Teaching with the Brain in Mind

Introduction

I first discovered the concept of "brain-compatible learning" during a business development workshop facilitated by Marshall Thurber, a futurist and entrepreneur, in June 1980. The impact was so powerful that even today, almost two decades later, I can fill the page of a flip chart with ideas I remember (and still use!). Without a doubt, both the content and process of that day were deeply embedded in my brain. The presenters clearly understood—and knew how to use—important principles about learning and the brain.

After that day, I became so enthusiastic (some would say a zealot) that I decided to share my excitement with others. Because I was teaching, my first response was, "Why don't my own students have this kind of learning experience every day?" The question was both humbling and promising.

I decided to use this newfound brain/learning connection. I cofounded an experimental, cutting-edge academic program in San Diego, California, called SuperCamp. Our purpose was to use the latest research on the brain to empower teens with life skills and learning tools. We held our first session in August 1982. It was an immediate success, and we offered it in other states and countries. We

were flooded with media attention and soon found ourselves in *USA Today* and *The Wall Street Journal*. Later, we appeared on CNN and "Good Morning America."

Long-term follow-up research validated that the benefits of our program lasted years after the 10-day program itself (DePorter and Hernacki 1992, p. 19). Students' grades and school participation went up, and the students reported greater self-confidence. The experiment we began years ago is now an international fixture with more than 20,000 graduates. Today it's still growing and based in Oceanside, California.

I have seen, felt, and heard firsthand the difference brain-compatible learning makes. Students of all backgrounds and ages, with every imaginable history of failure, and with lifelong discouraged attitudes can and have succeeded with this approach. While brain-compatible learning is not a panacea, it does provide some important guidance as we move into the 21st century. Programs that are compatible with the way humans naturally learn will stand the test of time. The principles of brain-compatible learning will flourish when many other fad-like educational programs have long faded from memory.

1 The New Winds of Change

KEY CONCEPTS

- **Background and theory update on brain research**
- **The state and direction of research today**
- **Tools for learning about the brain**
- **How to interpret the new brain research**

We are on the verge of a revolution: the application of important new brain research to teaching and learning. This revolution will change school start times, discipline policies, assessment methods, teaching strategies, budget priorities, classroom environments, use of technology, and even the way we think of the arts and physical education. But before we consider the practical applications of this research, we must have a useful model for deciphering it.

Models of Education

The educational model that dominated much of human history was uncomplicated. If you wanted to learn about something, you became an apprentice to someone who possessed skills or knowledge in that area. The path was simple: find people who knew more than you and learn from them. This worked for peasants and royalty, parents and children, blacksmiths and monks.

The Industrial Revolution changed this path. A new model soon emerged with the notion that you could bring everyone together in a single place and offer a standardized, "conveyor belt" curriculum.

This paradigm of schooling was developed in the 1800s and popularized throughout most of the 20th century. Often called the "factory model," it drew from fields of sociology, business, and religion. It emphasized useful skills like obedience, orderliness, unity, and respect for authority.

A peculiar twist to this paradigm emerged during the 1950s and 1960s. In those decades, the dominant theory of human behavior was influenced by the doctrines of psychologists John Watson and B.F. Skinner. Their behaviorist theories went something like this: "We may not know what goes on inside the brain, but we can certainly see what happens on the outside. Let's measure behaviors and learn to modify them with behavior reinforcers. If we like it, reward it. If we don't, punish it." Considering what we knew about the brain at that time, this approach made some sense.

Recently, a new paradigm began emerging. History will likely record that it began in the final two decades of the 20th century. Technology paved the way for this paradigm shift; it changed the way we think, live, and learn. In the 1970s, 1980s, and 1990s, phrases like "super learning" and "accelerated learning" became mainstream as the Information Age blossomed. "Brain scanners" like Magnetic Resonance Imaging (MRI) and Positron Emission Tomography (PET) gave us new ways to understand and see inside the brain. For the first time in history, we could analyze the brain while its owner was still alive. A new breed of "inner science" developed: neuroscience, which is an exciting interdisciplinary approach to questions about the brain.

In 1969, 500 neuroscientists were registered in the International Society of Neuroscience. Today, more than 30,000 are members. A bonanza of neuroscience discoveries now reveals astonishing insights about the brain and learning. Schizophrenia and Tourette's syndrome can be treated with medication. We are closing in on the causes of Parkinson's and Alzheimer's diseases. The ability to walk again after a spinal cord injury is becoming a very real possibility. A memory pill, Nimodipine, helps students better recall what they read. We now know the biological roots of impulsive and violent classroom behavior. Many of our conventional educational beliefs are being shattered like glass.

How Do We Learn About the Brain?

We are learning about the brain at an unprecedented rate. Jeri Janowsky, a top learning and memory neuroscientist at Oregon Health Sciences University in Portland, says, "Anything you learned two years ago is already old information. . . . Neuroscience is exploding" (Kotulak 1996, p. 124). In the coming years, we can expect new and more accurate technologies to further illuminate the brain's mysteries. For now, the following are the "workhorses" of neuroscience.

Brain Imaging Devices

Magnetic Resonance Imaging (MRI) machines provide high-quality cross-sectional images of soft tissue like the brain without X-rays or radiation. This tool has two new variations. Functional MRI (fMRI) is a lower budget variation, cheaper, and much faster. Another is NMRI (Nuclear Magnetic Resonance Imagery), which is 30,000 times faster and captures an image every 50 milliseconds. That speed allows us, for example, to measure the sequence of thinking across very narrow areas of the brain (see fig. 1.1).