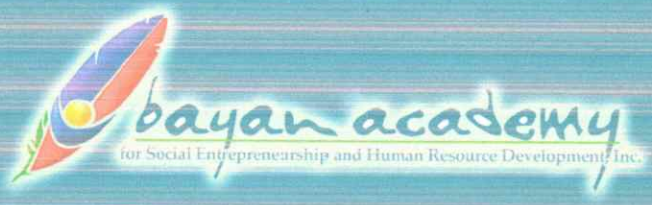

A Leadership Training Development Program

Becoming Whole Brain Leaders

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WHOLE BRAIN THINKING AND LEARNING

By: Dr. Eduardo A. Morató, Jr.

> "The human brain is an enchanted loom where millions of flashing shuttles weave a dissolving pattern, always a meaningful pattern, though never an abiding one, a shifting harmony of sub patterns. It is as if the Milky Way entered upon some cosmic dance."
>
> - Sir Charles Sherrington

> "In each human brain, there are an estimated one million, million (1,000,000,000,000) brain cells. Each brain cell (neuron) contains a vast electrochemical complex and powerful micro data processing and transmitting system that, despite its complexity, would fit on the head of a pin."
>
> - Tony Buzan

Our brains are like sponges which receive a gazillion bits of information. Some effort is required to transform these data stimuli into patterns of thinking. The more we repeat patterns of thinking, however, the less our brains resist them, and the easier it is for us to remember and favor them. More likely than not, these are the patterns we would prefer to use for the rest of our lives.

Some brains may be more absorptive than others but it does not mean that less absorptive brains cannot learn. It may just take longer. Perhaps, the right neural pathways have not yet been explored by the learner who may have different preferences, or dispositions if you will, on how to learn. Some brains may prefer certain ways of learning over others because it is more fun and easier for them to learn that way.

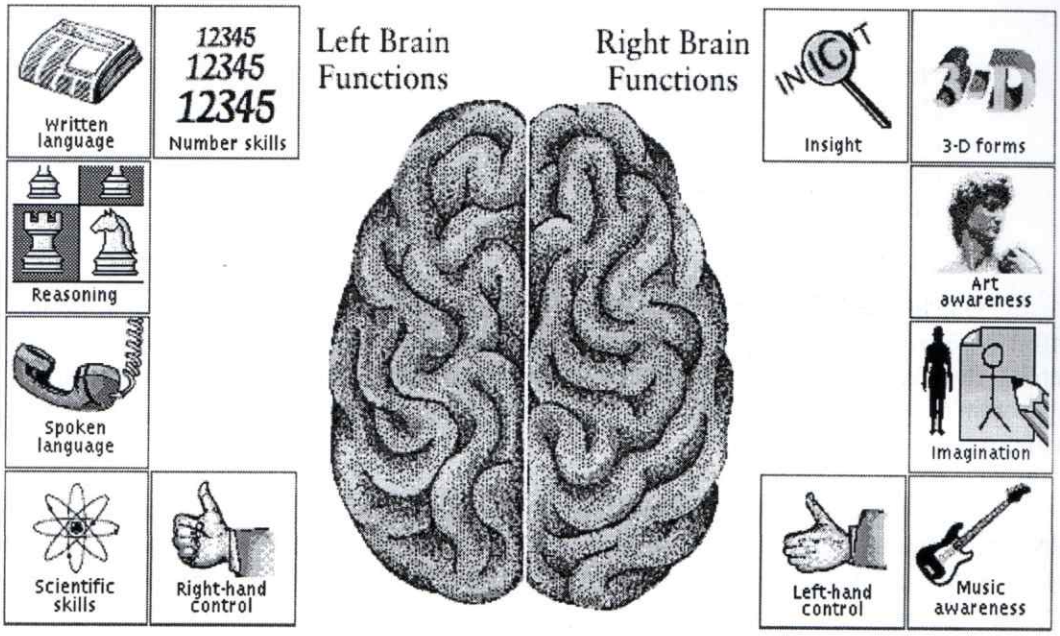
The great learner is one who develops many neural pathways or ways of learning. The superbrain is one which connects and interconnects all of life's learnings. In his book, "The Forming of Natural and Artificial Intelligence," Professor Peter Kouzmich Anokhin concluded his sixty years of research with these words, "We can show that each of the ten billion neurons in the human brain has a possibility of connections of one with twenty eight thoughts after it. If a single neuron has this quality of potential, we can hardly imagine what the whole brain can do. What it means is that the total number of possible combinations/permutations in the brain, if written out, would be 1 followed by 10.5 kilometers of thoughts! No human yet exists who can use the potential of his brain."

"I HAVE TWO BRAINS, THE LEFT AND THE RIGHT"

In the late 1960s, Nobel laureate Dr. Roger Sperry, with the help of his students Michael Gazzaniga and Jerre Levy, announced the findings of their research on the most evolved area of the brain, the cerebral cortex. Epileptic patients with life-threatening seizures were subjected to an operation in which the connections between the left and

right brains were cut. As a result, the two hemispheres of the brain were isolated from each other. The left brain controlled the right part of the body while the right brain controlled the left. Since the two hands of the split brain patients were controlled by the opposite sides of their brains, the functionality of the left and the right hemispheres of the brain could be studied. (See Figure 1)

Figure 1



Numerous experiments revealed that the two halves of the brain thought in different ways. The right hemisphere seemed to think in images, visual patterns and shapes and favored spatial thinking, rhythm, imagination, daydreaming, color, dimension and wholeness. The left hemisphere appeared to prefer a different set of mental skills that had to do with words, numbers, logical, sequential ordering, analysis, classifying and arranging.

Research undertaken by other scientists have confirmed the conclusions of Sperry but they observed that, while each hemisphere is dominant in a particular set of mental skills, both sides of the brain are skilled in all areas of thinking. The left and right brain faculties are actually contained throughout the cortex. An impaired left or right brain can activate the mental faculties that have been rendered less dominant in one side of the brain.

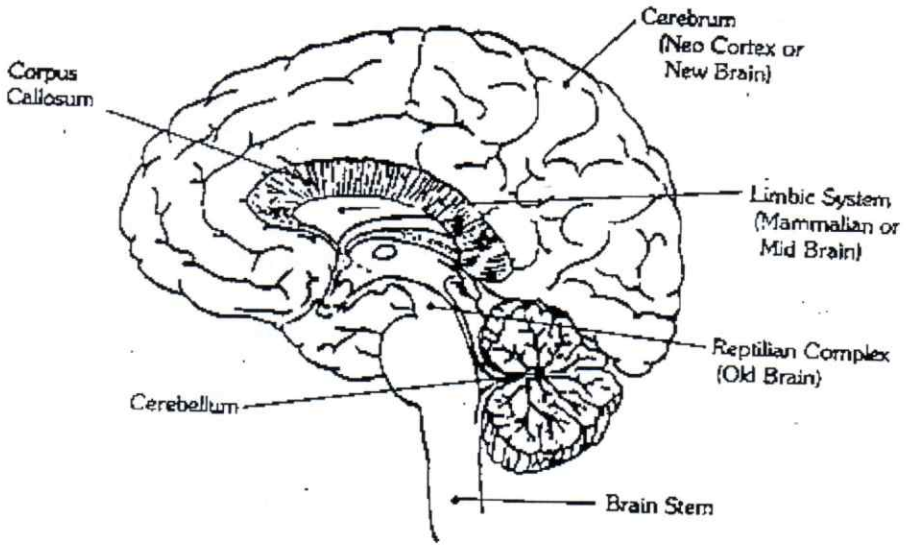
What the subsequent researches suggest is that learners can try to practice the different mental faculties of the left and right hemispheres because there is no such thing as just a right brained or left brained person.

The educator should, therefore, endeavor to activate all the mental skills that the right and left brain hemispheres manifest. The more neural pathways in the brain are built, the greater the learning for the student. The more the right and the left hemispheres are connected to one another, the more the learner learns. Educators should remember that students merely retain a small fraction of the learning that they only **read**, merely a fraction of what they only **hear**, just a fraction of what they **see**. However, if a learner **reads, hears, sees** and **experiences** a lesson, the greater are the chances of learning and retaining that learning for a long period of time.

"I HAVE THREE BRAINS: REPTILIAN, LIMBIC AND NEOCORTEX"

Dr. Paul MacLean, former director of the Laboratory of the Brain and Behavior (US Institute of Mental Health), looked at the evolutionary development of the brain and posited his "triune brain theory." As animals evolved, layers of the brain also evolved. In humans, Dr. MacLean claimed, the three layers of the brain developed: the reptilian brain (R-complex), the limbic brain and the neocortex. For MacLean, while all three layers of the brain interact constantly, they have separate functions. (See Figure 2)

Figure 2



The reptilian brain is composed of the brain stem and the cerebellum. Its primary job is to maintain bodily functions and trigger the instinct to fight or to flee. The cerebellum is in charge of movement, while the brain stem controls digestion, reproduction, circulation, breathing and the need to stay alive. Since the reptilian brain is designed for physical survival, this is what links humans to all animals. It perpetuates the

species, establishes social dominance in groups and sets territorial boundaries. The reptilian brain governs the hard-wired patterns of human behavior.

The second brain to evolve is the limbic system, primarily concerned with emotions. The limbic brain includes the amygdala (which attaches events to emotions) and the hippocampus (which converts information to long term memory and memory recall). The amygdala arouses emotions such as anger, compassion, fear and pity and tempers the repetitive, ritualistic and instinctive habits of reptiles. The hippocampus aids the brain in selecting what memories to store, most probably by affixing emotional content to them.

In the animal kingdom, the limbic system is highly developed among mammals, which need to take care of their young over a long period of time. Elephants, chimpanzees and humans are known to care of even their very weak offsprings. Social bonding is also very strong among mammals. They are present in other species as well, but not to a high emotional state. It is necessary for mammals, which bear only one or several offsprings, to act in this manner. Fish and insects can lay millions of eggs, obviating the need for emotional bonding.

The neocortex, or the cerebral cortex, accounts for over 80% of the brain. It is responsible for verbal, mathematical and logical thinking, as well as the cognitive and problem solving functions. It allows humans to do long range planning and forecasting, to discern relationships and patterns of meaning, to create personal metaphors or models of understanding, and to process emotions in a "sensible" manner. The neocortex is highly developed in human beings, hence our dominance in this planet. The neocortex allows us to think and reflect about ourselves, hypothesize on new possibilities, concoct new paradigms, and continuously improve upon ourselves in a geometric pattern.

MacLean's triune brain theory suggests that educators (and managers in the work setting) can tap into the instinctive, emotional and intellectual faculties of learners.

The basic need to survive makes human beings naturally competitive for food, for mates, for territory, for shelter and for a higher ranking in the pecking order of dominance. Games, contests and performance scoring systems evoke the "fight or flee" or "reptilian" instincts from learners.

However, the environment should not be so competitive as to scare most of the learners to flee. In order to reduce the number of "fleeing learners," the educator should rely on the limbic system for emotional and social bonding among learners. Teams can be formed to approximate equal chances for the competitors. Team identification strengthens the "fighting spirit" and allows members of the team to teach, tutor, and mentor one another. This has value in itself. However, but higher order thinking is required to push the teams to achieve their best.

The neocortex plays an excellent role in goal setting, strategizing, implementing and achieving results.

In the world of business or public governance, MacLean's theory applies perfectly. The reptilian brain is superactivated because corporations fight to thrive and to survive. Fleeing is, oftentimes, not an option. Institutional morale, organizational cohesion, and culture building are essential to raise levels of energy, dedication and commitment. The corporation or institution then becomes a community. It becomes the second family. Hence, the limbic brain also becomes superactivated. Finally, the neocortex is driven full speed ahead as corporations, countries and development agencies strive to be the best, the most competitive, the cheapest, the sturdiest, the cleanest, the biggest, and all the other superlatives they want to become.

"I HAVE FOUR BRAINS: LEFT CEREBRAL, LEFT LIMBIC, RIGHT LIMBIC, RIGHT CEREBRAL

Dr. Ned Hermann adds his theory on brain dominance to the growing discourse on the functioning of this thinking organ. He combined the theories of Dr. Roger Sperry and Dr. Paul McLean to postulate that the brain specialized functionally into four distinct quadrants. People manifest their brain preferences in the subjects that they enjoy most in school and in the careers that they pursue. Oftentimes, they overdevelop a preferred brain function over their lifetime.

Hermann maintains that the two halves of the brain are not used in the same way and with the same frequency by people. Each of the cerebral hemispheres has one-half of the limbic system lodged into it. Since the limbic system is the control center that regulates basic bodily functions, chemical balances, heart rate, blood pressure, hormones and emotions, it plays a crucial part in learning. From this discovery, Hermann divided the brain into four, with each quadrant exhibiting a distinct learning preference. He designed his own Hermann Brain Dominance Instrument (HBDI). He drew a metaphorical model of the four-quadrant brain of thinking preferences. This model is depicted in the illustration below. (See Figure 3) The left side of the model is occupied by the left brain. On the top left quadrant is the Left Cerebral brain preference. On the lower left quadrant is the Left Limbic brain preference. On the lower right quadrant is the Right Limbic brain preference, while the upper right quadrant is the Right Cerebral brain preference. In the order presented (from upper left going counterclockwise to upper right) the quadrants are labeled simply as A, B, C, D.