

Metacognition

*“Knowledge of cognition includes the awareness of what one knows, how one learns, what strategies one knows, and when one implements strategies. Regulation of cognition includes planning, monitoring, and evaluation. Planning involves one’s connection to previous knowledge, plan for using strategies, and use of time. Monitoring is one’s self-checking at each stage of the task. Evaluation includes the learner’s appraisal of the outcome and reflection on what new knowledge he or she gained” – [Schraw, Crippen, and Hartley in **Promoting self-regulation in science education: Metacognition as part of a broader perspective on learning.** *Research in Science Education*, **36**, 111-139.]*

As mentioned in the quote given above, **metacognition** is the term most often used (in general literature about problem solving and executive decision making) to describe the processes necessary to successfully understand and guide our own thinking and to superintend our problem solving behaviors. Flavell (1976) defines metacognition as follows:

“Metacognition refers to one’s knowledge concerning one’s own cognitive processes and products or anything related to them, e.g., the learning-relevant properties of information or data.
...Metacognition refers, among other things, to the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects or data on which they bear, usually in the service of some concrete goal or objective.”

He illustrates this term further by saying:

“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 a fact; if it occurs to me that I had better scrutinize each and every alternative in any multiple-choice type task situation before deciding which is the best one; if I become aware that I am not sure what the experimenter really wants me to do; if I sense that I had better make a note of D because I may forget it; if I think to ask someone about E to see if I have it right.”

According to Nancy Chick, CFT Assistant Director (Assistant Director at the Center for Teaching; Vanderbilt University – see <https://cft.vanderbilt.edu/guides-sub-pages/metacognition/>):

Metacognitive practices increase students’ abilities to transfer or adapt their learning to new contexts and tasks. They do this by gaining a level of awareness above the subject matter. They also think about the tasks and contexts of different learning situations and themselves as learners in these different contexts. Notice that students must “know about” these strategies, not just practice them.

Metacognitive practices help students become aware of their strengths and weaknesses as learners. ...A key element is recognizing the limit of one’s knowledge or ability and then figuring out how to expand that knowledge or extend the ability. Those who know their strengths and weaknesses in these areas will be more likely to “actively monitor their learning strategies and resources and assess their readiness for particular tasks and performances” (quoting Bransford, Brown, & Cocking). In short, “if people lack the skills to produce correct answers, they are also cursed with an inability to know when their answers, or anyone else’s, are right or wrong”.

“[I]t is terribly important that in explicit and concerted ways we make students aware of themselves as learners. We must regularly ask, not only ‘What are you learning?’ but ‘How are you learning?’ We must confront them with the effectiveness (more often ineffectiveness) of their approaches. We must offer alternatives and then challenge students to test the efficacy of those approaches.”