the research in their own learning environment.

STASTISTICAL TECHNIQUES USE

In order to study the nature of the data descriptive statistics, mean and standard deviations were calculated with the help of Ms Excel and t-test used to find out the significant difference between the mean scores of male and female school students of secondary class. The mean score of Meta cognitive skills and Achievement motivation with respect to gender were presented pictorially in the form of graph. On the basis of these tools, procedures and statistical techniques employed, the analysis of data, interpretation and discussion of have been presented in the forthcoming chapter.

ISSN: 0971-1260
Vol-22-Issue-3-July-September-2019

DATA ANALYSIS AND INTERPRETATION

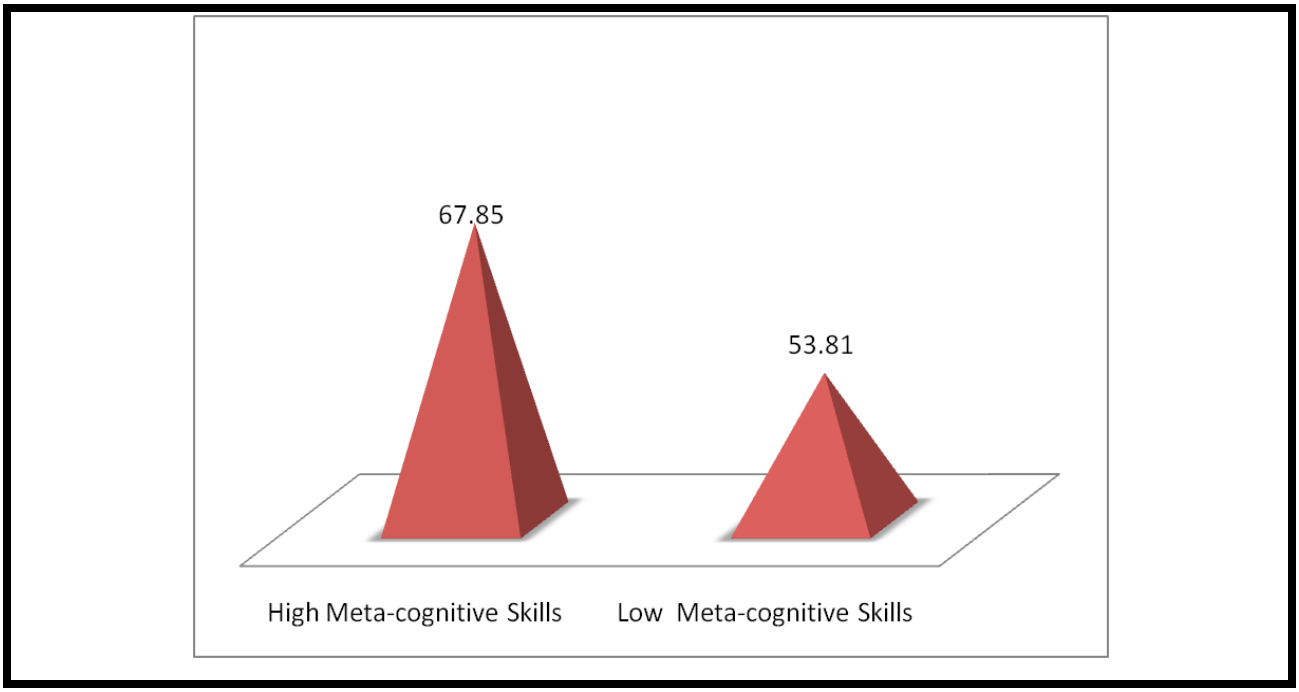
Objective-1: To compare the academic achievement of the secondary school students having high and low meta-cognitive skills.

Hypothesis-1: There exists no significant difference between academic achievement of the secondary school student having high and low meta-cognitive skills**.**

Table

Means, S.D. and 't' value of Academic Achievement of Secondary School Students having High and Low Meta-cognitive Skills

Variable	Groups	N	Mean	S.D.	't' value	Level of Significance
Academic Achievement	High Meta-cognitive Skills	75	67.85	8.02	10.71	Significant at 0.01 level
	Low Meta-cognitive Skills	61	53.81	5.89		



ISSN: 0971-1260
Vol-22-Issue-3-July-September-2019

Fig.: Mean Scores of Academic Achievement of Secondary School Students having High and Low Meta-cognitive Skills

Table indicates that the t-value 10.71 for academic achievement of secondary school students having high and low meta-cognitive skills is found significant at 0.01 level. Thus the null hypothesis $Ho_{1,}$ "There exists no significant difference between academic achievement of the secondary school students having high and low meta-cognitive skills" stands rejected. In terms of mean scores it was inferred that the mean academic achievement score of students having high meta-cognitive skills (67.85) is higher than the mean academic achievement scores of students having low meta-cognitive skills (53.81). It indicates that students having high meta-cognitive skills had better academic achievement than the students having low meta-cognitive skills.

Objective-2: To compare the academic achievement of male and female secondary school students having high meta-cognitive skills.

Hypothesis-2: There exists no significant difference in academic achievement of male and female secondary school students having high meta-cognitive skills.

Table

Means, S.D. and 't' value of Academic Achievement of Male and Female Secondary School Students having High Meta-cognitive Skills

Variable	**Group**	**N**	**Mean**	**S.D.**	**'t' value**	**Level of Significance**
Academic Achievement	Male Students with high Meta-cognitive Skills	34	66.78	6.21	1.260	Not Significant
	Female Students with high Meta-cognitive Skills	41	69.06	9.36		

ISSN: 0971-1260
Vol-22-Issue-3-July-September-2019

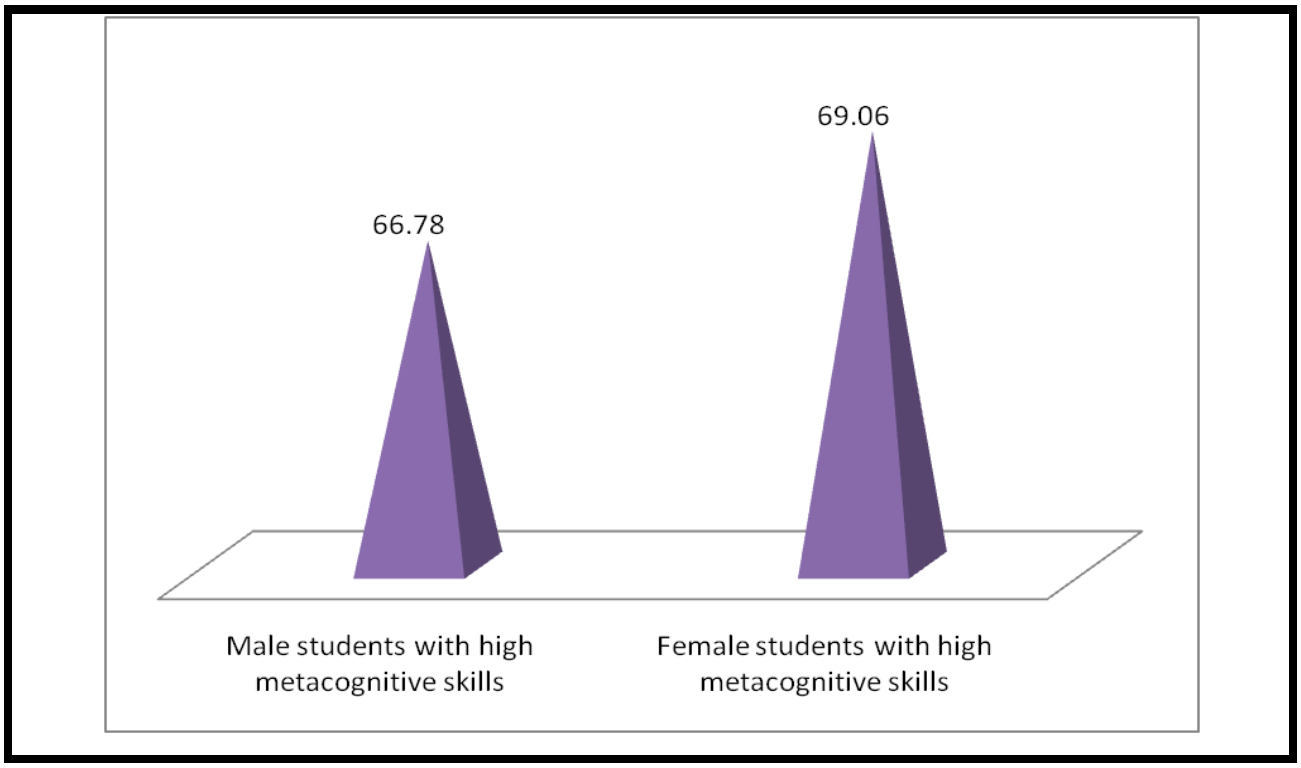


Fig.: Mean Scores of Academic Achievement of Male and Female Secondary School Students having High Meta-cognitive Skills

Table indicates that the t-value (1.26) for academic achievement of male and female secondary school students having high meta-cognitive skills is found not significant at 0.01 level. Thus the null hypothesis Ho_2, "There exists no significant difference between academic achievement of male and female secondary school students having high and low meta-cognitive skills" stands accepted. In terms of mean scores it was observed that the mean academic achievement score of male students having high meta-cognitive skills (66.78) is lesser than the mean academic achievement scores of female students having high meta-cognitive skills (69.06). However it was further found that male and female students having high meta-cognitive skills do not differ significantly on academic achievement.

Objective-3: To compare the academic achievement of male and female secondary school students having low meta-cognitive skills.

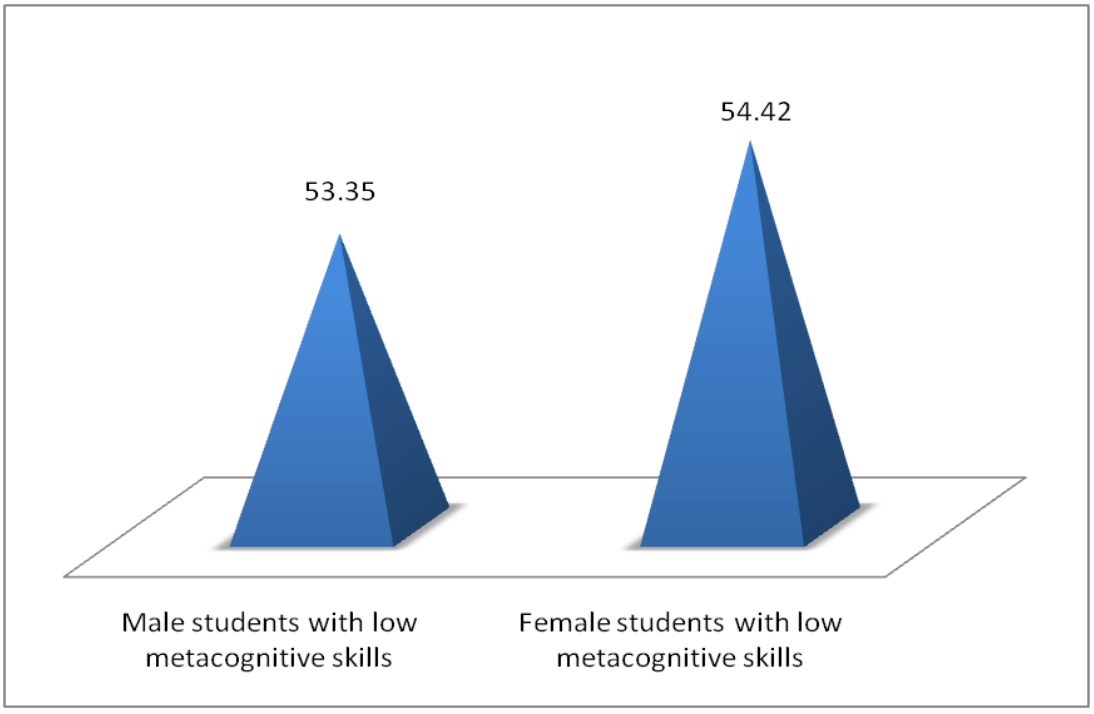
ISSN: 0971-1260
Vol-22-Issue-3-July-September-2019

Hypothesis-3: There exists no significant difference in academic achievement of male and female secondary school student s having low meta-cognitive skills**.**

Table

Means, S.D. and‘t’ value of Academic Achievement of Male and Female Secondary School Students having Low Meta-cognitive Skills

Variable	Groups	N	Mean	S.D.	‘t’ value	Level of Significance
Academic Achievement	Male Students with Low Meta-cognitive Skills	28	53.35	4.33	0.626	Not Significant
	Female Students with Low Meta-cognitive Skills	33	54.42	7.56		



ISSN: 0971-1260
Vol-22-Issue-3-July-September-2019

Fig.: Mean Scores of Academic Achievement of Male and Female Secondary School Students having Low Meta-cognitive Skills

Table reveals that the t-value (0.62) for academic achievement of male and female secondary school students having low meta-cognitive skills is found not significant at 0.01 level. Thus the null hypothesis Ho_3, "There exists no significant difference between academic achievement of male and female secondary school students having low meta-cognitive skills" stands accepted. In terms of mean scores it was observed that the mean academic achievement scores of male and female students having low meta-cognitive skills (53.35) is lesser than the mean academic achievement scores of female students having low meta-cognitive skills (54.42). It depicts that male and female students with low meta-cognitive skills do not differ significantly on academic achievement.

Objective-7: To study the relationship between the academic achievement and meta-cognitive skills of the secondary school students.

Hypothesis-7: There exists no significant relationship between the academic achievement and meta-cognitive skills of the secondary school students.

Table

Coefficient of Correlation (r) Between Academic Achievement and Meta-cognitive Skills of Secondary School Students

Variables	**N**	**'r' value**	**Level of Significance**
Academic Achievement	200	0.68	Significant at 0.01 level
Meta-cognitive Skills	200		

Table It is clear from that the 'r' value (0.77) between academic achievement and meta-cognitive skills is found significant at 0.01 level. So, the null hypothesis Ho_7, "There exists no significant relationship between academic achievement and meta-cognitive skills of secondary school students" stands rejected. It become quite clear that academic achievement and meta-cognitive

ISSN: 0971-1260
Vol-22-Issue-3-July-September-2019

skills of secondary school students are positively and significantly correlated with each other. It can be interpreted that higher the academic achievement, higher the meta-cognitive skills of secondary school students and vice-versa.

FINDINGS OF THE STUDY

- Significant difference was found between students having high and low meta-cognitive skills on academic achievement. It indicates that students having high meta-cognitive skills had better academic achievement than the students having low meta-cognitive skills.
- Academic achievement of male and female secondary school students having high meta-cognitive skills in relation to gender differs not significantly. However it was further found that male and female students having high meta-cognitive skills do not differs significantly on academic achievement.
- There was no significant difference in academic achievement among male and female secondary school students with low meta-cognitive skills. It was inferred that male and female students with low meta-cognitive skills do not differ significantly on academic achievement.
- There was found a positive correlation between academic achievement and meta-cognitive skills. It could be that academic achievement and meta-cognitive skills of secondary school students are positively correlated with each other. So the results show that secondary school students have more academic achievement if they are better in meta-cognitive skills.

CONCLUSION

On exploring the present study, effect of meta-cognitive skills on academic achievement among secondary school students, it was found that the levels of high and low meta-cognitive skills effected the academic achievement of male and female secondary school students. Male and female students having high and meta-cognitive skills do not differs significantly on academic achievement but the students having high and low meta-cognitive skills differ significantly on academic achievement . Hence, the study exposes that meta-cognitive skills plays a significant role in determining their academic achievement. Students with high meta-cognitive skills

ISSN: 0971-1260
Vol-22-Issue-3-July-September-2019

exhibited enhanced achievement than their counterparts. A positive correlation between meta-cognitive skills and academic achievement. They found that students with high meta-cognition skills are more strategic, and are able to engage in self-regulated learning as well as using problem solving strategies effectively, and therefore achieve significant higher academic score than those with low meta-cognitive skills. This finding therefore suggests that students having good meta-cognitive skills are likely to achieve academic success and thus depicting meta-cognitive skills as a good predictor of academic achievement.

In spite of the fact that students meta-cognitive skills encompasses students' ability to planning, implementation, monitoring, and evaluation one's self, one's cognitive processes as well as learning strategies so as to determine areas of weaknesses that can be corrected for the purpose of achieving academic success.

EDUCATIONAL IMPLICATION

- The study provides invaluable resources to all those who are concerned with the improvement of secondary schools student's academic achievement.

- The study exposes the details regarding the meta-cognitive skills, and academic achievement in Bhiwani district. In the light of the results of the study the policy makers and administrators shall take appropriate steps to improve the learning environment in academics based on respective district.

- The study encourages secondary school students to practice their meta-cognitive skills and using these skills to achieve academic achievement.

- The study creates ample opportunities for the teachers to analyze the meta-cognitive skills acquired by the students thereby providing training to those who need extra care.

- The present study provides guideline to authorities how meta-cognitive skills is to be developed effectively which in turn enhance the academic achievement.

- Learners with good meta-cognitive skills are able to monitor and direct their own learning processes if they know their level of skills.

ISSN: 0971-1260
Vol-22-Issue-3-July-September-2019

- The study highlights that the meta-cognitive skills and motivation are relevant factors in determining the achievement of students.

- The findings of this study could be used in schools to create more effective tutoring methods for low-achieving students in academics.

- The findings of this study also prompt more researches among secondary school students with low success in all subjects.

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