

Springboards to Success

Recent research is identifying and validating cognitive strategies that can help students learn.

By Barak Rosenshine

Cognitive strategies are guides that support learners as they develop new internal procedures, procedures that enable them to perform higher-level operations in areas such as reading comprehension and scientific problem solving. As a result of emerging research on cognition and information processing, investigators have begun to develop and validate cognitive strategies that can help students to learn.

For example, one approach that has been used successfully to help students improve their reading comprehension has been to teach students to ask themselves questions about their reading. In these studies, students would read passages and use prompts such as ‘who’ and ‘why’ to ask questions about the passage. And, as a result, comprehension improved when the students were tested on new passages.

What happened? Asking oneself a question, obviously, does not lead directly to improved comprehension on new passages. Rather, it is believed that the process of asking questions changed the way students read — it led them to search the text and combine information — and it was this change in processing that led to improved comprehension on new passages.

The process of teaching students cognitive strategies is distinctive in that the investigators used a variety of supports, or scaffolds, to teach students to use the strategies. A scaffold is a temporary support that is used to assist a learner during initial learning. It operates to reduce the complexities of the problems and break them down into manageable chunks that the child has a real chance of solving.

The scaffolds are gradually withdrawn as learners become more independent, although some students may continue to rely on scaffolds when they encounter particularly difficult problems. Scaffolds include simplified

problems, modeling of the procedures by the teacher, thinking aloud by the teacher as he or she solves the problem, prompts, suggestions, and guidance as students work problems. Scaffolds may also be tools, such as cue cards or checklists. Some of these scaffolds, drawn from the research, are presented here.

Procedural prompts are concrete aids that supply the students with specific procedures or suggestions that facilitate the completion of the task. An example would be question stems such as “How are ____ and ____ alike?” and “What do you think causes _____?”

Models of the appropriate responses can be used to assist with difficult tasks such as writing essays or arguments. For example, the teacher could model questions starting with the words ‘when,’ and ‘where.’

Thinking aloud by the teacher is a good way to demonstrate the internal thought processes one goes through when using a cognitive strategy. For example, a teacher might think aloud while summarizing a paragraph — illustrating the hidden processes that occur as one first determines the topic of the paragraph and then uses the topic to generate a summary sentence.

Guided initial practice is typically used after modeling. As the students work through their task, the teacher gives hints, reminders of the prompts, reminders of what was overlooked, and suggestions as to how something can be improved.

Regulating the difficulty of the task involves having the students begin with simpler material and then gradually move to more complex materials. For example, students might first learn to write summaries of single paragraphs and then progress, with guidance and modeling from the teacher, to producing a summary of longer passages.

Anticipating and discussing potential difficulties helps students to avoid mistakes. For example, the teacher might show a question that is too narrow and invite the students to discuss why it is a poor question.

Cue cards containing key information such as a procedural prompt reduce the strain on working memory.

Self-evaluation checklists allow students to obtain immediate feedback on their work. A useful question might be “Did I use good signal words?”

Models of expert work enable students to compare their efforts with the work of an expert.

Fix-up strategies are strategies students learn to use when their project is not going well. A fix-up strategy might be to re-read the difficult portions of the text.

Feedback in groups without the teacher is another form of guided practice. Such groupings allow the students extra practice in asking, revising, and correcting questions, as well as providing support and feedback to each other.

Independent practice with new examples is required for consolidating cognitive strategies. For example, a newly-learned strategy might be applied to a different content area than was used for the original instruction.

Increasing student responsibilities occurs as students become more competent during guided practice and independent practice. The teacher gradually diminishes the use of models and prompts and other scaffolds.

These scaffolds can be used to help students not only in the learning of cognitive strategies, but also in a variety of other learning situations.

(Dr. Rosenshine is Emeritus Professor of Educational Psychology, University of Illinois at Urbana-Champaign. Adapted with permission from School Reform Proposals: The Research Evidence. For the complete article, go to www.asu.edu/educ/eps/EPRU/documents)