

Metacognitive Processes

Metacognition is one's ability to use prior knowledge to plan a strategy for approaching a learning task, take necessary steps to problem solve, reflect on and evaluate results, and modify one's approach as needed. It helps learners choose the right cognitive tool for the task and plays a critical role in successful learning.

What Is Metacognition?

Metacognition refers to awareness of one's own knowledge—what one does and doesn't know—and one's ability to understand, control, and manipulate one's cognitive processes (Meichenbaum, 1985). It includes knowing when and where to use particular strategies for learning and problem solving as well as how and why to use specific strategies. Metacognition is the ability to use prior knowledge to plan a strategy for approaching a learning task, take necessary steps to problem solve, reflect on and evaluate results, and modify one's approach as needed. Flavell (1976), who first used the term, offers the following example: I am engaging in *metacognition* if I notice that I am having more trouble learning A than B; if it strikes me that I should double check C before accepting it as fact (p. 232).

Cognitive strategies are the basic mental abilities we use to think, study, and learn (e.g., recalling information from memory, analyzing sounds and images, making associations between or comparing/contrasting different pieces of information, and making inferences or interpreting text). They help an individual achieve a particular goal, such as comprehending text or solving a math problem, and they can be individually identified and measured. In contrast, metacognitive strategies are used to ensure that an overarching learning goal is being or has been reached. Examples of metacognitive activities include planning how to approach a learning task, using appropriate skills and strategies to solve a problem, monitoring one's own comprehension of text, self-assessing and self-correcting in response to the self-assessment, evaluating progress toward the completion of a task, and becoming aware of distracting stimuli.

Elements of Metacognition

Researchers distinguish between metacognitive knowledge and metacognitive regulation (Flavell, 1979, 1987; Schraw & Dennison, 1994). Metacognitive knowledge refers to what individuals know about themselves as cognitive processors, about different approaches that can be used for learning and problem solving, and about the demands of a particular learning task. Metacognitive regulation refers to adjustments individuals make to their processes to help control their learning, such as planning, information management strategies, comprehension monitoring, de-bugging strategies, and evaluation of progress and goals. Flavell (1979) further divides metacognitive knowledge into three categories:

- *Person variables*: What one recognizes about his or her strengths and weaknesses in learning and processing information.
- *Task variables*: What one knows or can figure out about the nature of a task and the processing demands required to complete the task—for example, knowledge that it will take more time to read, comprehend, and remember a technical article than it will a similar-length passage from a novel.
- *Strategy variables*: The strategies a person has “at the ready” to apply in a flexible way to successfully accomplish a task; for example, knowing how to activate prior knowledge before reading a technical article, using a glossary to look up unfamiliar words, or recognizing that sometimes one has to reread a paragraph several times before it makes sense.

Livingston (1997) provides an example of all three variables: “I know that I (*person variable*) have difficulty with word problems (*task variable*), so I will answer the computational problems first and save the word problems for last (*strategy variable*).”

Why Teach Metacognitive Skills?

Research shows that metacognitive skills can be taught to students to improve their learning (Nietfeld & Shraw, 2002; Thiede, Anderson, & Therriault, 2003).