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Subject Code: CORE12	Subject Title: Personal Development
Module No: 7	Topic: The Powers of Mind

I. OVERVIEW

Good day Academians, in this module you will learn how powerful your mind is. You will also know that your brain is an amazing body structure because it performs a lot of tasks. It is the control center of your body. Let us now know the parts of the brain and their specific functions.

A. Learning Competencies

Learners will be able to:

- Discuss that understanding the different parts of the brain, processes and functions may help in improving thoughts, behavior and feelings. **EsP-PD11/12PM-Ig-6.1**

B. Specific Learning Objectives

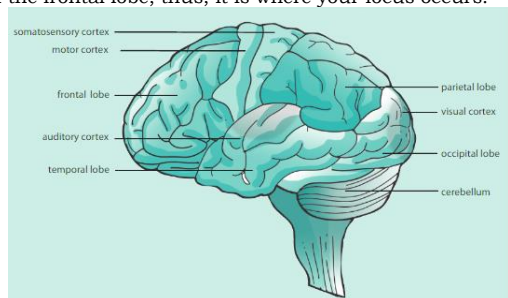
The learners will be able to:

- Identify how the different parts of the brain, processes and functions may help in improving thoughts, behavior and feelings.

II. LET'S BEGIN

Exterior Parts of the Brain

The exterior parts of the brain are the following: (1) frontal lobes, (2) temporal lobes, (3) occipital lobes, (4) parietal lobes, and (5) motor cortex and somatosensory cortex (Sousa, 2011). The frontal lobe is involved in planning and thinking. It is the rational and executive control center of the brain, which plays an important role in monitoring higher-order thinking, directing problem solving, and regulating the excesses of the emotional system. It also contains the self-will area or what others call as personality. According to Geday and Gjedde (2009), most of your working memory is located in the frontal lobe; thus, it is where your focus occurs.

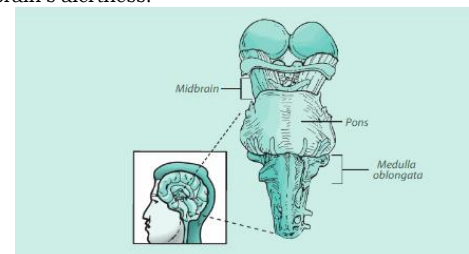


Your frontal lobe slowly matures until adulthood, which reveals that your capacity to control the excesses of the emotional system during teenage years is not yet fully functional during adolescence (Dosenbach et al., 2010). This implies that adults are more likely to control their emotions better than you; hence, the tendency that you resort to risky behaviors is high. Trauma to the frontal lobe causes dramatic, and sometimes permanent, behavior and personality changes (Sousa, 2011). Your temporal lobes, on the other hand, are found above the ears. They deal with sound, music, face, and object recognition, and some parts of long-term memory. The speech centers are located at the left temporal lobe. Located at the back of your head are the paired occipital lobes, which function for visual processing. At the top of your occipital lobes are the parietal lobes, which are involved mainly with spatial orientation, calculation, and certain types

of recognition (Sousa, 2011). The motor cortex is the part of your brain that controls your body movement; it also works with the cerebellum to coordinate the learning of motor skills. The somatosensory cortex processes the signals of touch, which are received from other parts of the body (Sousa, 2011).

Some Interior Parts of the Brain

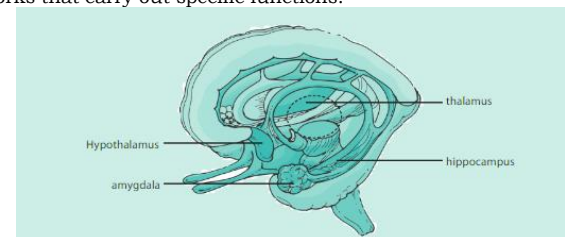
The brain also has distinct interior parts. Your brain stem resembles the entire brain of a reptile; hence, it is sometimes referred to as the reptilian brain. It consists of the midbrain, pons, and medulla oblongata. Of the 12 cranial nerves (olfactory, optic, oculomotor, trochlear, trigeminal, abducens, facial, vestibulocochlear, glossopharyngeal, vagus, and accessory nerves), only the olfactory and optic nerves do not end in the brain stem. Thus, your vital body functions, such as heartbeat, respiration, body temperature, and digestion, are monitored and controlled by your brain stem. Also, the reticular activating system (RAS) is located in the brain stem, and it is responsible for your brain's alertness.



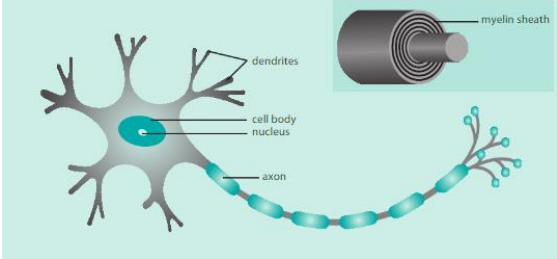
Located above your brain stem and below the cerebrum is the limbic system, composed of the structures that have different functions such as generation of emotion and processing of emotional memories. Its location allows the interplay of emotion and reason.

The four parts of the limbic system which are important to learning and memory are (1) thalamus, (2) hypothalamus, (3) hippocampus, and (4) amygdala (Sousa, 2011). Most sensory information goes through the thalamus and directed to other parts of the brain for more processing. The thalamus is involved in many cognitive activities, including memory. Further, as part of the limbic system, the hypothalamus is in charge of monitoring

the internal systems to maintain homeostasis or the normal state of the body. It moderates different body functions, which include sleep, body temperature, and food intake, by controlling the release of some hormones. The hippocampus, on the other hand, does an important role in consolidating learning and converts information to the long-term storage regions. It is significant in creating the meaning of information by comparing those that are at working memory and those that are stored experiences. The hippocampus, according to Balu and Lucki (2009), is capable of neurogenesis, the production of new neurons, which has a significant effect on learning and memory (Deng, et. al., 2010). Another brain structure included in the limbic system is the amygdala, which is known to take part in emotions, especially fear. It plays an important role in regulating your interactions with your environment that can help you survive, such as whether you attack, escape, mate, or eat (Sousa, 2011). It encodes the emotion whenever a memory is kept in the long-term storage. The emotional element of a memory is stored in the amygdala; hence, the emotions related with a specific memory are recalled whenever the experience is remembered (Squire and Kandel, 1999). This implies that you remember situations more when your emotions are triggered by them. The cerebrum is the largest brain structure, representing nearly 80 percent of the brain by weight (Sousa, 2011). It has folded bulges called gyri, and it is marked by deep furrows called fissures and shallow ones called sulci (singular: sulcus). The cerebrum is divided into two halves, called the cerebral hemispheres, by a sulcus that goes from front to back. The two hemispheres are connected by the corpus callosum, which is made up of more than 200 million nerve fibers that function as the bridge by which the hemispheres communicate with each other and coordinate activities. Your right cerebral hemisphere is in charge of the left side of your body, while your left cerebral hemisphere is in charge of the right side. The hemispheres are covered by thin but tough laminated cortices, the brain's gray matter. This is where most of the actions of the brain take place such as thought, memory, speech, and muscular movement. The neurons in the cortices form columns that branch and extend through the cortical layer into a dense web below known as the white matter, where neurons connect with each other to form neural networks that carry out specific functions.



Located just below the rear part of the cerebrum and right behind the brain stem is the cerebellum. It accounts for 11 percent of the weight of your brain. It is a convoluted and highly organized brain structure that contains more neurons than all the other brain parts put together. It is the cerebellum that coordinates movement. It monitors impulses from nerve endings in the muscles; hence, it plays a key role in the performance and timing of complex motor tasks. It controls your movement when you shoot or bat the ball, when you do your dance movements, or when you put food inside your mouth when you eat. It stores the memory of automatic movements such as touch typing and knife skills. Your performance in doing your tasks is improved by enhancing your speed and accuracy with lesser effort through automation. It is also involved in mental rehearsal of motor tasks, which is essential in improving performance and becoming more skilled (Sousa, 2011). The brain is a complex organ. It performs various tasks such as planning and thinking, learning and memory, motor coordination and movement, motivation, perception, and processing of emotions.



Your brain is composed of a trillion of brain cells, which may be nerve cells or glial cells. The nerve cells, which are called neurons, are the functioning core for the brain and the entire nervous system. There are about 100 billion neurons, which allow the brain to process the electrical impulses coming from all over the body, to store your experiences and those details involved, to learn languages, and to combine information. Neurons are formed through a process called neurogenesis. Each neuron consists of a nucleus, as well as the neuron's cell body, dendrites, and axons. The dendrites receive electrical impulses from other neurons and transmit the message to another neuron through the long fiber, called the axon, by an electrochemical process. The axon is surrounded by a layer called the myelin sheath, which insulates it from other cells and increases the speed of impulse transmission. Neurons are not directly in contact with one another. Between the dendrite of one neuron and the axon of another neuron, there is a small gap of about a millionth of an inch, which is called a synapse. The neuron sends out the electrical impulses through the axon to the synapse where neurotransmitters or the chemicals that either excite or inhibit the neighboring neuron. Some of the common neurotransmitters are epinephrine, norepinephrine, serotonin, and dopamine. According to Sousa (2011), learning occurs by changing the synapses, so that the influence of one neuron on another also changes. Recent studies show that people whose occupations demand more complex skills possess a greater number of dendrites in their neurons. This greater number in dendrites facilitates more connections among neurons, which result in higher capability to store learning. On the other hand, the glial cells hold the neurons together and filter harmful substances from affecting the neurons.

III. LET'S DIG DEEPER
BRAIN LATERALIZATION

One of the wonders of the human brain is its characteristic ability to integrate dissimilar and seemingly unconnected activities that are happening in specialized areas of your brain into a meaningful experience. The corpus callosum, which acts like a bridge between the two cerebral hemispheres, allows the unification of awareness and shares memory and learning. There are pieces of evidence showing that certain activities are mainly limited to only one hemisphere of your cerebrum. Such operation is called specialization. On the other hand, each hemisphere stores and processes information in different ways or functions separately from each other. This is called laterality (Sousa, 2011). The table below shows the specific functions of the hemispheres.

Left Hemisphere Functions		Right Hemisphere Functions
Connected to right side of the body	C	Is connected to the left side of the body
Processes input in a sequential and analytical manner	O	Processes input more holistically and abstractly
Is time-sensitive	R	Is space-sensitive
Generates spoken language	P	Interprets language through gestures, facial movements, emotions, and body language
Does invariable and arithmetic operations	U	Does relational and mathematical operations
Specializes in recognizing words and numbers (as words)	S	Specializes in recognizing faces, places, objects, and music
Is active in constructing false memories	C	Is more truthful in recall
Seeks explanations for why events occur	A	Puts events in spatial patterns
Is better at arousing attention to deal with outside stimuli	L	Is better at internal processing
	O	
	S	
	U	
	M	

The table above shows that the left hemisphere of your brain recognizes words, and that it recognizes words, letters, and numbers written literally (Ellis, et. al., 2007). It analyses situations, evaluates facts in a logical manner, perceives visual information, and detects time and order. It performs simple arithmetic calculations (Zamarian et al., 2009). One of its specialties is to arouse your attention so that you are able to deal with outside stimuli. Another function of the left hemisphere is to process positive emotions such as joy (Hecht, 2010). The right hemisphere, on the other hand, gathers information more from images than from words. It tends to look for visual patterns. It interprets language through its meaningful components such as body language, emotional content, and tone of voice (Campbell, 2006). It is more in charge of spatial perception; recognizing places, faces, and objects; and focusing on relational and mathematical operations such as geometry and algebra. Last, the right hemisphere functions in handling negative emotions such as sadness and depression (Hecht, 2010).

Most people probably learned in high school about the difference between the left and right hemispheres of the brain. It is reasonable of course to expect that this information has been buried deep within the recesses of people's minds never to return again because they are not brain surgeons in the first place. It is not critical to anyone's success to understand the concepts behind how the brain functions. However, having knowledge about the brain may provide people with a greater sense of confidence in themselves and in their own ability to develop their skills as a person.

THE WHOLE BRAIN THEORY

In 1976, Ned Herrmann researched the brain as the source of creativity Inspired by the researches of Roger Sperry, Paul MacLean, Joseph Bogen and Michael Gazzanaga, Herrmann identified four distinct types of thinking each approximately corresponding to one of the brain structures. The result of this research is the Herrmann Whole Brain Model. The model was developed by Ned Herrmann, while head of Management Development at General Electric.

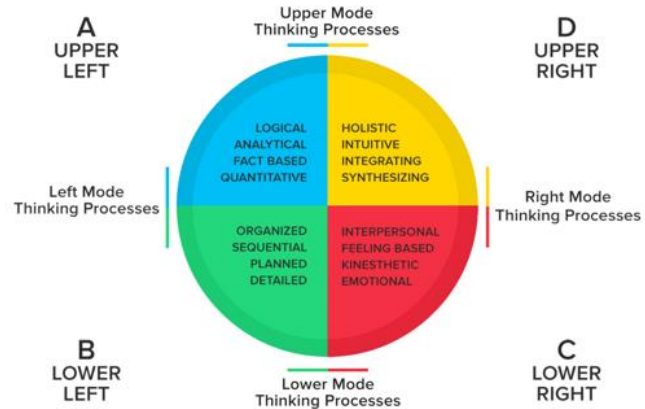
In August, 1979, following many tests, comprehensive research, and tons of data, Herrmann had developed a valid self-assessment that enables individuals to comprehend their own thinking style preferences later called the Herrmann Brain Dominance Instrument (HBDI).

People obviously have diverse approaches on how they distinguish and digest information, make decisions, and solve problems. As soon as the individual understands his/her thinking style preferences, the door is unblock to enhanced communication, leadership, management, problem solving, decision making and other aspects of personal and interpersonal development.

The Whole Brain Model is a mental model that describes thinking preferences. These are the ways of thinking that pleases people the most and appear normal for them at this point in their lives. These means of thinking can alter, frequently as a consequence of momentous emotional experiences life transitions and other important insights. Thinking preferences describe the patterns of what people choose to pay attention to and what people do not wish to pay attention to.

Thinking preferences can be different than skills or the content of work or behavior, depending upon the circumstances. When people think or function differently than their favorites, even if they have exceptional skills, it is more possible that they will find it somewhat tense and consuming more of their energy.

FIGURE 1: THE WHOLE BRAIN MODEL BY NED HERRMAN



The four thinking styles in the Whole Brain Model are:

1. Logician - Analytical, mathematical, technical and problem solving.
2. Organizer Controlled, conservative, planned, organized and administrative in nature.
3. Communicator - Interpersonal, emotional, musical, spiritual and the "talker" modes.
4. Visionary-Imaginative, synthesizing, artistic, holistic and conceptual modes.

Whole brain technology provides a basis for measuring the different preferences by determining the degree of dominance that has developed among the four thinking structures of the brain. All four are massively interconnected. Taken together, these represent a whole brain divided into four equal quadrants: upper left (A), lower left (B), lower right (C), and upper right (D), upper right (D). These four quadrants (A, B, C, D) are characterized as: A-rational, B-safekeeping, C-feeling, and D-experimental.

TABLE 2: DIFFERENCES IN PROCESSING MODES

	A UPPER LEFT	B LOWER LEFT	C LOWER RIGHT	D UPPER RIGHT
Descriptors	Logical Factual Rational Critical Analytical Quantitative Authoritarian Mathematical	Technical reader Data collector Conservative Controlled Sequential Articulate Dominant Detailed	Musical Spiritual Symbolic Talkative Emotional Intuitive(regarding people) Reader (personal)	Intuitive (regarding solutions) Simultaneous Imaginative Synthesizer Holistic Artistic Spatial
Skills	Problem solving Analytical Statistical Technical Scientific Financial	Planning Regulatory Supervisory Administrative Organizational Implementation	Expressing ideas Interpersonal Writing (correspondence) Teaching Training	Integrative Visualizing Causing change Conceptualizing Generating ideas Trusting intuition
Struggle with	Expressing emotions Lack of logic Vague, imprecise concepts or ideas	Risk Ambiguity Unclear expectations and directions	Too much data and analysis Lack of personal feedback Pure lecture, lack of participation	Time management and deadlines Administration and details Lack of flexibility

TABLE 3: QUADRANT A-UPPER LEFT

DESCRIPTORS	DEFINITION
Analytical	Breaking things or ideas into parts and examining them to see how they fit together.
Challenging	Questioning, playing the “devil’s advocate”
Critical	Exercising or involving careful judgement or evaluating (judging the feasibility of an idea)
Definitive	Clear, exact free from ambiguity or obscurity

Direct	Frank, to the point.
Factual	Concerned with that can be documented or actually happened.
Intellectual	Guided by objective, rational processes rather than subjective, emotional processes
Logical	Able to reason deductively from what has gone before.
Mathematical	Perceiving and understanding numbers and being able to manipulate them to an end.
Objective	Unbiased, based on facts and not affected by personal feelings or prejudice.
Problem-solver	Able to find solutions to difficult problems by identifying and resolving key issues.
Quantitative	Oriented towards numerical relationships; inclined to seek exact measures.
Rational	Making choices on the basis of reason as opposed to emotions.
Realistic	Concerned with what is factual or probable rather than speculative or imagined.
Rigorous	Having a thorough and detailed approach to problem solving.
Technical	Having a special, practical knowledge of a mathematical or scientific subject.

Each person has thinking preferences, some are intense, while others are just in the middle. Those preferences extend into dominances. Without the consciousness of those preferences, one may fall victim to blind spots that has access to all four ways of thinking. Executing whole brain thinking means being capable to completely influence one's own inclinations extended to other when it come to other people's ways of thinking. Except whole brain thinking is a reminder that each quadrant when necessary, and adapt to and take advantage of the preferences of those around to improve performance and results.

TABLE 4: QUADRANT B-LOWER LEFT

DESCRIPTORS	DEFINITION
Administrative	To manage, supervise, or direct. Expresses oneself clearly, readily, and effectively.
Articulate	Expresses oneself clearly, readily, and effectively.
Controlled	Restrained, holding back, in charge of one's emotions.
Detailed	Paying attention to the small items or parts of an idea or project.
Disciplined	Self-controlled, able to follow through with plans.
Dominant	Commanding; prevailing over others.
Industrious	Hard working and diligent.
Organized	To arrange or form into a coherent unit of functioning whole.
Persistent	Tenacious; sticking to a task until it is completed.
Planner	Determining the necessary steps to achieve a desired outcome.
Practical	Disposed to action rather than to speculation or abstraction.
Procedural	Establishing and following spelled out policies and processes.
Punctual	Always on time; time conscious and concerned with meeting deadlines
Safekeeping	Cautious, careful, protective; concerned with consequences.
Sequential	Dealing with things and ideas after another or in order.
Structured	Being concerned with systematic frameworks; operating within the set boundaries.

TABLE 6: QUADRANT C-LOWER RIGHT

DESCRIPTORS	DEFINITION
Cooperative	Working or acting together willing for a common purpose.
Emotional	Free things deeply
Emphatic	Able to understand how another person feels and able to communicate that feeling
Enthusiastic	Giving yourself completely to whatever engages you.
Expressive	To show, manifest, or reveal one’s opinion.
Friendly	Kindly, amiable, cordial, genial and helpful.
Harmonizing	TO work toward agreement or feeling of connection with others.
Helpful	Giving and rendering aid, assistance, or service
Interpersonal	Able to develop and maintain relationships between people.
Musical	Having an interest in or a talent for music.
Passionate	Being deeply involved or having intense feelings towards ideas or causes.
Receptive	Willing and inclined to receive suggestions and offers to others.
Responsive	Willing to get involved; extending oneself to others.
Spiritual	Having to do with sacred matters as apart from material things.
Trusting	Willing to rely upon and believe in the integrity of others; assuming a positive outcome.

TABLE 5: QUADRANT D-UPPER RIGHT

DESCRIPTORS	DEFINITION
Adventurous	Interested in discovering or investigating the unknown
Artistic	Appreciating or creating painting, music, poetry, dance etc.; sensitive to pleasing elements of design.
Conceptual	Able to grasp key elements of thought and generalize abstract ideas.
Creative	Able to make unique connections and put things together in a new way.
Curious	Inquisitive; eager to learn or know.
Exploratory	Investigate new arenas, concepts, ideas and points of view.
Flexible	Adaptable, able to see things in a number of different ways, willing to change
Holistic	See the big picture and understand how parts interconnect to form the larger whole.
Imaginative	Able to think beyond the bounds of reality
Integrating	Able to combine pieces, parts and elements of ideas, concepts and situations into a unified whole.
Intuitive(ideas)	Knowing something without consciously thinking it out; having instant understanding without the need for facts or proof
Open-minded	Receptive to new ideas or differing points of view
Risk-taker	Inclined or willing to take chances.
Simultaneous	Able to process more than one type of mental input or attend to more than one activity at a time.
Synthesizer	Able to unite separate ideas, elements, or concepts into a new whole.

Dominant thinking in one of the four thinking styles causes the development of thinking preferences. Then these thinking preferences establish people interests, foster the development of competencies, and influence career choices and ultimately work.

UNDERSTANDING THE LEFT AND RIGHT BRAIN

During the late 1960s, the idea of right brain and left brain thinking was developed from the research of an American psycho biologist Roger W. Sperry. He discovered that the human brain has two very different means of thinking composed of the right and the left brain. Sperry was awarded a Nobel Prize in 1981.

The shapes of these two parts are similar, but differences have been gradually found in their functions. The right brain is referred to as the analog brain. It is visual and processes information in an intuitive and simultaneous way. It controls the three which are the dimensional sense, creativity, and artistic senses. It looks first at the entire picture then the details. The left brain is also referred to as the digital brain. It controls reading and writing, calculation, and logical thinking. It is verbal and processes information in a logical and chronological manner. It looks first at the pieces then putting them as one to get the whole. For some reason, the right and left brain control the opposite side of the body, so the right brain controls the left side and processes what people see in the left eye while the left brain controls the right side and processes what the right eye sees. These two work together, to allow people to function as humans.

Each individual thinks in a certain way, has more interest in certain areas, and above and beyond all is most effective in certain ways. An accurate understanding of the left and right brain can help one to become more productive, efficient, and creative. It is also important to be aware that there are different ways of thinking, and by knowing what their natural preference is, so one can pay attention to the less dominant side to improve the same.

Although all people can make use of both sides of the brain in everyday lives, each relies on one side of the brain more than the other. This reliance is referred to as dominance which may appear among people in the style adopted in the process of learning and thinking. This dominant makes up for a big element of one's personalities.

The Right Brain

According to the left-brain, right-brain dominance theory, the right side of the brain is best at expressive and creative tasks.

Some of the abilities popularly associated with the right side of the brain includes:

1. Sees, thinks and processes information in concrete images, therefore, it does not use a step-by-step method to reach a conclusion.
2. The right brain is reality-based because it thinks in whole, concrete images; that is, it thinks in whole pictures and does not think in abstract or parts. Therefore, it cannot work easily with abstract symbols like words and numbers.
3. Thinks multi-dimensionally, or comprehending a subject on many different analytical levels. Therefore, a right-brained person will not fully understand a concept until all aspects of the subject are put together to form the whole image or conclusion.

4. Thinks emotionally, intuitively, creatively, globally and analytically
5. Reacts best to visual images, oral discussions and handling objects
6. May excel in music, art, drawing, athletics and coordinated physical movement.
7. May be naturally mechanically-minded always taking things apart, repairing or improving them without instruction or even coming up with new inventions.
8. Remembers faces, places and events very well but not the names.
9. May have a photographic memory for images, reading selections, oral discussions, places visited and musical works.

However, the right brain may also have difficulties in some areas like:

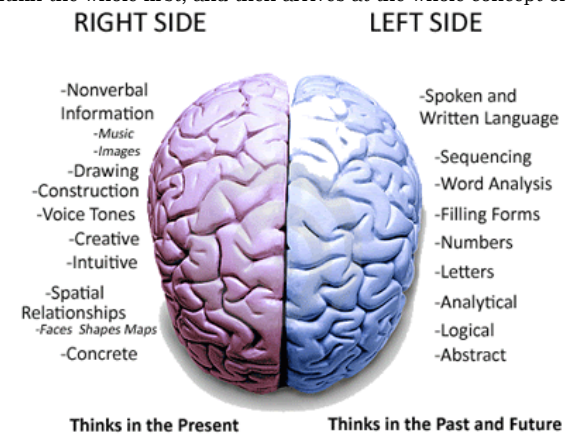
1. Understanding the parts of whole images without the whole object present. For example if a teacher is using an orange cut up into pieces to demonstrate fractions there should also be a whole orange in view of the student to keep the "whole" picture in their minds.
2. Thinking in sequences and has to be trained in sequencing skills, using concrete materials and visual aids. Examples of aids are: blocks with letters or numbers, flashcards, multiplication tables, coins for understanding money, clock faces with removable numbers, etc.
3. Focusing in organizing a large body of information such as a school project with written material, drawings, photos, references, and others. This is because a right-brained person is always using a multi-dimensional thinking process and can get confused where to start on a project and how to put it together in a logical, step-by-step format.
4. Verbal or language arts skills of hand printing, phonics, spelling, reading, writing sentences and paragraphs.
5. Understanding and working with mathematical concepts of time, measurements, size and weights, money, fractions, number facts, word problems, algebra and geometry.
6. Follow oral and written instructions without a visual demonstration. Needs all three senses involved: listening, seeing and touching.

The Left Brain

The left-side of the brain is considered to be proficient at tasks that engage logic, language, and analytical thinking.

Some of the abilities commonly connected with the left side of the brain include the following:

1. Thinks in abstract letters, numbers, written words and formulas.
2. Excels in mathematics, reading, spelling, writing, sequencing and the use of verbal and written language.
3. Is strongly verbal and reacts best to verbal input.
4. Responds well to phonics when learning to spell and read.
5. Handles sequencing of numbers, letters, words, sentences and ideas easily.
6. Does not need to visualize in whole, concrete images to understand ideas, both concrete and abstract.
7. Sees the parts within the whole first, and then arrives at the whole concept of a given idea.



HOW RIGHT BRAIN VS. LEFT BRAIN THINKING IMPACTS LEARNING

The brain makes use of both sides in mixing and matching each side's abilities for a fully-functional human brain. However, each person has a dominant side that leans more towards the behaviors of the respective side.

There are a number of characteristics, many of which could be considered personality traits that a person with either type of dominant side has:

1. Curriculum-In order to be more "whole-brained" in their orientation, schools need to give equal

weight to the arts, creativity, and the skills of imagination and synthesis.

2. Instruction-To foster a more "whole-brained" scholastic experience, teachers should use instruction techniques that connect with both sides of the brain. They can increase their classroom's right-brain learning activities by incorporating more patterning, metaphors, analogies, role playing, visuals, and movement into their reading, calculation, and analytical activities.

3. Assessment - For a more accurate "whole-brained" evaluation of student learning, educators must develop new forms of assessment that honor right-brained talents and skills.

How does right brain or left brain dominance affect how a learner performs in the classroom? Most classroom teaching styles use left brain strategies. This tends to support left brain dominant students, and can make learning not easy for right brain dominant students. Left brain learners are good at linear and sequential processing, like language and math. Left brain adolescent learners are also good at planning and following directions. These adolescents simply learn information in lecture-style, teaching approach. Right brain learners process information more holistically. They study by understanding the big-picture, not the details. They are inclined to be visual, not language oriented. This means they have more trouble following a lecture-style teaching approach. Right brain learners need to know why they are doing something. Right brain learners can gain from reviewing material before class to understand the bigger picture, and to understand the background for details that will be taught in class.

Left brain learners can easily articulate themselves in words. This is a large part of what is expected in class participation and in assignments. Right brain learners may know what they want to say, but frequently have difficulty finding the right words. A left brain learner tends to be good with symbolic language and mathematics, and can easily remember vocabulary words or math formulas. A right brain learner needs to see, feel, or touch the real object. Right brain learners like better hands-on activities, and need to draw out a math or other problem to understand it. They also need diagrams or illustrations to help imagine the problem or solution.

Right brain learners study visually, not by listening to a lecture-style class. They must take extensive notes, and use diagrams and drawings to make information more visual, to facilitate learning the information. They also have to make mental images of things they hear or read in order to memorize the information.

Left brain learners are good note takers and list makers. They are also good at planning and scheduling. This means they are good at completing assignments. Right brain learners are likely to approach things at random. They tend to not make study schedules, and hop around from one task to another with no consideration to priorities. Right brain learners may be late with an assignment, not because they were not working hard. It is for the reason that they were working on a lower priority assignment. Right brain learners need extra effort in reading instructions to make certain they understand the assignment. They also add effort in making assignment lists and study schedules.

Left brain learners are better at writing and spelling, since it involves sequencing and organizing of letters and words. Right brain learners need additional time to write a paper, and necessitate more revisions to get it to say what they want to say. Right brain learners must also depend more on spelling checkers and proof reading for their assignments. Right brain learners tend to be more creative, but have more problem than left brain learners with the mechanics of writing and communicating

Understanding whether adolescents are right-brain or left-brain learners can help improve their academic success during those crucial years when grades count toward high school and college. Knowing adolescents' learning style is helpful to parents, teachers, tutors and, most importantly, adolescents themselves. Adolescents need learning methods that align with their learning style. And if adolescents struggle to learn, this knowledge can ultimately improve self-esteem as they realize that low grades and a dislike of school may have more to do with a one-way-fits-all teaching method rather than with how smart they are.

Adolescents, like any other human beings are not absolutely right-brain thinkers or left-brain thinkers; there's a continuum. Even if adolescents are left-brain dominant, they should not be excluded from right-brain presentations, as a visual context can be helpful to everyone. Some of the great leaps in learning are made through right-brain teaching strategies.

Furthermore, whole-brain teaching strategies strike both sides of the brain. Music and soothing colors may be used to relax learners, so the emotional climate is more conducive to learning. Any kind of imaging technique, like visualization, drawing and drama, help reinforce learning and provide context.

Rather than labeling adolescents as smart or academically challenged, mentors must consider how they can better accommodate the differences in learning styles. With about half of the population who are right-brain dominant, educators should be open to learning methods that adjust for differences. Understanding the differences in right-brain and left brain thinking reinforces schools' shift away from relying completely on memorization.

Advantages of Using Both Sides of Your Brain

If your left brain is the dominant part of your brain you may have problems thinking in a creative way or in being intuitive while if your right brain is the dominant part you may have problems planning for your life or thinking logically. By learning how to use both sides of your brain you will take the advantages of both sides.

The following is what you should do in order to use both sides of your brain if you were left brained:

1. *Avoid using logic only* - If you were thinking of a problem or if you were about to make a decision, avoid using logic only, don't just try to gather information in an overly intensive way but instead gather as much information as you can then make the decision based on the available information even if they seemed incomplete. That way, your left brain will use the information while the intuition of your right brain will compensate for the missing information.
2. *Use images and visualization* - While studying or reading try to draw images or to visualize the situation. By using both the visual images and the written text you will be training both sides of your brain to work together.
3. *Listen to music* - While you are reading try to listen to music in order to allow the right brain to get involved.
4. *Try to find any hobby that requires creativity* - Try to find if you are interested in drawing, painting or writing poems. Whatever the hobby that requires creativity that you can find can help you train your right brain.

5. *Break the routine* - If you are fond of numbers and likes to solve Sudoku for several hours a day, you may lose all of your creative abilities. Try to break this routine by doing something random in between, try to go the beach and sit in front of the sea to think randomly, try to close your eyes then imagine your future or imagine anything that you would like, just break that routine using any method that you can think of.

The following is what you should do in order to use both sides of your brain if you were right brained:

1. *Try to get deeper into details* - You may not like this but just try as much as you can to think of problems or situations in a little more detail rather than just looking at the full picture, try to gather more information even if you felt that you already know what you are going to do.
2. *Plan for your life* - Try to make schedules and to follow them. Try to set goals and record your progress. If you already have goals then try to write them down and if they are long term ones then divide them into smaller short term ones that are more detailed
3. *Play complex games* - Try to find if there is any complex game that interests you, like chess for example, these types of games stimulate the left brain functions and allows you to use both sides of your brain.
4. *Work with numbers* - You should feel good while studying accounting or mathematics because you will be training your left brain and so increasing your ability to use your whole brain, try not to avoid numbers because they can help you in developing both of your brain hemispheres.

MIND-MAPPING

In a mind map, information structured in way that it reflects precisely how the brain functions in a natural thinking rather than linear manner. A mind map is a highly effective way of getting information in and out of your brain. It is a creative and logical means of note-taking and note-making that literally "maps out" your ideas.

All mind maps have some things in common. They have a natural organizational structure that radiates from the center and use lines, symbols, words, color and images according to simple, brain-friendly concepts. It converts a long list of monotonous information into a colorful, memorable and highly organized diagram that works in line with your brain's natural way of doing things

One simple way to understand a mind map is to compare it to a map of a city. The city center represents the main idea; the main roads leading from the center represent the key thoughts in your thinking process; the secondary roads or branches represent your secondary thoughts, and so on. Special images or shapes can represent landmarks of interest or particularly relevant ideas.

The mind map is the external mirror of your own radiant or natural thinking facilitated by a powerful graphic process, which provides the universal key to open the dynamic potential of the brain.

The five essential characteristics of a mind map:

1. The main idea, subject or focus is crystallized in a central image.
2. The main themes radiate from the central image as "branches".
3. The branches comprise a key image or key word drawn or printed on its associated line.

- Topics of lesser importance are represented as 'twigs of the relevant branch.'
- The branches form a connected nodal structure.

Radiant thinking is a clearer, more natural and more efficient way of using our brains. What happens in your brain when you taste a ripe pear, smell flowers, listen to music, watch a stream, touch a loved one, or simply reminisce? The answer is both simple and amazingly complex. Each bit of information entering your brain, every sensation, memory or thought, which incorporates every word, number, code, food, fragrance, line, color, image, beat, note and texture can be represented as a central sphere from which radiate tens, hundreds, thousands, even millions of hooks. Each hook represents an association, and each association has its own infinite array of links and connections.

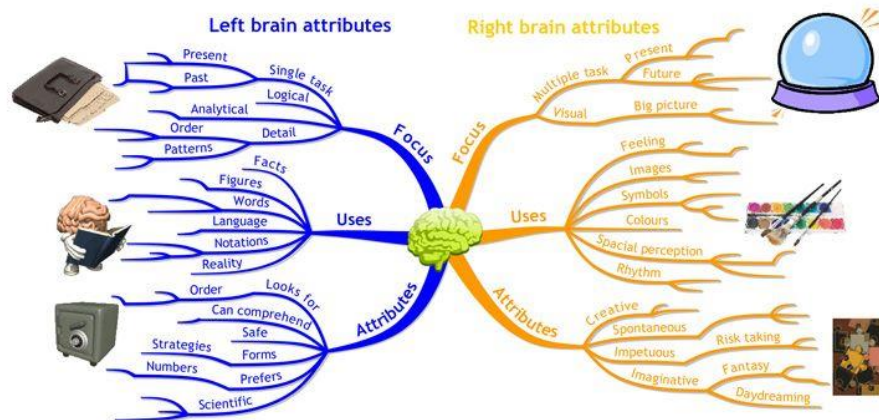
The mind map is made even more powerful by the use of all the left and right brain-thinking tools, which enhance the clarity, structure and organization of your thinking. Mind maps provide an excellent way to engage your entire brain in the thinking and learning processes.

Steps in Mind-mapping

Mind maps are a form of visual mapping, where you use a combination of words, lines, symbols and images to describe something tangible (like a product, a location or something that you can see and experience) or intangible (services, concepts, ideas and plans).

If you are using a mind-map to come up with a solution or ideas to a problem here are the steps:

- Start with the topic - Put the topic, central concept or idea in image form, in the center of an empty page. Space on the page should be used wisely and yet freely so that the brain doesn't feel unbridled, and there is space to occupy more and more ideas as they come. Beginning in the center provides the brain with freedom to move in all directions and reveal ideas/solutions more naturally and freely. It may be more convenient to position the page in landscape orientation because that makes drawing easier.
- Define the structure - Create the fundamental structure with which you would be organizing your ideas. The structure would include branches radiating out from the central idea and drawn as thick lines. These main branches are termed as Basic Organizing Ideas (BOIs),
- Define each branch - Put down a key image or word for each branch as your ideas come. Allow the ideas to flow freely and quickly (long pauses are not to be encouraged) without judgment on whether they are practical or crazy. There is no need to bother about aesthetics. Draw freely and unconcernedly.
- Highlight the priorities - The concepts of lesser importance can be represented as the twigs and drawn as thinner lines.
- Extend your mind map by additional ideas - As information and ideas keep coming, connect them to the mind map in a suitable manner.
- Review and revise - After the first attempt, allow your mind to settle. Once it has, you may want to revisit what you did. Review it and revise and/or reorder it. Sometimes, a different sheet of paper may be required for this.



Mind mapping software vs. hand-drawn maps

There are two ways on how to create mind maps which are using software or hand-drawn. They both serve you equally well in functionality and application. Both methods clearly have huge benefits and advantages and occasions when each proves a better option.

Advantages of Software Mind-maps

- Mind mapping software enables you to arrange information in expandable and collapsible topic trees. This makes it possible to store much more information in a software-produced visual map, without overwhelming you.
- Mind mapping software enables you to embed documents, links, notes and other data within the structure of your map, transforming it into the equivalent of a powerful visual database. What this means is that you can create a project map that contains shortcuts to a wealth of supporting information. Whether that's stored in Word documents, Excel spreadsheets, web pages or even individual e-mails, it's all just a click away. In addition, to avoid visual clutter, many programs enable you to sub-divide large maps into linked sub-maps.
- Mind mapping software enables you to rearrange the topics in your map at will, until it perfectly represents your ideas. In contrast, unless you have a really big eraser, it's hard to move topics in a hand-drawn mind map. Your topics are more or less "anchored" to the paper. Every time you move a topic within a software-produced mind map, you "re-factor" it. In other words, the parent idea to which you attach a topic changes its meaning and context that enables your brain to generate new ideas, and to see connections between existing ideas.
- A software-produced visual map isn't just something you create once and forget about. Because you can update its contents as needed, it can become a powerful tool for tracking your progress on an ongoing basis.
- Mind mapping software enables you to export your ideas to other types of software, such as word processors and presentation software. This enables you to use your visual map as a creative "front end" to almost any type of presentation to give form and structure to your ideas.
- Mind mapping software also opens up new opportunities for collaboration that don't exist with hand-drawn maps. You can e-mail a map you've created to others on your team or upload it to a shared workspace, where they can annotate or add to it. Several mind mapping applications also enable multiple people to work on a map at the same time.
- Another powerful advantage of mind mapping software is that you can utilize it to present your ideas, which makes it a powerful alternative to PowerPoint. What's more, you can even update your presentation with comments from your audience, which helps to

increase their buy-in to your ideas. 8. Another unique capability of mind mapping software is that it can be used with an LCD projector and screen to record and display ideas during a group brainstorming session. There's something very powerful about seeing your ideas recorded real time and placed in context with all of the other ideas the group has brainstormed, that just isn't possible with flip charts and colored markers.

9. Another unique capability of mind mapping software is that you can utilize it to create your own "information dashboard" which is a map that consolidates a wealth of data that you need to manage into a single, visually-oriented screen.

10. Finally, what makes mind mapping software unique is its flexibility. The number of different things you can do with it from a personal standpoint is amazing. You can track your personal goals, create a database of ideas, create lists of tasks and track your progress on them, and much more. You can do many of the same things with hand-drawn maps, of course, but not to the level of detail (and the collection of related, linked resources and files) that's possible utilizing mind mapping software.

There are two types of mind maps using the computer that you can make use of. Neither of the two types of mind maps require any software download and both are used in your browser.

The first is Mindmeister (<http://www.mindmeister.com/>). Here are the features about Mindmeister:

- It's easy to use.
- Can be used/edited synchronously by unlimited users.
- Can be published as a wiki so anyone with the URL can edit the map (and it has versions, so you can revert to a previous version).
- Can be shared with invited people only (invited via email), and can be password protected if necessary.
- Can be embedded into other sites (and if clicked on will take the user to the Mindmeister map in situ).
- Can be downloaded as a Mindmeister file (useful for backup), image, pdf, and (should the service ever be withdrawn) as Freemind (mind), and Mindmanager (mmap) files.
- It has an offline option (paid version). The second is Mindomo: <http://www.mindomo.com/>. The best things about Mindomo are:

1. Nodes can be grouped by color (easy to show related/common factors).
2. There are more sophisticated functions (which makes it more difficult to use as a tool).
3. You can share the mind maps for collaborative editing (but not synchronous editing)
4. You can put links to the mind map in a site/add the HTML to a site, but not embed the live mind map.
5. You can use icons and a range of images.

Advantages of Hand-drawn Mind Map

1. *Hands-on* - You don't necessarily need a computer screen to create hand-drawn mind maps; grab pens, pencils and paper and away you go. Naturally, scanning, coloring and sharing can be done on the computer, yet that often comes after the initial creation of your hand drawn mind map or you may use colored pens and pencils and finish the mind map completely by hand. The physical creation is immediate and progressive; you can instantly have direct flow from brain to paper and capture thoughts and ideas before you forget them. Hands-on encourages body movement, feeling as well as thinking, using your senses and combining physical, mental, personal, intimate, tactile and therapeutic elements. Hands-on gives you freedom of personal expression, tapping your unique brainpower and capturing your individuality right on the paper before you. Since you create a mind map from brain, through arm, via pencil or pen to sheet the creation of your content becomes highly memorable particularly when you add your own styling and design; essentially "drawing" how and as you feel.

2. *Unique* - Your style evolves as you create more mind maps and the look and feel becomes your personal method of expression much like an artist develops their own identifiable trademarks. Each mind map can be created differently in look, color, design and style to make it special. You can create quick pencil mind maps right through to artistic, colorful and imaginative mind maps. Any mistakes or errors as with creating art, can become part of the creation, part of the expression. Developing your unique style encourages both creativity and idea generation to flourish.

3. *Memorable* - Creating hand-drawn mind maps is highly addictive. They bring out your knowledge and experiences and uncover your hidden brainpower as well as capturing new learning. Since the creation is physical, pen to paper, your content becomes highly memorable, helping you clarify your thinking and explore and develop your creativity. Keeping your mind maps in a physical folder means you can revisit and review and refresh your thoughts and knowledge. The text and images having been created by your own hand in your own style also assist recall.

4. *Portable* - Hand-drawn mind maps offer versatility; you can create whenever and wherever you wish, instantly. Ideas come any time and you can capture them fast. You can also create your mind maps in a relaxing environment of your choice; anywhere quiet and comfortable aids the creation process. It might be a relaxing room or a wide open field. Pens, pencils and paper are highly flexible; you can create a mind map on a small scrap of paper or a huge sheet. Over and above paper you can explore wipe boards, flipcharts, canvas, even blank walls. Create mind map murals on rolls of paper or walls. Hand-drawn offers unlimited potential to diversify and explore artistically.

5. *Stylish* - Developing your own style, you can create original and personal mind maps whether you are creating for yourself or to share with others. Drawing style and ability can be as unique as your fingerprint. You have the flexibility to create your mind map exactly how you want to; hand-drawn means 100% radial, twists, turns, flair and flamboyancy, multi-angle both in terms of direction and dimension. You develop your style because you are injecting yourself into your mind maps it encourages both the physical and emotional; it can be moving and therapeutic and really tap your inner feelings and ideas. The flexibility encourages your uniqueness. The connection between mind, body and paper taps your personal expression.

Sample Mind-Up Activity

Mind maps are a powerful tool to get yourself unstuck, focused and organized so do your best creative work. Tony Buzan is the person best known for coining the term mind map and helping to educate the world at large about the concept

Let's be honest: some mind maps are so busy and detailed that they tend to frighten most people instead of inspiring them. That's a fair question. To address this concern, let's look at four major benefits of using mind maps to help develop your ideas:

Mind Maps Keep You From Losing Your Mind - The human brain, while very powerful, does have its limits. We can't keep many thoughts in our mind at once. David Allen, the author and entrepreneur who created the popular Getting Things Done (GTD) methodology for organization and prioritization, often quotes the following statistic: the human mind can only hold between 5-9 thoughts in memory without losing track of them. Once you go beyond that limit, you start to forget things-this usually lands you in trouble. David Allen's solution is to use inbox processing to put all of your tasks and to

do list items into a trusted system where you can easily find them and take action on them when you need to do so. By getting rid of the extra noise or things to worry about, you reduce the number of thoughts that you're thinking about at a moment in time. This allows you to focus and, more importantly, not worry about losing something important. Instead of writing yourself a note or an e-mail, which you might not understand days and weeks from now, what if you drew yourself a mind map and captured a more complex idea that way? You could empty out your mind, especially if you have a burning idea that needs to be expressed, and you could file it away for future use.

Mind Maps Adapt To Your Preferred Learning Style - Mind maps are flexible constructs that can adapt to different learning and communication styles. They are an attractive learning option because they can appeal to multiple communications and learning styles. You may find certain types of media to be easier to learn from than others. You can incorporate different styles within your mind maps to make them work better for you, so that it's easier to think, learn, and present information.

Let's look at the three basic communication and learning styles: Visual-Visual communicators like to use pictures to learn about things and to communicate. Mind mapping, especially when it combines images and symbols with text and connecting lines, is a great way to communicate information for people who have a preference for visual communication. Experts like Tony Buzan will encourage you to put pictures in mind maps and use colors to appeal to your visual sense. Mind maps clearly have a strong visual component and therefore they should work well for you if you're a visual thinker and learner.

Audio - If you are an auditory learner, sounds and spoken words are the best way for you to learn. The language you use makes reference to hearing, listening and saying things. You likely learn best by reciting facts and committing them to memory. You like to have people explain things to you instead of giving you documents. You would think that auditory thinkers and communicators might not benefit from the use of mind maps. This may be true, but as an auditory learner, you could use the mind map as a way to arrange audio files in a logical, easy to find framework so that they can come back to it into the future. Many mind mapping applications now allow you to attach or embed many kinds of files within a mind map.

Kinesthetic/Touch - Kinesthetic learning styles have gained more exposure during the past few decades. If you have a kinesthetic preference, you are a 'hands on' person who understands things better when you can touch and use them. You learn better by tearing apart and reassembling an engine that reading a book or hearing a lecture about it. But how do you touch a mind map, especially when it's on a computer screen? After all, most mind maps don't have moving parts, right? How do you get 'hands on' with a mind map? By drawing it by hand! Using a mind map to describe something can serve two purposes for kinesthetic learners. The mind map can help you express something in a way that's easier for you to do than if you only used sounds and words. The act of drawing or printing the information (even if it's done with software instead of on paper) can help you put your thoughts together. It may feel more natural. The mind map can help you remember the information because you may remember the movements

b

and pen strokes that you used to create it. One other point: you may work well with multiple styles. For example, mind maps drawn by hand combine both a visual and a kinesthetic component.

3. Frictionless Thought Organization-Thoughts are astoundingly fast. Here are some rough statistics for comparison:

Words we can handwrite per minute: 22-31

b. Words we can type per minute; 120 is above average for a touch typist

c.

Words we can say per minute: 150-160, (which is a recommended rate of speaking for audio books and presentations) but it can go much higher. d. Words per minute that we can read or think: 200-300 is a good average

You can read and think much faster than you can capture thoughts on paper or computer screens using words. You need a way to capture the thoughts quickly but comprehensively when inspiration strikes or when you're pressed for time.

You want to be able to document your ideas with minimal friction. But what does friction mean in this context? In physics class, you learned that friction is the force that asserts itself when two things move against each other. Friction slows down moving objects by creating resistance. When it comes to doing creative work, you

can think of friction as anything that slows down your ability to do work, especially when you're talking about putting your thoughts to paper. Pen and paper is a great low tech solution that works well for the first draft of a project. However, you lose time in the motions of switching between mouse and keyboard or when you create a mind map by hand You

lose even more time when you try to redo a handwritten mind map so it's easier to understand. These are

examples of friction.

If you're comfortable with the combination of mouse and keyboard, you can use your point and click skills with mind mapping software. Or, to really speed things up, use keyboard shortcuts instead.

This speed and power allows you to achieve something that we call frictionless thought organization. By

eliminating the barriers to transcribing your thoughts, mind mapping becomes an extremely powerful tool to allow the rapid documentation and development of ideas. Your ideation processes take a huge productivity leap when you use mind mapping to its fullest potential. Mind mapping removes friction during the creative process. Mind mapping is the closest that you can get to

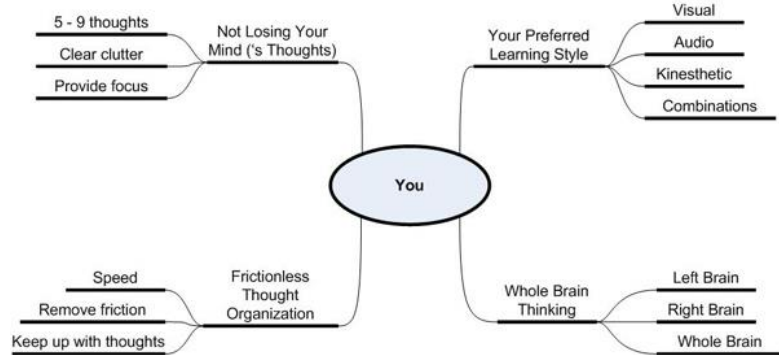
frictionless thought organization-transcribing your thoughts out of your head with minimal resistance.

Whole Brain Thinking Leads to Superior Results-Tony Buzan contends that mind maps provide an excellent way to engage your entire brain in the thinking and learning processes. You may have heard people talk about being left brain' or 'right brain' These two concepts have been explained in a previous Lateral Action article. Whole brain thinking is the concept of using both sides of your brain together to think better. Your brain does this every day just keeping you alive. Most of the time this synchronization happens without any conscious thought.

Mind maps, with their combination of images, colors, shapes and text, can appeal to both sides of the brain.

You can use the mind map to explore unusual, imaginative concepts (right brain) while using mind mapping techniques to put them into order and tie them together with logic (left brain).

When you're lost in a mental jungle, doesn't it make sense to use both sides of your brain to navigate through? Mind mapping helps you make the most of both sides of your brain. This combination of capabilities allows your mind to build rich connections between pictures and text and it helps to cement knowledge in your brain, leading to longer retention of information.



Improving Learning Using Left and Right Brain Mind Mapping Activities

We have learned that our two cerebral hemispheres process information and respond in different ways, which to a great degree may affect and shape our personality, ways of thinking, and learning. Each of us is said to have a dominant hemisphere, which will influence the ways in which we perceive the world around us and, more specifically, how we learn.

Identify which brain hemisphere is dominant in you. Take this 18-item quiz at <http://www.web-us.com/brain/braindominance.htm>

Most theories suggest that right brain-dominant persons follow their emotions and intuitions, and those who are left-brained respond in logical ways and are guided by sequence and order. Hence, by

understanding your dominant brain working for you, you may adjust your study methods and suit them to your personality type. If you were, on the other hand, a left brain-dominant person, you are a linear thinker. You prefer a structured approach when you are processing information. You focus on details and start from the small picture to understand the big one. You follow a schedule and maintain routines; as such, you like predictability and consistency. You also prefer to study in a clean and quiet place so that you can concentrate more effectively. You also prefer verbal directions and value facts over your feelings; thus, you could be self-motivated to do your tasks. However, the left-brained person wants to know how things are graded all the time and may not work without having a valid reason or purpose. He or she may spend too much time making things perfect. Hence, you learn more easily and retain information more efficiently by coming up with detailed outlines of your lessons and formula tables. Your ease to organize your notes will aid you in preparing for your exams. Reading out loud and going over the material section by section or in a chronological pattern may enhance your comprehension and memory. Also, you need to be more creative and open by playing the five sense games so that your aesthetics are developed and your creativity is enhanced. You need to read more books and know how to put your ideas in a storyboard. You should also be open to brainstorming and drawing a mind map for concepts to allow you to see the whole picture and the purpose of your actions more. You need to break your routines and try something new so that you have the opportunity to learn the different ways of doing things. On the other hand, if you were a right-brained person, you are fluid and spontaneous. You focus on the basic concept before you can relate it to your goals. Unlike the left-brained person, you would start from the big picture to understand the small one. You could be flexible with rules and facts; hence, you go with the flow, try new methods, or skip from one task to another. Thus, you tend to care less with organization or neatness. You may take down notes but lose them. These characteristics lead to having trouble explaining things step by step and keeping detailed records. Also, you may leave things the way they are even though they do not help in your performance in school.

Hence, you learn your lessons more easily by using charts, time lines, or graphs and by labeling the parts of information or topics being studied. You may show ease in understanding the topics being presented to you by making concept maps, with which you understand the relationship among various concepts. To do so, you need to set your goals. You take time to clarify your goals and prioritize them, so that you do not get distracted easily. You organize your study area or workplace. Being neat and organized allows you to save time in finding what you need and in finishing your tasks quickly. Using a schedule book or a planner permits you to manage your time wisely, so that you do not neglect a subject. You tend to always start projects early, so that you finish well before the deadline. However, later research studies show that the brain is not at all dichotomous as we all thought it was. Researchers at the University of Utah discovered that while activity was at times higher in certain important regions, both sides of the brain were essentially equal in their activity on average. For example, your left hemisphere picks out the sounds that form words and works out the syntax of the words, but it is your right hemisphere that is actually more sensitive to the emotional component of the words you hear, such as the rhythm of speech that presents the intonation and stress. Hence, you should stimulate or activate both the hemispheres to facilitate high-intelligence brain activities used in learning, decision-making, and problem-solving. The mind mapping technique was developed by Tony Buzan (2002), who described it as an approach that makes use of the production of pictures or diagrams of one's thoughts or conversations, which may be used in task management, problem-solving, decision-making, note-taking, brainstorming, and presenting. It is simply making a diagram of the structure of memory patterns in the brain because it operates on key words, and copying this approach is extremely helpful (Pritchard, 2005).

Both hemispheres of the brain should be stimulated to facilitate high-intelligence activities necessary for learning, decision-making, and problem-solving.

