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METACOGNITIVE READING STRATEGIES IN RELATIONSHIP WITH SCHOLASTIC ACHIEVEMENT IN SCIENCE OF IX STANDARD STUDENTS OF ENGLISH MEDIUM SCHOOLS IN AURANGABAD CITY

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Metacognition is "thinking about thinking" or a higher thinking method. Metacognition involves activities such as planning how to approach a learning task, monitoring comprehension, and evaluating the progress. Metacognition is used by people on everyday basis. For example, after reading a paragraph the reader may ask himself questions about the text. If the reader cannot answer his own questions then he must go back and reread or use some metacognitive strategies for better understanding. This study throws light on the metacognitive reading strategies of IX standard students of English medium schools of Aurangabad city and explore their relationship with their scholastic achievement in science. The study was carried out on 100 students of IX standard from English medium schools of Aurangabad city. The metacognitive strategies used by students were measured by a tool "Metacognitive Awareness of Reading Strategies" prepared by Mokhtari and Richard (2002). The findings reveal that there is positive and moderate relationship between metacognitive reading strategies and scholastic achievement in science. It is also revealed from the findings that female students are better in metacognitive strategies than male students.

KEYWORDS: Metacognition, Metacognitive Strategies, Scholastic Achievement in Science

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INTRODUCTION

Over the last 35 years, many definitions have been proposed for the word metacognition, or "thinking about thinking". 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". Metacognition plays an important role in communication, reading comprehension, language acquisition, social cognition, attention, self-control, memory, self-instruction, writing, problem solving, and personality development. Metacognition includes knowledge and regulation of one's thinking processes. Metacognition is a special type of knowledge and ability that develops with personal experience and with schooling. It is in a recursive loop with cognitive development in that it both produces and is a product of cognitive development.

Metacognition is often simply defined as, "thinking about thinking" or a higher thinking method. Metacognition involves activities such as planning how to approach a learning task, monitoring comprehension, and evaluating the progress. People in their everyday basis use Metacognition. For example, after reading a paragraph the reader may ask himself questions about the text. If the reader cannot answer his own questions then he must go back and reread the text for better understanding. Although related, cognition and metacognition differ: Cognitive skills are those needed to perform a task whereas metacognitive skills are necessary to understand how it was performed. Successful adult learners employ a range of metacognitive skills, and effective teachers of adults attend to the development of these skills.

Metacognition refers to higher order thinking which involves active control over the cognitive processes engaged in learning. Activities such as planning how to approach a given learning task, monitoring comprehension and evaluating progress towards the completion of a task are metacognitive in nature. Because metacognitive plays a critical role in successful learning, it is important to study metacognitive activity and development to determine how students can be taught to better apply their cognitive resources through metacognitive control. Flavell (1979) first used the word 'metacognition'. He described in these words: metacognition refers to one's knowledge concerning one's own cognitive process or anything related to them for example the learning related properties of information or data.

Metacognition is an important part of intentional learning, since it involves actively thinking about what you know, what you don't know, and how you can get better at knowing and applying what you know. Metacognition 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.

- Metacognition refers to learners' automatic awareness of their own

- knowledge and their ability to understand, control, and manipulate their own cognitive processes.
- Metacognition 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, monitoring comprehension, and evaluating the progress towards the completion of a task: these are skills that are metacognitive in their nature.
- Different fields define metacognition very differently. Metacognition variously refers to the study of memory-monitoring and self-regulation, 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.

According to Flavell (1979) metacognition consists of both metacognitive knowledge and metacognitive experience or regulation. Metacognitive knowledge acquired refers to acquired knowledge about cognitive process. Flavell divides metacognitive knowledge into three categories: knowledge of person variables, task variables and strategy variables (Livingston, 1997).

Metacognitive Knowledge

Knowledge of person variable refers to general knowledge about how human beings learn and process information, as well as individual knowledge of one's own learning processes. Knowledge of task variables, includes knowledge about the nature of the task as well as the type of processing demands that it will place up on the individual knowledge about strategy variables includes knowledge about both cognitive and metacognitive strategies as well as conditional knowledge about when and where it is appropriate to use such strategies (Livingston, 1997).

Metacognitive Regulation

Metacognitive experience involves the use of metacognitive strategies on metacognitive regulation (Brown 1987) Metacognitive strategies are sequential processes that one uses to control cognitive activities, and to ensure that a cognitive goal (e.g. understanding a text) has been met. These processes help to regulate and oversee learning and consist of planning and monitoring cognitive activities, as well as checking the outcomes of these activities (Livingston, 1997).

SIGNIFICANCE OF THE STUDY

Science satisfies the intellectual curiosity of man. Providing materials and media for intellectual exercise. In society there is always a problem to be solved. One of the very useful outcomes of learning science is the development

of reasoning and problem solving skill. If properly cultivated through the teaching of science, the students can apply these skills to solve problems in their personal and social life. For cognitive development science learning is of Paramount importance. Metacognition is about the processing of new information that is received.

Kuhn (2000) defined metacognition as, "Enhancing (a) metacognitive awareness of what one believes and how one knows and (b) meta-strategic control in application of the strategies that process new information. This awareness is developmental and lies on a continuum. Proficient readers use one or more metacognitive strategies to comprehend text. The use of such strategies has developed overtime as the reader learn which ones are best suited to aid in comprehension.

Metacognitive skills are important not only in school, but throughout life. If students are taught metacognitive awareness concerning the purpose and usefulness of a strategy as they are taught the strategy, they are more likely to generalize the strategy to new situations. Given the importance of high-stakes accountability and the use of standards, it is imperative to teach metacognitive skills in the ABLE classroom. We engage in metacognitive activities everyday - being aware of and monitoring our learning. In addition to its obvious cognitive components, metacognition often has important affective or personality components. For example, an important part of comprehension is approaching a reading task with the attitude that the topic is important and worth comprehending. Being aware of the importance of a positive attitude and deliberately fostering such an attitude is an example of a metacognitive skill. Learners with good metacognitive skills are able to monitor and direct their own learning processes.

This paper throws light on the metacognitive reading strategies of IX standard students of English medium schools of Aurangabad city and its relationship with their scholastic achievement in science. Moreover it also attempts to know the relationship between scholastic achievement in science and different metacognitive reading strategies. This paper also reveals that whether sex determines the significant difference in different metacognitive strategies or not?

Review of Related Literature

A variety of studies have examined the influence of metacognitive skills on adult performance. Everson and Tobias (2001) report that research shows there is a difference in the metacognition of effective learners and ineffective learners. The effective use of metacognition has been shown to predict learning performance. Pintrich and DeGroot (1990) report that students with higher metacognitive skills outperformed those with lower metacognitive skills in problem-solving tasks, regardless of their overall aptitude. In a study

comparing self-regulated learning in college undergraduates and graduate students (Lindner, Harris, and Gordon, 1996), research showed a strong correlation between metacognition and degree completion. Research has consistently shown that students who are high achievers in academic learning domains such as reading, writing, math and science also exhibit higher levels of metacognitive knowledge about that domain, and have developed greater abilities in self-regulation (Baker & Cerro, 2000).

Coutinho (2007) studied the relationship between goals, metacognition and academic success. This study examined the relationship between mastery goals, performance goals, and metacognition and academic success. Regression analyses revealed a partial mediation effect in the relationship between mastery goals and academic performance.

Miller and Geraci (2011) studied training metacognition in the classroom. The influence of incentives and feedback on exam prediction: the finding reveals that when feedback was made more concrete, metacognitive improved for low performing students although exam scores did not improve across exams, suggesting that feedback and incentive influenced metacognitive monitoring but not control.

Wilson and Haiyan (2010) studied on the topic, "The relationship and impact of teacher's metacognitive knowledge and pedagogical understanding of metacognition" The result revealed that teachers who have a rich understanding of metacognition report that teaching students to be metacognitive requires a complex understanding of both the concept of metacognition and metacognitive thinking strategies.

Young (2010) in her Ph.D. thesis on the topic "Explorations of Metacognition among academically talented middle and high school mathematics students" reported the finding that, metacognition as measured by the existing questionnaire was not significantly related to measures of academic achievement or problem solving metacognition. However, problem solving metacognition was related to both problem solving accuracy and students diagnostic test score and summer courses grade.

Pelin and Erktin (2002) study on "Assessment of metacognition and its relationship with reading comprehension, achievement and aptitude" revealed that the awareness and cognitive strategies subscales of the inventory were significantly and positively correlated with regarding comprehension, self-checking and evaluation subscales of the inventory were significantly and positively correlated with science course grade of the gifted students.

OBJECTIVES

The present study has the following objectives:

1. To study the relationship between metacognitive reading strategies and

scholastic achievement in science of IX standard students of English medium schools of Aurangabad city.

2. To study the relationship between global reading strategy and scholastic achievement in sciences of IX standard students of English medium schools of Aurangabad city.
3. To study the relationship between problem solving strategy and scholastic achievement in sciences of IX standard students of English medium schools of Aurangabad city.
4. To study the relationship between support reading strategy and scholastic achievement in science of IX standard students of English medium schools of Aurangabad city.
5. To study the difference between metacognitive reading strategy of boys and girls of IX standard students of English medium schools of Aurangabad city.
6. To study the difference between global reading strategy of boys and girls of IX standard students of English medium schools of Aurangabad city.
7. To study the difference between problem solving strategy of boys and girls of IX standard students of English medium schools of Aurangabad city.
8. To study the difference between support reading strategies of boys and girls of IX standard students of English medium schools of Aurangabad city.

HYPOTHESES

1. There is positive and high correlation between metacognitive reading strategies and scholastic achievement in science of IX standard students of English medium schools of Aurangabad city.
2. There is positive and high correlation between global reading strategy and scholastic achievement in science of IX standard students of English medium schools of Aurangabad city.
3. There is positive and high correlation between problem solving strategy and scholastic achievement in science of IX standard students of English medium schools of Aurangabad city.
4. There is positive and high correlation between support reading strategy and scholastic achievement in science of IX standard students of English medium schools of Aurangabad city.
5. There is no significant difference between metacognitive reading strategy of boys and girls of IX standard students of English medium schools of Aurangabad city.
6. There is no significant difference between global reading strategy of boys

and girls of IX standard students of English medium schools of Aurangabad city.

7. There is no significant difference between problem solving strategy of boys and girls of IX standard students of English medium schools of Aurangabad city.
8. There is no significant difference between support reading strategies of boys and girls of IX standard students of English medium schools of Aurangabad city.

METHODOLOGY

Aurangabad city is a vast city with many English medium schools. Survey method was used for the study considering the economy of time to collect relevant data regarding the research topic. The population for the study consisted of students of IX standard of English medium schools running in Aurangabad City.

SAMPLE

Aurangabad is a historical city and has number of English medium schools. Schools are divided into four zones North, South, East and West zone. From each zone one school was randomly selected and 25 students from each school were randomly selected. The total number of sample was 100 out of which 54 were male and 46 were female students. Ninth standard students were selected because at this age students are able to understand their reading habits and if guided properly can develop better reading habits enhancing better comprehension of the material read.

TOOL USED

For the purpose of data collection a test of "Metacognitive Awareness of Reading Strategies" prepared by Mokhtari and Richard (2002) was used. The tool comprises of 30 statements of which 13 belong to Global Reading Strategies, for example "I have a purpose in mind when I read", 8 to Problem-Solving Strategies, for example "I take notes while reading to help me understand what I read", and 9 to Support Reading Strategies, for example "I read slowly but carefully to be sure I understand what I'm reading". Opinions have to be expressed on a five point scale (1, 2, 3, 4, and 5) where 1 means "I never or almost never do this", 2 means "I do this only occasionally", 3 means "I sometimes do this" (About 50% of the time), 4 means "I usually do this" and 5 means "I always or almost always do this".

The overall average indicates how often an individual uses reading strategies when reading academic materials. The average for each subscale of the inventory shows which group of strategies (i.e. global, problem-solving,

and support strategies) were used most when reading.

Results And Findings

The data was collected and coefficient of correlation was found between Metacognitive Reading Strategies and Scholastic Achievement in science. Coefficient of correlation was also found between Global Reading Strategy, Problem Solving Strategy and Support Reading Strategy and Scholastic Achievement in science. Mean, S.D., t-value is also calculated to measure the level of significance in Metacognitive Reading Strategies of male and female students and to find out if there is any gender differences in using all three strategies of metacognitive.

Table 1

Correlation Between Metacognitive Reading Strategies and Scholastic Achievement.

Reading Strategies and Scholastic Achievement	Correlation 'r'
Metacognitive Reading Strategies and Scholastic Achievement in Science	0.65
Global Reading Strategies and Scholastic Achievement in Science	0 .68
Problem Solving Reading Strategies and Scholastic Achievement in Science	0.64
Support Reading Strategies and Scholastic Achievement in Science	0.63

Results in Table 1 reveal that there is a positive and moderate correlation (0.65) between metacognitive reading strategies and scholastic achievement in science of IX standard students of English medium schools of Aurangabad city. Hence, Hypothesis 1 is accepted. Similarly, there is moderate and positive correlation between global reading strategy and scholastic achievement in science (0.68), between problem solving strategy and scholastic achievement in science (0.64) and between support reading strategy and scholastic achievement in science, as the coefficient of correlation is 0.63. Hence, Hypotheses 2, 3 and 4 also stand accepted.

Results and findings show that if metacognitive reading strategies are emphasized and practiced during T/L process better achievement can be shown on the part of the students. The more students are aware of their thinking processes as they learn, the more they can control such matters as goals, dispositions, and attention. Self-awareness promotes self-regulation. If students are aware of how committed (or uncommitted) they are to reaching goals, of how strong (or weak) is their disposition to persist, and of how

focused (or wandering) is their attention to a thinking or writing task, they can regulate their commitment, disposition, and attention.

Table 2

Mean, SD and Significance of Difference Between Means of Metacognitive Strategies in Male and Female Students.

Sr. No.	Variables	Gender	N	Mean	S.D.	df	*'t'*	Significance
1.	Metacognitive Reading Strategies	M	54	111.07	11.33	98	4.23	Sig
		F	46	120.52	10.96			
2.	Global Reading Strategies	M	54	42.37	6.28	98	2.43	Sig
		F	46	45.26	5.6			
3.	Problem Solving Reading Strategies	M	54	32.05	3.65	98	3.59	Sig
		F	46	34.76	3.84			
4.	Support Reading Strategies	M	54	36.18	6.32	98	4.05	Sig
		F	46	40.58	4.48			

Table 2 provides results on the significance of difference between means to understand gender differences on the various variables. Results show that on all the variables i.e. Metacognitive Reading Strategies (4.23), Global Reading Strategies (2.43), Problem Solving Reading Strategies (3.59) and Support Reading Strategies (4.05) there is significant difference between male and female students of IX standard of English medium schools of Aurangabad city (0.05 level of Significance). It can be seen from the table that in all the case the female students have a higher mean than male students. Hence Hypotheses 5, 6,7 and 8 stand rejected.

Results and findings show that there exist gender differences in using metacognition. Metacognitive research has progressed from investigations of discrete skills to a theory of intelligence and intellectual development. Findings have discrete educational applications. Teachers should adapt metacognitive knowledge to instructional programmes and pay attention to how their students learn. Instructors should explicitly teach the reading, note taking, and study strategies that will be effective in their courses. Instructors should teach students how to monitor and self-assess their use of study strategies.

CONCLUSION

Metacognition is essential to successful learning because it enables individuals to better manage their cognitive skills and to determine weaknesses that can be

corrected by constructing new cognitive skills. Almost anyone who can perform a skill is capable of metacognition – that is, thinking about how they perform that skill. Promoting metacognition begins with building an awareness among learners that metacognition exists, differs from cognition, and increases academic success. The next step is to teach strategies, and more importantly, to help students construct explicit knowledge about when and where to use strategies. A flexible strategy repertoire can be used next to make careful regulatory decisions that enable individuals to plan, monitor, and evaluate their learning. Metacognition helps people to perform many cognitive tasks more effectively. Strategies for promoting metacognition include self-questioning (e.g. "What do I already know about this topic? How have I solved problems like this before?"), thinking aloud while performing a task, and making graphic representations (e.g. concept maps, flow charts, semantic webs) of one's thoughts and knowledge. Carr, 2002, argues that the physical act of writing plays a large part in the development of metacognitive skills.

Researches related to metacognitive awareness and its use might help students to organize their studies and minimize their errors while self-studying. Gifted student's metacognitive awareness can be nurtured by proper guidance, role of metacognition during problem solving can be of immense help for educators, metacognition can be used to improve student's grammar knowledge, student's can be guided as to how to acquire metacognitive abilities.

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