

Research Findings of Special Interest: Organization and Transformation of Knowledge

The Brain's Way to Make Meaning

The brain's search for meaning occurs through "patterning." Patterning refers to the meaningful organization and categorization of information. In a way, our brains are both artist and scientist, attempting to discern and understand patterns as they occur and giving expression to unique and creative patterns of its own. The brain is designed to perceive and generate patterns, and it resists having meaningless patterns imposed on it. In school, "meaningless patterns" are isolated pieces of information unrelated to what makes sense to a student. When the brain's natural capacity to integrate information is acknowledged and invoked in teaching, then vast amounts of initially unrelated or seemingly random information and activities can be presented and assimilated. (Caine and Caine, 1991)

Important Findings from Cognitive Sciences

Most of the knowledge base on this topic comes from studies of good and poor readers. However, some of it is derived from research on expert teachers and from training studies.

Meaning is not in the words on the page. The reader **constructs meaning** by making inferences and interpretations. Putting information into another format [transformation] helps clarify this for students. Reading researchers believe that information is stored in long-term memory in organized "knowledge structures." The essence of learning is linking new information to **prior knowledge** about the topic, to the text structure or genre, and to strategies for learning.

How well a reader constructs meaning depends in part on **metacognition**, the reader's ability to think about and control the learning process (i.e., to plan, monitor comprehension, and revise the use of strategies and comprehension); and on attribution, beliefs about the relationship among performance, effort, and responsibility.

Reading and writing are integrally related. That is, reading and writing have many characteristics in common. Readers increase their comprehension by writing, and reading about the topic improves their writing performance.

Collaborative learning is a powerful approach for teaching and learning. The goal of collaborative learning is to establish a community of learners in which students are able to generate questions and discuss ideas freely with the teacher and with each other. Students often engage in teaching roles to help other students learn and to take responsibility for learning. This approach involves new roles for teachers.

Sources:

Caine, R. N. and Caine, G. (1991). *Making Connections: Teaching and the Human Brain*. Alexandria, VA: Association for Supervision and Curriculum Development.

Knuth, R. A. and Jones, B. F. (1991) Paper presented at the annual meeting of the American Educational Research Association, NCREL, Oak Brook, IL.



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