

Exploring the Role of Metacognition in Enhancing Learning Effectiveness and Student Performance

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ABSTRACT

Metacognition, often described as "thinking about thinking," is a critical determinant of effective learning and academic success. It involves self-awareness, regulation, and monitoring of cognitive processes such as attention, memory, comprehension, and problem-solving. This paper highlights the role of metacognitive knowledge (declarative, procedural, and conditional), metacognitive strategies, and self-regulation in enhancing students' learning outcomes. Drawing on foundational theories by Flavell and subsequent models, the study emphasizes how metacognitive skills empower learners to plan, monitor, and evaluate their own learning processes. The development of metacognition begins in childhood and strengthens with experience, contributing to independent learning, academic achievement, and lifelong learning abilities. Educational practices that nurture metacognitive awareness—through modelling, questioning, strategy training, and reflective practices—are shown to significantly improve student performance. Therefore, fostering metacognitive skills in learners is essential for building effective, self-directed, and sustainable learning strategies.

Keywords: Metacognition, Self-regulation, Cognitive monitoring, Learning strategies.

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INTRODUCTION

The basic goal of learning is to make an individual self-reliant for performing active role in the life. Learning progress of the student is the essential responsibility of educational institute by providing necessary support system. Psychologists are creating different strategies to increase learning performance and student may perceive their task easily. So that students can take it in a very easy way and remember for long time and apply the strategies in the proper situation and they carry their learning efficiency and apply their earned knowledge in academic and professional task. In this regard some psychological mental activity like problem solving ability, emotional intelligence and metacognition traits are help to accelerate learning performance in daily life. The present education system continuously trying to develop the whole entity moreover aims to how to learn, how to remember, how to inspire oneself, metacognition helps to students in acquiring good tactics, cognitive monitoring, regulate thinking, planning strategies etc. cognitive monitoring is very important where students will find solution in a very simple way and be aware of their knowledge and thing which will accelerate their learning. Present study conducted on the variable metacognition the key indicators to learning.

Understanding Metacognition:

One question intrigues that many cognitive psychologists explain why some people learn and remember more than others. For those who perform extraordinary about the executive control process including attention, maintenance, organize etc, in this rapport 'metacognition' is one of the latest buzzwords in educational psychology, but what exactly metacognition is?

Metacognition is a combination of two words 'Meta' and 'Cognition'. The prefix 'meta' refers to something that covers the subject, whereas 'cognition' is the internal structure and process that is involved in the acquisition and use of knowledge including sensation, perception, attention, memory, thinking, and reasoning. So, it is referred to a level of thinking that involves active control over the process of thinking that is used in learning time, also involved in the way a person controls, modifies

and appraises his own thoughts (Kour, 2000).

Metacognition is traditionally defined as the experience and knowledge we have about our own cognitive process (Flavell, 1979). Flavell (1979) also defined as the experience and knowledge about knowing and learning. This metacognitive knowledge is used to monitor and regulate cognitive processes such as reasoning, comprehension, problem-solving, and learning and so on (Metcalf and Shimamura, 1994). Because people differ in how well and how quickly they learn the Subject matter.

Metacognition involves three kinds of knowledge:

(A) Declarative knowledge is about learner, the factors that influence learner's learning and memory, and the skill strategies and resource needed to perform a task knowing what to do. (B) Procedural knowledge knows about how to use the strategies and lastly (C) conditional knowledge to ensure the completion of the task of knowing when and why to apply the procedures and strategies (Burning, Schraw, Ronning, 1999). Metacognition is the strategies application of this declarative, procedural and conditional knowledge to accomplish goals and solve problems (Schunk, 2000).

Metacognition simply defined as thinking about thinking. Although the term has been part of the vocabulary of the psychologist for the last couple of decades and the concept for as long as humans have been able to reflect on their cognition experiences, there is much debate over exactly what metacognition is. One of the reasons for the confusion is used several terms to describe the same basic phenomenon i.e. self-regulation, executive control, meta-memory etc. John Flavell (1979) is (most) associated with metacognition; according to him metacognition consists of both metacognitive knowledge and metacognitive experience or regulation.

The basic concept of metacognition is the notion of thinking about one's own thoughts. Thinking of what one knows i.e., metacognitive knowledge, what one is currently doing i.e., metacognitive skills and what one's current cognitive or affective state i.e., metacognitive experience. The main differentiate of metacognitive thinking from other children of thinking. It is necessary to consider the source of thought. Therefore, metacognition sometimes has been defined simply as thinking about thinking, cognition of cognition (Flavell, 1979).

Models of metacognition:

Economic analyses of There are several models of metacognition among which three important models are.

Flavell's Classical Model (1979)

A model of Cognitive Monitoring John Flavell of Stanford University is regarded as a foundation researcher in metacognition. He was influenced by the work of Jean Piaget.

A) Metacognitive knowledge: This refers to the segment of acquired world knowledge that has to do with cognitive matters. It is the knowledge accumulated through experience and stored long-term memory. Some of this stored knowledge is declarative ('knowing that') and some procedural ('knowing how'). It consists primarily of knowledge of beliefs about what factors or variables act and interact to affect the course and outcome of cognitive enterprises. Knowledge of person variables refers to general knowledge about how human beings learn and process information, as well as individual knowledge of one's own learning processes.

B) Metacognitive experiences: Metacognitive experiences can be fully or less fully conscious and verbalizable, brief or lengthy, simple or complex in the text. It refers to how to use internal knowledge and a conscious cognitive or affective experience that accompanies and maintain to an intellectual enterprise. One is having a metacognitive experience whenever he/she has the feeling that something is hard to perceive, comprehended, remember or solve; if there is a feeling that something is far from the cognitive goal, metacognitive experiences are especially like to occur in situation that stimulates a lot of careful, highly conscious thinking and provides many opportunities for thoughts and feelings about own thinking to arise. Metacognitive experiences can very important effects on cognitive goals or tasks, metacognitive knowledge, and cognitive actions or strategies.

C) Metacognitive goals and tasks: These are the desired outcomes or objective of a cognitive venture. Goals and tasks include comprehension, committing facts to memory or producing something, such as a written document or an answer to a subject problem, or simply improving one's knowledge about something. Achievement of a goal draws heavily on both metacognitive knowledge and metacognitive experiences for its successful completion.

D) Metacognitive strategies: Metacognitive strategies are designed to monitor cognitive process, are ordered processes used to control one's own cognitive activities and to ensure that a cognitive goal has been met. A child with good metacognitive skills and awareness uses these processes to oversee his own learning process, plan or monitoring ongoing cognitive activities and to compare cognitive outcomes with internal or external standards.

Nelson & Narens (1990) suggest an alternative model of metacognition and the 'control- monitoring' processes. In this model there are two critical features: the first is the splitting of cognitive processes into two or more specially interrelated levels that's are 'and 'Object level'. The second critical feature of the metacognitive system is also kind of dominance relation, defined in terms of the direction of the flow of information. This flow gives rise to a distinction between controls versus monitoring. The object level can be viewed as the ongoing cognitive process of interest, such as attention, learning, language processing and problem-solving etc. The meta-level also contains a model that is a person understands of the task they are performing and the ongoing cognitive processes that are engaged while thy complete work.

A. Metacognitive knowledge: Metacognitive knowledge is a declarative knowledge stored in memory and comprises models of cognitive processes; it also comprises information regarding the person, as well as information about task, strategies, and goals. Metacognitive knowledge involves knowledge of what sort of goals people pursue when confronted with specific tasks or situations. It gets continuously enriched, updated and differentiated by integrating information coming from the monitoring of cognition at a conscious level through observation of one's behavior action and their outcomes when dealing with specific task in various contexts.

B. Metacognitive Experiences: Metacognitive experiences are what person is aware of and what he or she feels when coming across a task and processing the information related to it. They are interface between the person and the task, the awareness the person has of task features, of the in fluency of cognitive processing, of the progress toward the goal set, of the effort exerted on cognitive processing and of the outcome of processing. They take the form of metacognitive feelings, metacognitive judgments/estimates and online task-specific knowledge.

C. Metacognitive Regulation: metacognitive regulations are sequential processes that one uses to control cognitive activities and to ensure that a cognitive goal 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 those activities.

D. Metacognitive Skills: metacognitive skills refer to the deliberate use of strategies in order to control cognition. It comprises orientation strategies, planning strategies, strategies for regulation of cognitive processing.

Metacognition and child development:

Metacognitive abilities are the result of development; children are more able to exercise executive control over strategies. Metacognitive abilities begin to develop around ages 5 to 7 and improve throughout school (Flavell, Grenn and Flavell 1995; Garner 1990). Metacognitive abilities have to work with age or maturation. There is great variability ever among students of the same developmental level, but these differences do not appear to be related to intellectual ability or cognitive ability. It has been seen in every child but some individual differences in metacognitive abilities are probably caused by biological differences or by variations in learning experiences.

Some researcher suggested that metacognition begins in early childhood, while others suggest that it is not until adolescents that children become capable of metacognition. They agree that adolescents in middle school and high school years are thoroughly able to exercise metacognitive skill. In early childhood experiences lay the foundation for metacognitive skill building. Dawson and Guare stated the roots of metacognitive skills are seen in infancy when children first begin to short and clarify objects and they first begin to perceive cause and effect relationship. They also explained that when young children learn to observe daily rituals and routines, they are beginning to use metacognition. Kuhn suggested that the foundation of metacognitive thinking is laid somewhere around ages three to five and metacognitive does not fully developed until adolescents. Waters and kunnmann found that the first graders could engage in metacognition when trained and prompted by their teachers and those first graders were too able to transfer metacognitive skills from one context to another as they moved from first to second grade. By these different opinions regarding precise development patterns for

metacognition, appears safe to say that teachers may guide children in primary grade for building basic metacognitive skill and that teachers might expect students from upper primary grade through high school and college to use metacognitive skill, in increasingly independent ways.

Research on the development of metacognition, which is knowledge about cognition, Jean Piaget and his colleagues, claimed that young children do not know that there are such things as conceptual, perceptual and emotional perspective of points of view. They used the concept egocentrism to interpret the findings on their developmental studies on a wide variety of social cognitive topics such as perceptual perspective taking and understanding of thoughts, dreams or intentions.

Development of metacognition:

Metacognition can be increased through training and practices. If students can use proper metacognitive skills and techniques on academic performance or daily life skill he/she may be a good achiever. Following strategies for developing metacognition among children may be followed, discussed by Nair, Sudharman, and Poulouse (2004),

- Planning: Before starting any learning task or activities teacher, parents should point out strategies and step which would be followed at learning time and tackling the problem, rules to remember and directly to follow. Such as for example during memorizing a lesson which technique help for good memorizes, easy steps for math problem solving etc.
- Choosing consciously: Student should be provided self-choice for learning and select the appropriate method for fruitful learning. Teachers and parents should follow their activities unless they select the wrong step or method. Students should have the freedom to choose their method with consciously.
- Modeling: The probability of most influence on students or children is that of teachers modeling. Modeling and discussion on topics develop the vocabulary that the learners need for thinking and talking about their own thinking.
- Asking thought providing questions: It causes people to define their terminology operationally and examine the premises on which their thinking is based. It's helpful to clarify children's problem-solving process.
- Clarifying pupils' terminology: Pupils often use hollow or trust less, obscure and non specific terminology. Teacher needs to clarify them in details so that the meaning and value are explained to the full extent.
- Paraphrasing: Teacher should help students to restate, translate, compare and paraphrase the ideas of other people. It would help them to become a good listener of other's thinking and good listeners of their own thinking as well.

From these strategies is helpful for the understanding of metacognition. Students can gain executive control of their behaviour. These processes should take place before, during and after stage of task or learning.

Components of Metacognition

Psychologists state several components of metacognition when a learner practices metacognitive skills, summarized in the list below. According to Carol W. Benton

- The learner is increasingly self-aware.
- The learner exerts control over personal thought processes.
- The learner engages in self-regulation.
- The learner becomes increasingly independent in learning the task.
- The learner selects and applies learning strategies.
- The learner monitors personal progress through a learning task.
- The learner modifies learning strategies and seeks resources or assistance when needed.
- The learner reflects on learning.
- The learner engages in self-evaluation (self-assessment)

Educational values of metacognition:

Reading and learning from text, reference or from any other media is a fundamental part of the life of students. Academic benefit depends on how well he/she retains information from reading. On this aspect of reading that has become the focus of study. Cognitive psychologist and educators assist similar in self-assessment of comprehension. Assessing and monitoring of reading fall under the category of metacognition, a person's cognition is known about their own cognitive phenomena. Metacognition has judges about levels of comprehension and learning of the text, and predict about future memory for the

implement. Maki and Berry (1984) used the term meta-comprehension refer to metacognitive involving text materials; it is important for academic success.

Metacognitive strategies help an individual to be a good learner. Its assist becomes more efficient and powerful to our learning, because it helps us to find information, evaluate when we need additional resource, and understand when to apply difficult techniques to solve the problems. When children begin to take these strategies he/she is capable to learn when, how and why. They are able to learn more effectively and intentionally. By using metacognitive strategies a learner should be goal oriented and a good achiever. According to Coutinho (2007) metacognitive awareness is positively correlated with mastery goal oriented. So the teacher and school need a metacognitive environment which nourishes the development of good thinkers who are the successful problem solver and life learner, and trained teacher consciously trained every student to aware their metacognitive skills.

CONCLUSION

Metacognition plays an important role in communication, reading, learning, language acquisition, self-control, memory, problem-solving and personality development. Metacognition is related to academic achievement and learning outcomes. A student with good metacognitive skills performs extraordinary at academic performance, because of metacognitive skills linked to efficient ways to improvement on performance in academic and work environment. They regulate their learning behaviour with a variety of specific strategies, they can manage their own time, how to study decide to whom to study and monitor their knowledge with a variety of internal and external supports. Watkins and Hattie reported that high academic achieving students are more likely to utilize strategies consistent with their motivational states. Academic success and level of achievement are related to students' self-regulation. Bugs and Bondy showed that the capacity to understand metacognitive knowledge and strategies varies on age. Students with poor metacognitive skills may benefit from metacognitive training to improve their metacognition and academic performance.

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