

Connecting Practice and Research: Metacognition Guide

"[M]etacognition is a powerful phenomenon that enables students to set goals, plan, problem solve, monitor progress, and evaluate their own thinking effectiveness... It provides the means for adolescents to oversee thinking as it happens, to determine what they know, to appraise what they need to know, and to orchestrate what they should do in a learning situation." (Beamon, 2001)

What is Metacognition?

Simply, metacognition is "thinking about thinking." Metacognition goes beyond thinking (*meta + cognition*) in that it is the active awareness and knowledge of one's own thinking processes. Metacognitive skills are sometimes referred to as "self-direction skills" (Burke, 2007, 151).

The word "metacognition" was invented by an American psychologist, J. H. Flavell who emphasized its important role in communication, reading comprehension, language acquisition, social cognition, attention, self-control, memory, self-instruction, writing, and problem solving (Flavell, 1979). Anderson and Krathwohl (2001) maintain that metacognition is more difficult to teach and assess than factual, conceptual, and procedural categories of knowledge because it is the most abstract.

According to Marzano et al. (1988), there are two key components of metacognition: **knowledge and control of self**: knowledge of one's own skills, intellectual resources, and abilities as a learner; and **knowledge and control of thinking**: knowledge of thinking and learning strategies, and when and why to use these strategies in relation to tasks and texts. Operating within and throughout these two key components is the **metacognitive process**: the awareness and the ability to plan, monitor, and assess one's use of these strategies (Schraw and Dennison, 1994).

In her essay on the essence of understanding in reading, Ellin Oliver Keene (2007, 37) describes metacognition as "listening to the voice in your mind that speaks while you read." Keene sees metacognitive skills as intricately integrated in the development of understanding, for example:

- **Monitoring for Meaning** — knowing when you know, and knowing when you don't
- **Using and Creating Schemata** — making connections between the new and the known, creating schemata when necessary
- **Asking Questions** — generating questions to prompt interpretation and to probe the text more deeply
- **Determining Importance** — deciding what matters most and is most worth remembering
- **Inferring** — combining background knowledge with information from the text to predict, conclude, make judgments, and interpret
- **Using Sensory and Emotional Images** — using images to deepen and stretch meaning
- **Synthesis** — integrating understanding with knowledge from other texts and sources.

Metacognitive and cognitive strategies may overlap depending on the purpose for using the strategy. A self-questioning strategy used while reading to obtain information would be a cognitive strategy, while a self-questioning strategy used to monitor understanding of what was read would be a metacognitive strategy (Livingston, 1996).

Why Teach Metacognition?

Metacognition contributes to successful learning and moves students toward independence, interdependence, and self-efficacy. Through metacognitive strategies, students learn to master information and solve problems more easily (Block, C. et. al. 2005; Scruggs, 1985).

In "their landmark study" on the behaviours of *effective readers*, Pressley and Afflerbach (1995) ascertained "that expert readers and highly skilled readers used specific metacognitive strategies before, during, and after reading" (in Israel, 2007, 3). Students with learning difficulties benefit from instruction in

Key Message

Metacognition is the ability to understand what we know, how we learned what we know, and how we manage and regulate or adjust our own thinking processes to maximize learning and memory. (Ormrod, 2006)

Key Message

If teachers hope to help all students become self-directed learners, it's necessary to help them develop fluency in both cognitive and metacognitive skills. (Pintrich, 2002)

Key Message

Instruction in metacognitive skills promotes the self-monitoring and self-regulation that can lead to intellectual growth, increase academic achievement, and support transfer of skills so that students are able to use any strategy at any time and for any purpose. (Bransford, 1986; Robinson, 1987)

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metacognition because it helps them to become more aware of their thinking processes, to recognize when meaning breaks down, and to understand what strategies work best for them. That is, they “learn what to do when they don’t know what to do” (Wade, 1990; Claxton, 2002).

Acquiring and using metacognitive skills has emerged as a powerful approach for promoting a focus on thinking skills in literacy and across all disciplines.

Instruction in metacognition:

- helps develop a repertoire of thinking and learning skills
- fosters confidence and independence in the classroom
- encourages students to self-regulate their learning
- improves decision-making and goal-setting skills
- enables students to self-assess the quality of their thinking
- enhances responsible citizenship
- increases awareness of other learning styles
- helps to decide which strategies to use in which learning situations
- strengthens essential skills and employability skills

How Can Metacognition Be Taught?

Israel (2007, 10) reminds us that metacognitive strategies for planning, monitoring, and evaluating are developmental. Whereas students in primary grades can learn to evaluate by giving reasons for liking or disliking a text, students in upper elementary grades can learn to evaluate how applicable the information is to other situations. By extension, students in senior grades can go beyond by providing reasons to persuade another individual, and can adapt information to different contexts.

Five basic principles for instruction in metacognition are:

1. Build an inclusive, positive, and stimulating classroom environment, e.g., by exhibiting a positive and enthusiastic approach to learning and by modeling thinking skills and habits of mind.
2. Construct teacher-driven metacognitive activities initially, with an emphasis on developing awareness of metacognitive processes, but also use the gradual release model as a guide so that students become capable of effectively selecting, using, monitoring, and evaluating their use of these strategies (Graham and Harris, 1993).
3. Create opportunities for students to talk about their thinking and to build a thinking vocabulary. To think and talk about their thinking, students need help to sort out thinking skills and terms associated with decision making, e.g., global terms like “metacognition” and specific terms like “classifying,” “formulating questions,” and having “self-knowledge” and “self-control.”
4. Engage students in talking about metacognitive strategies, e.g., through conference, interview, or survey questions. Israel cautions: “it is not wise to assume that students intrinsically have the metacognitive ability to respond to questions in a reflective manner.” (Israel, 2007, 33)
5. Provide students with ample practice so that they can become automatic users of metacognitive strategies. For example, making the discussion of metacognitive knowledge part of the everyday classroom discourse will raise the awareness of their own metacognitive knowledge and increase their skill (Pintrich, 2002).

More specific advice includes:

- Begin with goal setting and setting a purpose for a task (Israel, 2007, 31).
- Model comprehension and thinking strategies and explicitly show students how to proceed by thinking aloud and using prompts for each phase: planning, monitoring, and evaluating.
- Use accessible but appropriately challenging texts so that students can problematize the text, make meaningful use of strategies, and become aware of their thinking (Fitzgerald, 1983).
- Use explicit teaching methods embedded in the usual problem-solving and research activities specific to different subject areas. For example, teachers can introduce and provide practice in metacognitive skills in any of the four Language/English strands:

Oral Communication: Provide learners the time and opportunity to talk about thinking processes.

Reading: Provide readers with strategies to self-correct, e.g., by re-reading, relating passages to one another, checking topic sentences.

Writing: Help writers develop an understanding of the writing process, text structure, and genre without treating these as rigid formulae or a linear sequence of steps.

Media Studies: Promote an awareness of the influence of media on self and society.

Key Message

Metacognition can increase engagement. Metacognition “has the potential to empower students take to charge of their own learning and to increase the meaningfulness of students’ learning.” (Amado Gama, 2007)

Key Message

Learners need practice to develop automaticity. Conscious practice with metacognitive strategies can lead learners to become unconsciously metacognitive – a position in which they are always reflecting on and evaluating the standards of their own thinking and learning and their strategies for personal development. (Claxton, 1996)

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- Plan opportunities for students to learn metacognitive skills while they are involved in learning something else. For example, when developing a piece of writing in a particular discipline, students can reflect on their progress in relation to the criteria and then set new goals in order to move forward.
- Engage students in activities that require conscious reflection, e.g., by posing questions such as:
 - What do I have to do?
 - What am I trying to accomplish?
 - What other things have I accomplished that might help me be successful in this task?
 - What resources, people, or materials can help me be successful?
 - How much time do I need?
 - What are my options and alternative approaches?
 - How well did my choice work?
 - How close am I to my goal?
 - What other strategies or approaches might move me closer to the target?
 - What might I keep or change?
 - Do I need to go back and re-read anything?
- Ask learners *why* they respond in certain ways, make certain decisions, and draw certain conclusions to encourage them to think about their thinking. (Israel, 2007, 9)

Productive classroom practices such as reciprocal teaching, self-questioning, story and concept mapping, journaling, and buddy reading offer opportunities to teach both *with* and *for* metacognition. (Barton, V., et al. 2001)

Teaching <i>with</i> Metacognition	Teaching <i>for</i> Metacognition
• Reflect on instructional goals	• Embed metacognitive activities through varied instructional approaches
• Reflect on teaching approaches	• Provide time for students to brainstorm options and identify learning goals
• Model metacognitive thinking through think-alouds before, during, and after instructional tasks	• Ask students which tasks are easy, which are hard, and why
• Encourage the use of a variety of intelligences to complete tasks	• Encourage the use of alternative approaches
	• Have students confirm their understandings orally and in writing

How Should Metacognition Be Assessed?

Israel (2007, 81) provides many suggestions for conducting sensitive and effective interviews, think-alouds, and inventories, and other assessments:

- Focus on teaching and assessing a few strategies at a time
- Provide opportunities for practice, including transference to new situations
- Explain in advance to learners how they will be assessed
- Connect assessments to instructional goals, specific texts and tasks
- Avoid hypothetical situations, such as “What do you do when you get confused?”
- Ensure that assessments are developmentally appropriate
- Experiment with ways for students to represent their thinking in a variety of modes, for example, through sketches or tableaux
- Use more than one type of assessment measure, for example choice inventories and open-ended interview questions, and ensure that measures complement each other
- Design back by selecting or creating assessments before a lesson
- Use the same type of metacognitive assessment at the beginning and end of instruction.

Key Message

Types of well-established approaches to metacognitive assessment include interviews, surveys, inventories, and think-alouds. Think-alouds, for example, are “respected measures of assessing cognitive ability based on the work of Ericsson and Simon (1984/1993) and are commonly known as verbal reports of cognitive thought.” For example, students can think aloud while reading a text, be prompted to think aloud at strategic points, and give a retrospective report immediately after reading. (Israel, 2007, 71 & 72)

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Metacognition for Professional Educators

Metacognitive strategies are already in teachers' repertoires, however, teachers can become aware of and consciously model these strategies for students. Although using metacognitive techniques requires that teachers be attentive and capitalize on classroom opportunities, the investment of time and energy results in students becoming more purposeful, flexible, and creative problem solvers.

Some questions that teachers might ask themselves are: What can my students do? What is missing or what do I wish they could do? What do I need to teach? Is my teaching making a difference? How can I revisit these strategies in a different way? (Brownlie, Feniak, Schnellert, 2006)

Professional Print Resources

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