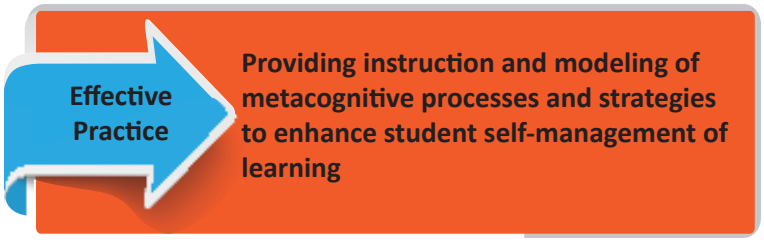
Center on Innovations in Learning

Wise Ways®



Indicator: All teachers build students' metacognitive skills by teaching learning strategies and tools and their appropriate application. (D10)

Explanation: Learning strategies are purposeful, in the sense that a person applies them deliberately to attain a desired outcome (Alexander, Graham & Harris, 1998). Using the proper learning strategies has been widely shown to improve academic performance (Alexander et al., 1998; Dignath, Büttner, & Langfeldt, 2008; Donker, De Boer, Kostons, Dignath-Van Ewijk, & Van der Werf, 2014; Hattie, Biggs, & Purdie, 1996; Weinstein, Husman, & Dierking, 2000).

Questions: What are the most effective learning strategies and tools to build metacognitive skills that improve student performance? What are the best practices for teaching those learning strategies and tools?

What are the most effective learning strategies and tools to build metacognitive skills that improve student performance?

Three categories of metacognitive learning strategies (see Schraw & Dennison, 1994) have been shown to improve student learning outcomes (Donker et al., 2014). They are:

Planning strategies – Planning strategies are used prior to a learning episode and include activities such as goal setting and pre-planning of resource allocation. Examples include setting a goal, deciding upon the amount of time to spend on an activity, and choosing what to do first (see Allen & Hancock, 2008.)

Monitoring strategies – Monitoring strategies are used for checking one's understanding and progress. These strategies can be considered as continuous assessments of one's achievement. Examples include self-checks, graphing of one's performance data, self-questioning and modifying one's approach to a specific learning task, if necessary (see Pennequin, Sorel, Nanty, & Fontaine, 2010.)

Evaluation strategies – Evaluation strategies are used after a piece of work has been completed (that piece may be as large or small as the teacher and student agree to) and are used in the analysis of one's performance and the effectiveness of the learning methods. For example, a student may reflect on her graphed performance over time to determine which strategies during that performance improved her results (see Kramarski & Gutman, 2006.)

What are the best practices for strategy and tool instruction?

Strategies must be explicitly taught and teacher modeling of strategies is key (Pressley & Harris, 1990). According to Harris & Pressley (1991), good strategy instruction is interactive. Students should collaborate in determining the goals of instruction, as well as in the implementation, evaluation, and modification of the strategy and strategy acquisition procedures. Further, students need to see evidence that the strategies they are learning really do lead to improved performance (see Pressley, Levin & Ghatala, 1984; Pressley, Levin & Ghatala, 1988; Pressley, Ross, Levin & Ghatala, 1984).

Before beginning strategy instruction, teachers and students should establish the goals of that strategy instruction (Brown, Campione & Day, 1981; Pressley, Borkowski & O'Sullivan, 1984). Teaching strategies to students includes not only the strategies themselves, but also teaching students how to select the best strategies to solve problems. When teaching new strategies, Rosenshine (1985) recommends that teachers: 1) use procedural cues, e.g., "wh" questions; 2) teach the strategy using small steps; 3) model the process of using the strategy and use "think aloud" to show what the teacher is thinking; 4) guide student practice. Pressley & Harris (2006) further recommend that teachers model 1) why the strategy is used by providing specific reasons for the strategy selection, 2) how the strategy is used by providing explicit instruction absent of ambiguity, and 3) what strategies to select in specific situations by selecting the appropriate strategy to match the situation.

References and resources

Alexander, P. A., Graham, S., & Harris, K. R. (1998). A perspective on strategy research: Progress andprospects. Educational Psychology Review, 10, 129– 154.

Allen, K. D., & Hancock, T. E. (2008). Reading comprehension improvement with individualized cognitive profiles and metacognition. Literacy Research and Instruction, 47, 124–139.

Brown, A.L., Campione, J.C. & Day, J.D. (1981). Learning to learn: On training students to learn from texts. Educational Researcher, 10, 14-21. Pressley, M., Borkowski, J.G., & O'Sullivan, J.T. (1984). Memory strategy instruction is made of this: metamemory and durable stratey use. Educational Psychologist, 19, 94-107.

Dignath, C., Büttner, G., & Langfeldt, H. P. (2008). How can primary school students acquire self-regulated learning most efficiently? A meta-analysis on interventions that aim at fostering self-regulation. Educational Research Review, 3, 101–129.

Donker, A. S., De Boer, H., Kostons, D., Dignath-Van Ewijk, C. C., & Van der Werf, M. P. C. (2014).Effectiveness of learning strategy instruction on academic performance: A meta-analysis. Educational Research Review, 11,1–26.

Harris, K.R. & Pressley, M. (1991). The nature of cognitive strategy instruction: Interactive strategy construction. Exceptional Children, 57 (5), 392-404.

Hattie, J., Biggs, J., & Purdie, N. (1996). Effects of learning skills interventions on student learning: A meta-analysis. Review of Educational Research, 66, 99–136.

Kramarski, B., & Gutman, M. (2006). How can self-regulated learning be supported in mathematical e-learning environments? Journal of Computer Assisted Learning, 22, 24–33.

Pennequin, V., Sorel, O., Nanty, I., & Fontaine, R. (2010). Metacognition and low achievement in mathematics: The effect of training in the use of metacognitive skills to solve mathematical word problems. Thinking and Reasoning, 16, 198–220.

Pressley, M., Borkowski, J.G., & O'Sullivan, J.T. (1984). Memory strategy instruction is made of this: metamemory and durable stratey use. Educational Psychologist, 19, 94-107.

Pressley, M. & Harris, K.R. (1990). What we really know about strategy instruction. Educational Leadership, 48(1), 31-34.

Pressley, M., & Harris, K. R. (2006). Cognitive strategies instruction: From basic research to classroom instruction. In P. A. Alexander & P. H. Winne (Eds.), Handbook of educational psychology (pp. 265–286). Mahwah, NJ: Lawrence Erlbaum

Pressley, M., Levin, J.R., & Ghatala, E.S. (1984). Memory strategy monitoring in adults and children. Journal of Verbal Learning and Verbal Behavior, 23, 270-288.

Pressley, M., Levin, J.R., & Ghatala, E.S. (1988). Strategy-comparison opportunities promote long-term strategy use. Contemporary Educational Psychology, 13, 157-168.

Pressley, M, Ross, K.A., Levin, J.R., & Ghatala, E.S. (1984). The role of strategy utility knowledge in children's decision making. Journal of Experimental Child Psychology, 38, 491-504.

Rosenshine, B. (1995). Advances in research on instruction. Journal of Educational Research, 88, 262-268.

Schraw, G., & Dennison, R. S. (1994). Assessing metacognitive awareness. Contemporary Educational Psychology, 19, 460–475.

Weinstein, C., Husman, J., & Dierking (2000). Self-regulation interventions with a focus on learning strategies. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), Handbook of self-regulation: Theory, research, and applications (pp. 727–747). San Diego: Academic Press.