Book Review

The Art of Changing the Brain

Insights and Connections to Teaching in Reading Recovery

Barbara Schubert, Trainer, University of Arkansas at Little Rock

Highly recommended reading for educators—and Reading Recovery professionals in particular—is James Zull's book, The Art of Changing the Brain. Dr. Zull, professor of biology and director of the University Center for Innovation in Teaching and Education at Case Western Reserve University, describes how everything we do in life requires us to teach. Our daily lives are centered on teaching as we explain our ideas and thoughts in support of other’s learning. As Zull explains, “Life is learning; life is teaching.” The better we understand how the brain works, the more successful we can be when we are engaged in teaching a task and “…the more artful you can be when you must teach!”

Zull’s book and the connections to Clay’s work in Reading Recovery

For those of us who teach children who struggle with literacy learning, there are many connections in Zull’s book to Clay’s (2005) work in Reading Recovery. I suggest that Zull’s discussions of learning and teaching are applicable to our understandings of powerful instruction for struggling learners, and I suggest the following ways that his concepts enhance and reinforce our work.

Early in Reading Recovery lessons, Reading Recovery professionals support children’s literacy learning by drawing on each child’s limited known repertoire, for example: knowing letters in some way, using known words to self-monitor and search for information in print, and controlling 1:1 correspondence. Based on Zull’s explanations, it is powerful to begin with the learner’s known to create new learning.

In every encounter with print, information must be attended to and integrated with new learning to extend the learner’s strategic control over increasingly complex texts in reading and in writing. The behavior (end result) must be processed (what has to happen in the brain) and this requires the teacher to look for ways to link to what the child controls currently and to engage the child in actions that will result in a change in the neuronal networks, or processing.

There are neuronal networks in our brains for everything that we know and do. Consider the fact that there are specific groups of neurons that fire when we see the color red, but different groups that fire when encountering the color blue. Different groups of neurons fire when we’re happy, sad, frightened, anxious, or angry. Combinations of neurons also fire simultaneously, with more parts of the brain needed to respond to tasks that demand greater complexity.

To illustrate, consider what happens when a child sees a group of letters on a page and needs to not only see the letters, but also to process what is seen into meaningful bits of information that can then be linked to prior knowledge both to solve current problems and ultimately to foster new learning and understanding. Likewise, consider the extensive volume of information that must be assembled to compose a message and then record that message, or to gain meaning from a variety of text genres and structures. An enormity of neuronal networks are assembled and used by each learner to think creatively, comprehend, compose messages, and extend one’s literacy expertise. Is it possible that our brains become comfortable with abstract ideas through encounters with real experiences? As Zull states, “The only recourse we have is to begin with what the learner brings” (p. 105), and Reading Recovery teachers strive to do this.

Related to this, Reading Recovery-trained teachers focus on children’s responding histories or prior knowledge to calibrate their support pre-
Zull reminds us that understanding each learner’s prior knowledge is a gift to the teacher; it tells us where and how to start with instruction. Marie Clay was adamant about the importance of taking the time to find out what children bring to reading and writing and using this knowledge to help children untangle their confusions. In every teaching interaction, we are reminded that the brain’s activities are complex, that literacy learning is complex, and that our approach to instruction in Reading Recovery lessons must be aimed at supporting what the child knows and how he knows it to maximize learning.

At first glance, the reader of Zull’s book might focus on the book’s title, asking why consider changing the brain when what we really need to do is change the way we teach so that there is a better alignment with how the brain works. Educators know that our future depends on a literate populace — people who know how to solve problems, find solutions, communicate well with others, and above all, engage in a democracy. The challenge for educators lies in how to problem solve, monitor, and redirect our thinking given the challenge of supporting a literate society. Zull reminds us that three psychological functions relate to complex problem solving: (a) Conscious Awareness, (b) Selective Attention, and (c) Voluntary Memory. Conscious awareness lets us be aware of what we know, selective attention allows us to focus on what is important, and voluntary memory signals what needs to be remembered for future use.

School reinforces this understanding in his video, Your Brain: a Lifetime of Brain Fitness (1996) with the following succinct summary of psychological functions:

You relate what you hear or see to things you already understand. The moment of truth is the moment of input, how you attend, how much you care, how you encode, what you do with it, and how you organize it. How well you access it depends on how well you stored it in the first place. How do you become more savvy about the way you remember things? Have a good system. Notice your errors and try to fix them.

Clay refers to this as self-monitoring or checking on oneself. When a teacher encourages a child to monitor his own reading, self-correction is encouraged. The focus is on helping the child build a self-extending system that improves over time. Zull labels this biology in action and makes it clear in the introduction to his book that learning is about biology. Science can provide us with the information about the brain and foster our understanding of how the brain works, but Zull’s position is clear that it is the learner who is actually learning, and thus, changing. The operative words are learner and change. Learning is change.

Current science, the emotions, learning and change, and teaching examples in Zull’s book

The information presented in Zull’s book is meaningful, clear and relevant for all educators. Zull describes the brain’s functions in clear, nontechnical language and uses a conversational tone throughout the book. The book is written in three
Based Research to Maximize Learning

Struggling Readers: How to Use Brain-emphasizes in her book, Carol Lyons
This is the same focus on teaching part of learning at the forefront of importance of keeping the emotional brain structure and the crucial relationships — why we need to understand parts: Part one addresses the foundations — why we need to understand the natural relationship between brain structure and the crucial importance of keeping the emotional part of learning at the forefront of attention — the art of knowing what one does not know and what it is that we do not know. In the end, Zull reminds us that it is our physical body and its interactions with the physical world that produce learning; clearly a reminder of Clay’s teaching procedures that link hearing, seeing, and movement to new learning.

Throughout his book, Zull employs numerous examples from his own teaching to demonstrate the changes that occurred both in his own learning and the learning of his students. While all of the book’s examples are drawn from teaching older students, significant insight can be gained in understanding why changing paradigms about literacy teaching and learning may present challenges when working with colleagues. Once attention is focused on what it is that one does not know about literacy teaching and learning, steps may be taken to modify or reconsider one’s thinking about teaching children. Traditionally, teaching has focused primarily on teachers’ knowledge rather than learners’ knowledge. As Zull reminds readers, teachers’ best opportunities to change the brain are by noticing and using the existing neuronal networks in each learner.

Headings throughout the book bring key points to the reader’s attention. Some examples are: “Searching for Connections,” “What Can a Teacher Do?” “The ’Wrong’ Connection,” “Helping People Learn,” “Emotion and the Brain Cycle of Learning,” and “Dynamic Learning and the Teacher.” At the end of each of the three parts of his book, Zull provides a summary of the salient points and invites the reader to connect that knowledge to the new knowledge presented in subsequent sections of the book.

Part two of Zull’s book focuses on knowledge, neuronal networks, change, and recommendations for the teacher. The chapters in part two describe current science about existing neuronal networks and how teachers can support change in neuronal networks resulting in learning. It may be that as teachers we have to forge stronger and much clearer connections between new learning and prior knowledge in support of children’s learning. Ultimately, unless there is some change in the connections made between new learning and prior knowledge, no new learning will occur.

Part three discusses ways to use more of the cerebral cortex to deepen learning and links together what is known about the sensory brain to help learners comprehend their experiences. Zull also focuses on the importance of using the motor brain to close the loop of learning and stresses the importance of self-evaluation — the art of knowing what we know and what it is that we do not know. In the end, Zull reminds

About the Author

Dr. Barbara Schubert is a Reading Recovery trainer and literacy coach trainer in the Center for Literacy at the University of Arkansas at Little Rock. She is a respected educator, author, consultant, and leader in the fields of literacy and cross-cultural understanding. The recipient of many field study grants, including Fulbright–Hayes Fellowships to West Africa and to China, Barbara is a past president of both the California Reading Association and the Santa Clara County Reading Council.

References