Introduction

Brain Research and the Classroom

The abundance of brain research available to educators at this stage in history is staggering. For the first time in history, the human brain can be observed as it is actually functioning, providing hard data on how the brain learns and remembers best. Educators now have the opportunity to make instructional decisions not based on philosophy or personal experience, but on objective data. This book is filled with these neuroscience findings, and practical applications of them in the classroom.

Getting the Input Put In

Much of the research being done on the brain has absolutely nothing to do with education. The research that does have to do with educational topics must be viewed carefully. It is a big leap from the neuron to the neighborhood. Research could take place at the systems level, all the way down to the individual neurons, to even the cell membranes and the synaptic gap. To make a leap of logic and apply research done at a microscopic level to a first-grade classroom or a tenth-grade chemistry class must be undertaken cautiously.

With that note of caution, I strongly urge all educators to take that step. Primary research reports are easy to find on the World Wide Web. As educators in this most exciting time, we must be bold and always have some action research project in the works, to make that leap from the neuron to the neighborhood in a practical way.

This book is a result of one such leap. I believe that the first phase in learning is getting the information inside the students' heads, or as I like to put it, "Getting the Input Put In." Research has helped to find the best ways to do just that.

A necessary step before that, however, is to get the students' attention so the input can be put in. If a lesson doesn't get into the brain to be processed in the first place, then the information doesn't have any chance of being transferred into long-term memory.

One important question educators should ask is, "How long can our students pay attention?" The time frame varies from shorter to longer, depending on several factors. These factors may include the time of day, student interest level in the topic, the energy and expertise of the instructor, how the students are feeling, how hungry they are, and a host of other variables (Burns, 1985; Johnstone & Percival, 1976). In addition, the ability to pay attention for longer periods may be compromised by environmental factors such as extensive early exposure to television (Christakis, Zimmerman, DiGiuseppe, & McCarty, 2004). So how long can today's students pay attention? Without being glib, I think the answer is "not as long as they used to be able to, and not as long as we would like."

Are Kids' Brains Different?

Why do I make the statement that kids today can't pay attention as long as they used to? Are we teaching to different brains than we were 20 or 30 years ago? Well, not exactly. The point must be made that the brains of kids today are exactly the same as the brains of kids 30 years ago. Kids' brains today still have four lobes, still are made up of neurons and glial cells, and they still change when they interact with the environment.

So, physically, students have the same brains as students 30 years ago. How that brain is organized, however, is radically different in students in today's world. It is similar to saying automobiles from the 1960s are the same as automobiles

today. They still have tail lights, steering wheels, and brakes, but because the environment has changed and style has changed, the cars are radically different.

The brain inside the head of today's student has been shaped by the radically different environment of today, and as a result, has in fundamental ways been wired differently from the brain of 20 to 30 years ago. My speculation is that 20 or 30 years from now, brains will be different still. How can I make such a strong statements, and what can educators do about it? The answer lies in the amazing research that has been done with the human brain.

Since the late 1960s, thanks to the pioneering work of Dr. Marian Diamond, we know about *brain plasticity,* the idea that the brain changes as a result of interacting with the environment. If we know that the brain changes through interactions with the environment, the other relevant question is whether the environment has changed since we ourselves were students.

I believe the answer to that question is a resounding yes. The environment has changed more in the past 20 to 30 years than perhaps at any other time in history. This was underscored during a recent visit with my eight-year-old daughter to a well-known chain electronics store. At one point, we stopped shopping and I told my daughter to look around. It occurred to me at that moment that although she thought the store and its merchandise were very ordinary, this was a most extraordinary store. It was extraordinary because most of the store's merchandise did not exist in any form when I was my daughter's age. We looked at personal computers, PalmPilots, DVDs, video players, flat-screen televisions, microwaves, pocket calculators, cell phones . . . the list goes on and on with these new technologies that were not available a few decades ago, but have now become such a part of contemporary life.

When I was young, we played with jump ropes and board games and passed notes in class. Students today play video games, surf the World Wide Web, and IM each other. Physical

safety is a priority today, resulting in car seats with five-point restraints and playgrounds that are much more static than they once were. Not much moves besides the swings. Moving equipment, like teeter totters and spinning carousels, has been removed because of liability issues. Children today, however, are more often exposed to drugs, ranging from caffeine to antidepressants, at a very young age. Many leisure-time activities of today's students are isolated affairs, as they interact with the video display, computer screen, or television, often more than with other children.

So, the environment has changed. And when the environment changes, the brains in contact with the environment have different connections. How do we get and keep the attention of this different brain that has been raised on microprocessors and cell phones?

Research indicates a direction for specific techniques to assist teachers in getting and keeping the attention of today's youth. This book is filled with scores of ideas to get and keep such students' attention.

So what is it that research is suggesting? A few times an hour—maybe more, maybe less, depending on your students, their interest level, the time of day, and so on—I recommend that you engage your students in something called a *state change*, to refresh their ability to pay attention and address their physiological needs.

State Change

The textbook definition of a state change is that it is "a holistic phenomenon of mind-body emotions, mood, emotional condition; sum total of all neurological and physical processes within an individual at any moment in time" (Hall & Belnap, 2002, p. xx). A friendlier definition is that a state change is a change in a student's thoughts, feelings, or physiology. This book lists specific directions for how to incorporate state changes that last from a few seconds to a few minutes, or more.

For those readers who think state changes have to be complicated to be effective, I offer the following story:

The Story of the King

A long time ago in a different land, there lived a king who had three sons, all of whom he loved very much. He could not decide which one to leave his vast fortune to, so he proposed a challenge. One day, he gathered his three sons together outside an immense storehouse at the back of the palace grounds. The king gave each of his sons a portion of the fortune, and showed them the inside of the storehouse, which had been emptied. He told them that the challenge was to spend the riches he had just given them on whatever they wished, but the task was to fill up the immense storehouse to the ceiling.

The first son immediately went out and spent his part of the fortune on dirt, because it was cheap. Amazingly, he managed to purchase enough soil to fill the storehouse over halfway, but, as his father pointed out, not to the ceiling.

The second son spent his money on hay and straw, and managed to fill the storehouse almost two-thirds of the way to the ceiling, but, again, had fallen short of the goal.

When the storehouse had again been emptied, the last son took his father to the storehouse at twilight. Just as evening was gently wrapping the palace up with shadows, he asked his father to step inside. Once inside the storehouse, the son shut the door, leaving the two of them briefly in darkness. Then the son pulled from his tunic a single candle, lit it, and filled the storehouse to the ceiling with . . . light.

The moral to the story is that state changes do not have to be complex, expensive, or lengthy to be effective.

So far I have suggested regularly doing state changes, and I have acknowledged that state changes can be very simple and very quick and still be effective. I'd like to make two additional points about state changes—the importance of gradient and the need to adopt and adapt.

Gradient

Gradient is simply the risk factor involved in any activity. Some of the activities presented here are so low risk that in my experience, very few if any students refuse to participate. Some of the activities suggested, in particular those in the last

section, could be higher gradient, that is, have a higher risk involved, than other activities. A mistake I made early in my career was to not consider gradient at all. Instead, I just tried to have the class do whatever energizing activity I had just learned or heard about. Sometimes it worked, but many times the hoped-for increase in energy and attention eluded me. Now I know that while my directions were good and the activity was strong, the gradient was just too high at that stage of my relationship with those classes.

My suggestion is to set yourself up for success. Read through the activities with your class in mind and choose ones you feel confident the class will participate in and enjoy. As the students begin to get in the rhythm of regular state changes, my experience has been that they will be more open to trying more involved state changes.

Adopt and Adapt

I have used all of these activities with elementary-aged students through adults. If you find one that you like, but you don't think it will work with your particular group, I encourage you to first *adopt* the idea that state changes are useful, even *essential*, to an optimal classroom experience, and *adopt* the notion that having fun is vital for best possible classroom atmosphere and for everyone's mental and emotional well-being, then *adapt* a particular activity for your particular class or teaching situation.

With any luck, the foundational spirit of fun, laughter, joy, and spontaneity come through loud and clear in the spirit of this book and the ideas contained within.

Using This Book

Our brains basically "run on empty." The human brain does not store energy. The brain needs a constant blood supply, which brings it oxygen and nutrients. Many of the state changes presented here are designed to energize students, and get their blood full of oxygen and flowing to the brain.

These state changes come from a wide range of resources and fields, many of them from outside of education. Contained within these pages you will find activities inspired by such diverse fields as occupational therapy, vision therapy, and sensory integration therapy.

Some of the activities can be done individually; some are designed to do in a group. The group activities can have the added advantage of creating a feeling of bonding in a team or classroom community, which is essential for creating a safe, threat-free environment where all can learn.

I encourage you to keep this book at your fingertips, and when a state change is required, turn to one and try it out. You could also select state changes in advance for use during a particular class or semester.

I have reorganized the state changes around the following four themes:

- Energize the Environment
- Get Your Students' Attention
- Energize Your Students
- Build Teams and Community

The first part, "Energize the Environment," examines numerous ways to keep the learning environment fresh.

The second part, "Get Your Students' Attention," is full of ideas to help students focus on the task at hand, an essential first step in the learning process.

The third part, "Energize Your Students," is full of ideas you can use when the students just need a little bit of a state change to refresh their attentional systems in the middle of a lesson.

The last section, "Build Teams and Community," has activities that you could use for an extended state change, and also for community building, team building, and rapport building.

Another feature of this new edition is the inclusion of a suggested age range for each activity; however, I have used every single one of these activities with students of all ages, from kindergarten to post-graduate level, with some adaptations for

age, body size, attention span, and so forth. So, if you see an activity you may be interested in that you think your kids would never go for, I would suggest you go back to the team building section and try some of those activities. For me, whenever I have succeeded in the facilitation of a classroom community, anything goes!

The designations for the activities will be as follows:

K–Adult = can be a successful activity for all ages

K–Grade 2 = lower elementary

Grades 3–5 = upper elementary

Grades 6–8 = middle school

Grades 9–12 = high school

Adult = college and beyond

The label K–Adult indicates that any age, kindergarten through adult, will benefit from the activity. That may not necessarily mean, however, that the state change should be used exactly as written for each age level. Please feel free to adapt an activity to the age level, maturity level, and space and time available. You know, do what teachers do!

How and When to Use These Activities

Your students will let you know when they need a state change. You could do an activity that gives you a feel for how energized your class is as a whole, such as "One-Word Whip," described in the section on Get Your Students' Attention. Students may ask you for a break. Usually, they will be more subtle than that, but they do give many clues.

What kind of clues do students provide to let you as the teacher know that it is time for a state change? Well, perhaps as you are teaching, their gaze may start to wander or they may look at the clock. They may get fidgety, noisy, and

restless. They may ask to use the restroom or get a drink or retrieve something from their locker. Student body language also gives out clues. The body and the brain are connected. Whatever happens in the body (thirsty, uncomfortable, restless) affects the brain, and whatever is happening in the brain (bored, need a break, need to move) affects the body and shows up as a clue that a state change is needed. Maybe your students slump in their chairs, or rest their head on their hands, or put their head down, and so on.

Once you tune in, the clues become more obvious. But when do you do a state change? And how can you get students refocused after a state change? To answer the first question, I recommend that you use state changes in the following four ways:

1. As part of the lesson.
2. As a "parenthesis" in the lesson.
3. As part of the classroom rituals and routines.
4. During natural breaks in the lesson.

As Part of the Lesson

I have used state changes in several ways. One way is to implement a state change that also keeps the learning episode going (See the "Feedback" section in Get Your Students' Attention for some ideas). For example, if I am lecturing, I may see the students need a state change by the way they are looking around the room, getting restless, or by the way their body language is telling me they are losing interest (slumped in chairs, holding head up with hands, etc.). In that case, I may choose to stop my lecture, have students stand, find a partner, and discuss one aspect of what I was just lecturing on. This serves the dual purpose of being a change of state, and helping the learning along by having students actively process information in an interactive way.

As a "Parenthesis" in the Lesson

I could also pause the instruction and insert a very brief state change that has nothing to do with the current lesson. For example, in a high school classroom, I might say, "OK, ladies and gentlemen, put your pens down for a moment and please stand up. Our brains need a steady supply of blood to bring in oxygen and nutrients. We have great blood pumps in our bodies. Our heart is the best, and another blood pump we have is our calf muscles. Please do a few toe lifts [instructor demonstrates]. Great. Take a deep breath; now blow it out. Take another deep breath and as you blow it out, sit down. Now, the process of mitosis is . . ." and back to the lecture.

As Part of the Classroom Rituals and Routines

There are natural points in the flow of a lesson where a state change could be inserted as part of your ritual and routine in class. For example, breathing every time you turn the page of a text (see the "Breathing" section in Part 2, Get Your Students' Attention for more ideas).

During Natural Breaks in the Lesson

There are also natural breaks in the flow of a lesson where a state change could be inserted, for example, when transitioning from lecture to beginning homework, when going from whole group to partners, and so on.

Refocusing Students After a State Change

Most often I do a physical state change that doesn't have anything to do with the particular content I am teaching. When it's completed, I simply go back to where I was in the lesson. I have rarely had much difficulty getting students to focus

again; actually, the opposite is true. If I do not do a state change at the appropriate time, it seems extremely difficult to get students to continue paying attention once they have checked out.

Please enjoy these activities—they are all shared with you in the hope that they will help your students, and help you be the absolute best, life-changing-force-of-nature teacher you can be—and have an absolutely outrageously fun time doing it!