The Brain-Compatible Classroom

Using What We Know About Learning to Improve Teaching

tone to make it an easy and enjoyable read. I did not want it to be a textbook. Textbooks can be boring, and boring is not good for the brain. Each chapter gives a simple summary of many other wise people's research on the brain and how it learns, and then gives real-life examples and anecdotes for you to use or modify for your own students.

I would like to thank all the teachers whose terrific ideas and strategies I share with you in each chapter. I admire their knowledge and skills and feel glad for their fortunate students. I thank my three wonderful children, Chad, Brent, and Lisa, who were patient when sometimes it seemed as though mom's computer must be her best friend. I thank Joyce McLeod and Deborah Siegel, who fixed all my goofy writing errors and gave me just the perfect editing recommendations. I thank my parents for being my best teachers—they knew what kids' brains needed before the current brain research came out. And I thank Gary, who invited me to that first seminar that improved my whole career and who, so many years and circumstances later, has invited me to marry him, improving my whole life.

Introduction

The field of education has entered an exciting and crucially important era—the brain era. We now know a great deal about the human brain and the biology of learning, and new discoveries are continually adding to that knowledge. One exciting facet of this knowledge explosion is the fact that people in general, not just neuroscientists, physicians, and psychologists, are interested in the findings and implications. Mass media and the popular press are highlighting brain-related topics that affect typical people. Average citizens, and parents in particular, are proving to be avid consumers of this information.

Until recently, our knowledge about the human brain was limited to what we could learn through the study of injured brains during surgery or from autopsies. Advances in medical technology over the past two decades—positive emission tomography (PET) scans and functional magnetic resonance imaging (MRI)—allow physicians and scientists to actually see how the brain functions while it is thinking or performing tasks. The implications of the current research on living brains are staggering, not only for the medical field, but also for the field of education. Educators are becoming privy to the biology of learning and therefore can discover which teaching practices actually maximize learning.

While many teaching methods have worked for decades, educators have found that some strategies haven't worked well at all. Tradition, intuition, and trial and error have been the basis for much of the instruction used in our classrooms. Today, education is poised to move beyond tradition for tradition's sake. Although we certainly have not uncovered all there is to know about the brain and learning, the medical field has given us some concrete, physiological data to consider when developing and implementing teaching strategies. Most undergraduate training of teachers has been based on how the adult should act, or how the teacher should teach. It is now time to study how the children act, how the learners learn. Educators can and must become learning experts. It is time to discover,

from a physiological perspective, why particular teaching strategies have always worked and what new teaching and learning methods will be even more successful. Educators working in brain-compatible environments can develop an unprecedented professional competence that will enable students to reap the rewards of powerful, successful learning.

The Process of Change Toward Brain-Compatible Learning

If you're not riding the wave of change, you may end up under it! Isn't that what the inspirational greeting cards and calendars say about change? As we learn more about the brain, teachers will be expected to gain a thorough understanding of the learning process and, consequently, improve teaching practices in accordance with how the brain learns best. Making the change to a brain-compatible learning environment in a classroom does not happen overnight, and educators will probably never be able to say that they have completed their learning about brain-based instruction and how to apply it in their classrooms. We may never discover all there is to know about how the human brain works.

The good news for educators is that although it will take a lot of time and effort to develop a brain-compatible classroom, no teacher is starting from scratch. Every teacher out there is already successfully implementing effective teaching practices. Many traditional instructional strategies are, and have always been, brain compatible. Some of the ideas and brain-based practices may be radically different from what is seen in traditional classrooms, while others may involve slight modifications from typical procedures. Brain-based education is not a process by which a teacher disposes of all traditional practices and starts over. Rather, educators can learn, share, try, reflect, modify, and institutionalize new teaching methods and classroom practices slowly and deliberately.

Hard work and lots of time are always a part of an effective change process. If change seems too easy, it probably is not a true, enduring change. Some professionals and some of the literature on school change assume that adoption is the same as implementation. Adoption of an innovation is simple. It is the implementation that takes the time and effort. Even successful implementation of a change in a school setting is

not enough. If lasting improvement is to occur, the new practices must be sustained over a long period of time in order to become part of "the way we do things here."

Prior to learning more about brain-compatible instructional strategies, it is useful to have some background information regarding how an individual will naturally progress through stages of change when applying these strategies or practices. The Concern-Based Adoption Model, shown in Figure I.1 (Hord, Rutherford, Huling-Austin, & Hall, 1987) describes the changing feelings of people as they learn about a proposed change, prepare to use it, use it, and modify it as a result.

Everyone involved in organizational change must understand that individuals go through these stages at different time periods and for varying lengths of time. Don't feel frustrated and give up too early. You may have to work through difficulties before operations can proceed smoothly. As Michael Fullan (1993) articulates, "Clarity must be achieved at the receiving end more than at the delivering end."

FIGURE I.1

Stages of Concern Related to Change

Degree of Concern	Stages of Concern	Expressions of Concern by Staff
0	Awareness	"I am not concerned about brain-based learning."
1	Informational	"I would like to know more about brain-based learning."
2	Personal	"How will brain-based learning affect me?"
3	Management	"I seem to be spending all my time getting brain-based materials ready."
4	Consequence	"How is my use of brain-based strategies affecting kids?" or "How can I refine the strategies to have more impact?"
5	Collaboration	"How can I relate what I am doing to what others are doing?"
6	Refocusing	"I have some ideas about something that would work even better."

Adapted from *Taking Charge of Change*, by S. M. Hord, W. L. Rutherford, L. Huling-Austin, and G. E. Hall, 1987, Alexandria, VA: ASCD.

Overview of the Seven Brain-Compatible Fundamentals

Many authors, including Caine and Caine, Jensen, Sylwester, Wolfe, McGeehan, Gardner, Goleman, Kovalik, and Sousa, have taken some of the latest scientific medical findings related to the brain and applied them to learning. In addition, many quality resources are available to anyone who wants to learn about detailed topics concerning brain-based learning. Books and articles give information about the physical sections of the brain and their functions, music and the brain, multiple intelligences and learning styles, the best foods for the brain, emotional intelligence, physical movement and the brain, classroom environment and teaching implications tied to the brain, and so on. Chapter 1 gives teachers a quick and basic overview of the parts of the brain and their functions. Chapters 2 through 9 compile, organize, and review the conclusions of the experts in terms of generalities or fundamentals that every teacher should know. Within each chapter are specific teaching strategies to use immediately as well as teachers' examples of classroom applications of brain-compatible instructional strategies. The following is a brief summary of seven brain-compatible fundamentals:

Seven Brain-Compatible Fundamentals

Emotional Wellness and Safe Environment

How are students' emotions linked to memory and learning? How do stress and emotions affect students' learning?

Teachers can establish a classroom and school environment that is fun and safe, and, therefore, more brain-compatible for learning.

The Body, Movement, and the Brain

Why do oxygen, water, sleep, certain foods, and movement affect students' brains and their learning?

Teachers can make adaptations to their physical classrooms and teaching techniques and educate parents about health-related issues to help children learn.

Relevant Content and Student Choices

Why does the brain remember some information and skills more readily than others? How, when, and why should we offer students choices?

Teachers can engage emotions and link new information to prior knowledge to make learning more meaningful for students. They can also increase motivation and memory, and accommodate ability levels and learning styles by offering choices to students. Information, practical strategies, and classroom examples are provided on project-based learning, multiple intelligences, learning styles, differentiated assessments, and involving students in decision making.

Time, Time, and More Time

What three time elements dramatically affect when and how well students learn?

Teachers can use the three time elements (time on task, time for comprehension, and opportune learning time periods in a child's life) in the classroom to increase learning.

Enrichment for the Brain

Is enrichment just for gifted kids?

Teachers can heighten learning for all students through the use of many enrichment practices, from using music in lessons to some bulletin board displays.

Assessment and Feedback

What forms of assessment are and are not brain compatible?

Teachers can use forms of assessments that enhance the learning process. Feedback should be prompt, specific, from a variety of origins, and built into the learning process.

Collaboration

How and why do students learn effectively through collaborating with others, both adults and peers?

To optimize learning in the classroom, teachers can apply the fact that the human brain is a social brain.