

## How the Brain Learns

Sousa, D. A. (2011). *How the brain learns* (4<sup>th</sup> ed.). Thousand Oaks: Corwin Press.

### Summary

The purpose of the book is to help educators understand how the brain learns so that they can be more successful in their teaching. Sousa designed the book to help answer questions like how does technology change the brain, how can I help student understand and remember more of what I teach, and what classroom strategies are more likely to appeal to the brain of today's student? *How the Brain Learns* is a technical book written for accessibility and full of implications for teaching.

To help educators accomplish the goal of more successful teaching, Sousa provides a "Practitioner's Corner" at the end of each chapter that furthers understanding through review and practice. The book is broken into eight chapters:

1. Basic Brain Facts
2. How the Brain Processes Information
3. Memory, Retention, and Learning
4. The Power of Transfer
5. Brain Organization and Learning
6. The Brain and the Arts
7. Thinking Skills and Learning
8. Putting It All Together

### Important Findings

According to Sousa, recent discoveries on the brain have:

- *Shown how emotions affect learning, memory, and recall.*

**Short-Term Memory** – there are two types of temporary memory: immediate memory and working memory. *Immediate memory* is a place where we put information until we decide what to do with it. Our immediate memory operates subconsciously or consciously. *Working memory* is a place where we build, take apart, or rework information for eventual storage. Our working memory works consciously and usually captures our focus and attention.

**Long-Term Storage** – in order to determine what information to store, the working memory asks two questions: does this make sense and does this have meaning? The first question, does this make sense, refers to understanding information based on past experience. The second question, does this have meaning, refers to whether information is relevant to the learner. To increase the probability that information is stored, both sense and meaning are necessary.

- *Challenged the understanding that the brain can multitask.*

**The Myth of Multitasking** – The brain cannot carry out two cognitive processes simultaneously. People can shift their attention quickly among several things, but they can still only focus on one thing at a time. Therefore, what is usually referred to as multitasking is actually **task switching**. Unfortunately, when attention moves sequentially from A to B to C or alternately from A to B back to A back to B, there is a cognitive loss involved. This is due to information from the current task stored in the working memory being replaced by information from the new task.

**Task Switching and Complex Texts** – Eight to eighteen year olds spend an average of seven hours per day with digital media. The propensity for task switching is affecting the ability of students to successfully read complex texts. This is because the skills that are necessary for understanding complex texts are not developing within students who are constantly wired. The three skills needed for this task are:

- a willingness to probe readings for literal and inferred meaning and to pause and deliberate over the unfolding story.
- a capacity for uninterrupted thinking to maintain a train of thought and to hold enough information in working memory to understand the text.
- an openness for deep thinking that involves deciding to agree or disagree with the author's premise and reflecting on alternatives.

Technology is a tool that can enhance, enrich, and present content more efficiently to students. However, students in primary and middle school still need personal contact and interaction because it is an important part of social development. Technology is reducing the frequency of these interactions leading to a reduction in necessary skills.

- *Revealed more about how the brain acquires spoken language.*
- *Found evidence that neurons in the brain regenerate, thereby enhancing learning and memory.*
- *Suggested that movement and exercise improve mood, increase brain mass, and enhance cognitive processing.*

**Fueling the Brain** – “Although it represents only about 2 percent of our body weight, the brain consumes nearly 20 percent of our calories (p. 15)!” Oxygen and glucose serve as fuel for the brain. Eating moderate portions of fruits and drinking plenty of water (8 ounces for every 25 pounds) can boost performance and accuracy of memory, attention, and motor function. Another important component of fueling the brain is exercise. Exercise increases blood flow to the brain and helps with forming long term memory.