Pause a moment and try to recall your very best classroom learning experience as a student. Here are a few prompts to help you recall that moment: Where were you? Who was the teacher? What was the subject or course? What role did the teacher play in this experience? What actions, mental and physical, were required of you? Do you remember what you learned? Do you remember how you felt? What was it about the experience that made it a great learning experience? What was happening in your brain during this learning experience?

The answer to this last question is the focus of cognitive neuroscience, the field of research of how the human brain learns. According to current research in this area, the human brain is undergoing a physiological change when learning occurs, involving physically changing neuronal networks in the brain [see James Zull’s The Art of Changing the Brain (2002) for a more complete discussion of neuronal networks and learning]. Learning engages the whole body. Movement, attention cycles, chemicals, and foods modulate learning. Are there optimum conditions for achieving the changes in the brain that define learning? Proponents of “brain-based” or “brain/mind” learning, the learning theory based on the structure of the brain, answer this last question affirmatively.

Renate and Geoffrey Caine, authors of Making Connections: Teaching and the Human Brain (1994), and Unleashing the Power of Perceptual Change: The Potential of Brain-based Teaching (1997), propose the following brain/mind principles as a framework for “selecting the methodologies that will maximize learning and make teaching more effective and fulfilling”:

1. The brain is a complex adaptive system, and body and mind work together naturally. Humans learn more effectively when learning experiences engage the use of their senses.
2. The brain is a social brain. It develops better in concert with other brains; humans learn better when their social nature is engaged.
3. The search for meaning is innate. The need to make sense of things drives learning.
4. The search for meaning occurs through patterning, the meaningful organization and categorization of information. Humans learn when new patterns are linked to what they already know.
5. Emotions are critical to patterning. They drive attention, meaning and memory. Humans learn best when appropriate emotions are elicited by their experiences.
6. The brain/mind simultaneously perceives and creates parts and whole. Humans learn more effectively when they are given the sense of the whole that links the facts and information of a learning experience.
7. Learning involves both focused attention and peripheral attention. Humans learn from context as well as from directed attention.
8. Learning always involves conscious and unconscious processes. Learning occurs at three levels: conscious attention to a problem, unconscious incubation, and focused use of successful learning strategies by the learner.
9. Humans have at least two ways of organizing memory: dynamic memory that is engaged in everyday experience and rote memorization.
10. Learning is developmental. Humans develop at different ways and rates; performance is the best evidence for future learning.

Helping Students Put Their Best Brains Forward
by Elizabeth Morrison

(Continued other side)
11. Complex learning is enhanced by challenge and inhibited by threat. Humans learn more effectively in a supportive, empowering and challenging environment.

12. Every brain is uniquely organized. Humans learn more effectively when their unique abilities are engaged.

Caine and Caine identify three interactive teaching elements that are based on these principles and set the stage for complex learning to occur; these are the “fundamental elements of great teaching” (1997). The most effective teaching will integrate one or more of the twelve principles listed above into some form of dynamic interaction where the student feels a sense of involvement in the process on multiple levels.

1. Relaxed Alertness—Creating the optimal emotional climate for learning. Caine and Caine define this as the optimal emotional state for learning moderated by the fear and pleasure center in the brain, consisting of low threat and high challenge.

2. Orchestrated Immersion in Complex Experience—Creating optimal opportunities for learning. The teacher creates a learning environment that places learners in a complex, authentic experience. Learners interact with knowledge in ways that are concrete, making connections to what is already stored in their brains. Learners are required to do something with what has been learned. A Spanish class where no English is allowed is an example of orchestrated immersion.

3. Active Processing of Experience—Creating optimal ways to consolidate learning. The learner engages in regular, active processing of information to consolidate and connect it to prior learning. Through questioning and feedback from teacher and peers, students are required to think deeply, identify characteristics and relationships, analyze situations, make critical decisions and communicate their understanding.

Communications Professor Jenny Britton teaches English for Academic Purposes (EAP) and Reading on Valencia’s west campus, and she has been researching and using principles of brain/mind learning for several years. Her approach in the classroom illustrates the practical application of these principles and elements. When introducing a new topic in EAP, Britton always gives the big picture, and then gives an example of where the topic is used in the larger context (principle 6). She breaks topics into parts, gives a five-minute presentation, and then gives students down time for practice, discussion and consolidation (principle 7 and teaching element 3, active processing of experience).

“I’ve really started thinking, ‘What are the emotional things that are going on with my students when they’re completing an exercise?’”

- Communications Professor Jenny Britton

Britton has observed that the effect of the emotional content of the environment is key to learning in her classes (principle 5). Based on what she has learned and observed, she says, “I’ve really started thinking, ‘What are the emotional things that are going on with my students when they’re completing an exercise?’” She has discovered that giving students a sense of choice promotes positive emotions. Says Britton: “I used to choose words for my students based on their frequency of use and based on the university word list...I now let them choose words for their target vocabulary [based on specified criteria], and they are a lot more willing to go to the dictionary, look up the definitions, make flash cards—if they’re choosing it, they’re happier.” Britton also finds a little stress can be a powerful learning tool: “Where there is something I really want them to know, I create a fair amount of stress and have a pop quiz. What I find is once they take that pop quiz, those who ‘bomb’ it do much better by the time they get to the mastery test. I make sure the experience is not a threat, because they know if they have flunked one area on the pop quiz and do better on the mastery test, the quiz score is dropped (teaching element 1, relaxed alertness).”

“What a teacher’s art is, is figuring out ways to get students to learn without negative stimuli coming in.”

- Communications Professor Jenny Britton

Professor Britton has found that the repetition of drill and practice is necessary for her EAP students to commit to memory the vocabulary (taken from the 807 university word list items) necessary for them to achieve the reading skills they need to succeed academically (principle 9). Says Britton, “The research shows if you focus more on vocabulary, to make it automatic so it is in long term memory, students are then able to use the frontal brain capacity to acquire reading skills such as determining style and bias of a reading passage...but if they don’t know the words on the page, they can’t do any of that.” Britton is undertaking the “Herculean project” of writing a unit of drill and practice exercises to build vocabulary from the university word list with different kinds of modalities that her students can access online.

Britton also uses competitive grammar games, such as identifying parts of speech or tenses, with prizes awarded to the winning team (principles 1, 2, 11); students are enthusiastic participants. Says Britton: “What a teacher’s art is, is figuring out ways to get students to learn without negative stimuli coming in.”

Back to your best learning experience: Did you feel relaxed alertness—low threat and high challenge? Did the teacher create a learning environment that placed you in a complex, authentic experience? Did you process information to consolidate the new experience and connect it to prior learning? Can you replicate the experience for your students? Using brain/mind based principles, the answer to the last question is yes!

References:


Caine Learning Institute, “What is Brain/Mind Learning?” http://www.cainelearning.com


