

**IMPACT OF METACOGNITION BASED LEARNING ON ACADEMIC ACHIEVEMENT  
IN MATHEMATICS**

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**Abstract:** This article explains the term metacognition its meaning, importance and how it develops in children. It states that teachers can help their children to develop metacognition awareness and identify the factors which can enhance the metacognitive development. Metacognitive thinking is an important element in the transfer of learning. Metacognitive strategies can help the children to develop metacognitive skills and stimulate their metacognitive thinking.

**Introduction**

Learning is a process developed within the individual throughout the life time. In order to become successful learners, reflection, feedback and an awareness of our knowledge is essential. If one is not aware of, or understands one's learning process and studying strategies, it becomes difficult to handle and take control of one's own learning. This awareness can be referred to as Metacognition. Metacognition is a term coined by John Flavell in the 1970's and is of great importance in an educational context. In a society filled with information and in a field where new scientific findings are frequently brought to day today life, it is necessary to develop and use one's critical thinking and metacognitive awareness.

Learning how to learn and developing a collection of thinking process which can be applied to solve problems, is a major goal of education. An environment of metacognitive awareness encourages thinking. In the creation of a metacognitive environment teachers monitor and apply their knowledge, deliberately modelling metacognitive behaviour to assist students in becoming aware of their own thinking. The hardest kind of thinking is thinking about thinking. In recent years metacognition has emerged as a major focus of research interest in cognitive psychology. There has been a growing recognition that metacognition or thinking about thinking helps the learners to learn more effectively. Therefore an attempt is made to answer the questions like: what is metacognition? How does it facilitate learning and what can teachers do to foster it in the classroom?

**Metacognition**

The term metacognition was introduced by Flavell in 1976 to refer to 'the individual's own awareness and consideration of his or her cognitive processes and strategies'. It refers to the unique capacity of the learner to be self - regulative, not just to think and know but to think about their own thinking and knowing.

## **Definition**

“Metacognition” is often simply defined as “thinking about thinking”

Reviewing a number of definitions of metacognition, it can be concluded that metacognition is:

- Thinking about thinking and developing the process of solving problems and answering questions.
- Awareness of the different processes involved in thinking
- The ability to take out our thinking , and examine it ,and put it back, rearranged if necessary
- An awareness of the process of how an answer is found, what strategies and type of thought has gone on and add the previous experiences that have been used.

## **Components**

According to Flavell metacognition consists of both metacognitive knowledge and metacognitive experiences or regulation. These components are two separate but interrelated parts of the term metacognition.

### **Metacognitive knowledge.**

Metacognitive knowledge is also called metacognitive awareness. It refers to what individuals know about themselves and about others as cognitive processors.

### **Metacognitive experiences or regulation**

Metacognitive experiences are those experiences that have something to do with the current ongoing cognitive endeavour. Metacognitive regulation is the regulation of cognition and learning experiences through a set of activities that help the learners to control their learning.

Metacognition includes at least three different types of metacognitive awareness when considering metacognitive knowledge.

#### **1 Declarative knowledge**

Declarative knowledge refers to knowledge about oneself as a learner and about what factors can influence one’s performance. In other words declarative knowledge is “knowing what”

#### **2 procedural knowledge**

Procedural knowledge refers to knowledge about doing things. High degree of procedural knowledge can allow the learners to perform tasks more automatically. In other words procedural knowledge “knows how”

#### **3 Conditional Knowledge**

It is knowledge about when and why a defined learning strategy is to be used. That is conditional knowledge refers to “knowing when”

Similar to metacognitive knowledge metacognitive experiences or regulation contains three skills that are essential for learning.

1 Planning: refers to appropriate selection of strategies and the correct allocation of resources that affect task performance.

2 Monitoring: refers to one's awareness of comprehension and task performance

3 Evaluating: refers to appraising the final product of a task and the efficiency at which the task was performed.

### **Metacognitive Skills**

Metacognitive skills include:

- Taking conscious control of learning
- Planning and selecting strategies.
- Monitoring the progress of learning
- Correcting errors
- Analyzing the effectiveness of learning strategies.
- Changing learning behaviours and strategies when necessary.

### **Teacher's Role in Training Metacognition**

Teachers can play a significant role in the establishment of structure and networks in meaningful learning in students. In fact, there are strong recommendations that teachers should carefully train students in purposeful, strategic studying, reading and problem solving. If the appropriate strategies are employed, teachers can make learners, better users of their metacognitive skills. The reviews of a number of studies shows that the development of the metacognitive skills improve the academic achievement of the students. Therefore the teacher can use the strategies to develop the metacognitive skills for improving the critical thinking and problem solving ability of the learners. This will lead to a better academic achievement in Mathematics,

### **Conclusion**

Teachers can examine the response to problems and can find out the specific areas of students weaknesses. Teachers can then modify and adjust the instructional processes related to metacognitive knowledge and regulation to meet the needs of individual students. In order to become a good problem solver the learner should possess a highly developed metacognitive skills. These all lead to the better academic achievement in Mathematics.

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