# Building Expertise by Using Cognitive Strategies

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Our knowledge of what strategies are and how they work in the development of expertise comes out of the strand of cognitive research called information processing. This research on how the brain processes information has shown that new content knowledge we acquire is first stored in our short-term memory. However, our short-term memory has only a limited capacity to hold information. We have to process this information in some way or it will fade quickly. Teaching students about strategies and using these tools or methods can accomplish this task of increasing learning.

**What is strategy instruction?**

*Learning strategies* are defined as behaviors, thoughts, or actions that allow learners to process information so it can be more efficiently stored in and retrieved from long-term memory. Learning strategies can be divided into two basic types. *Cognitive strategies* help us remember and organize content information. When we read, we might apply a cognitive strategy to skim the title, pictures, and headings of a text to get the gist of what we will read. We might take notes to help us remember the main points. A good reader will also know when it is possible to skip over sections of text and when it is important to read every word carefully. When learning a large number of facts, a good strategic learner may work to understand the big picture and then divide the facts into categories through a diagram or outline.

*Metacognitive strategies* consist of knowledge about strategies and about one's own thinking processes. They are the executive managers of knowledge and include planning, monitoring, evaluating, and revising one's own thinking. Metacognition is not an automatic process but is a result of long-term development of the cognitive system. Good metacognitive strategy users engage in an ongoing process of identifying what their prior knowledge of a topic is, what they don't know, and what they need to learn. Metacognitive strategies enable learners to plan and self-regulate their work and to choose appropriate cognitive strategies.

**What has been learned about the effectiveness of strategy instruction?**

Many students' ability to learn has been increased through the deliberate teaching of cognitive and metacognitive strategies. This is especially true for students with significant learning problems. For more than three decades there has been an abundance of research regarding strategy instruction for students with learning disabilities. When struggling students are taught strategies and are given encouragement, feedback, and opportunities to use them, they improve their ability to process information and improve learning. Some students will need more scaffolding and individualized, intensive instruction than others.

**What happens to students when they become strategic learners?**

The fact that adults use diverse strategies is not a mere quirk of human cognition. Good reasons exist for people to know and use multiple strategies. All of the components of good information processing receive instructional attention.

- Strategies are taught and matched to actual tasks and differ in their accuracy and processing demands across a range of problems. Teach only a few strategies at a time and teach them well. Strategies should not be taught as a separate topic, but in context across the curriculum.
- Develop a repertoire of flexible strategies. A good strategy user possesses a variety of strategies and uses these procedures to meet cognitive challenges. Strategies are rarely used in isolation, but integrated into higher-order sequences to accomplish complex cognitive goals.
- Self-monitoring should be taught to check performance and is aimed at helping students understand how strategies can help them solve problems, recognize when each strategy is likely to be most useful, and transfer strategies to novel situations.
- Metacognition about strategies – knowing when and where to use them – can be explained to students directly. Opportunities to clarify when strategies work is an essential part of instruction.
- Student motivation to use strategies is enhanced when they realize this is what good learners do when they tackle tasks.
- The instructional setting should be comfortable, reflective, and calm rather than anxiety-ridden.

**What are the most essential strategies to teach?**

Successful, efficient learners use numerous strategies across subjects and tasks. They know when to use strategies and for what purposes. It would be difficult to identify the most essential strategies because they are dependent on the needs of the learners and the requirements of the content. The following strategies are suggested as a starting place:

- Memory – visualization, verbalization, mnemonics, associations, chunking, writing, or combinations
- Computation and problem solving – verbalization, visualization, chunking, associations, cues
- Reading accuracy and fluency – self-questioning, chunking, context clues, repeated readings
- Reading comprehension – visualization, questioning, rereading, predicting
- Writing – planning, revising, questioning, verbalization, visualization, monitoring

**What are the basic steps in teaching strategy use?**

1. Describe the strategy to students. Model use of the strategy, particularly with "think aloud" statements about how to execute the procedure.
2. Give plenty of guided practice once students know the steps. During this time, provide reinforcement and feedback about how to improve.
3. Strategy generalization and adaptation are encouraged by having students practice strategies with different types of materials and prompts during other instructional sessions.
4. Increase students' responsibility and motivation to use strategies by heightening awareness that they are acquiring valuable skills that are at the heart of successful learning.

*Teaching of important content is not sacrificed in order to teach strategies, but rather teaching strategies are integrated with teaching of content.*