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## Brain Based Learning Strategies

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**Abstract:** Neuroscience research explains how the brain learns is a dynamic field. Brain-based education emphasizes how the brain learns naturally and is based on what we currently know about the actual structure and function of the human brain at varying developmental stages. Using the latest neural research, educational techniques that are brain friendly provide a biologically driven framework for creating effective instruction. This theory also helps explain recurring learning behaviours, and is a meta-concept that includes an eclectic mix of techniques.

**Keywords:** Neuroscience, Brain based Learning, Orchestrated immersion, Relaxed alertness, Active processing

## **1. Introduction:**

Brain Based Learning theory is based on the structure and function of the brain. As long as the brain is not prohibited from fulfilling its normal processes, learning will occur. People often say that everyone can learn. Yet the reality is that everyone does learn. Brain-Based Education is the purposeful engagement of strategies that apply to how our brain works in the context of education. Brain-based learning has been called a combination of brain science and common sense. “Brain-based” learning activities engage both hemispheres of the brain simultaneously, resulting in stronger, more meaningful learning experiences and permanent brain connections.

## **2. Core Principles Of Brain Based Learning:**

Caine and Caine (1991) developed twelve principles that apply what we know about the function of the brain to teaching and learning. The principles are:

- i. The brain is a parallel processor, meaning it can perform several activities at once, like tasting and smelling.
- ii. Learning engages the whole physiology.
- iii. The search for meaning is innate.
- iv. The search for meaning comes through patterning.
- v. Emotions are critical to patterning.
- vi. The brain processes wholes and parts simultaneously.
- vii. Learning involves both focused attention and peripheral perception.
- viii. Learning involves both conscious and unconscious processes.
- ix. We have two types of memory: spatial and rote.
- x. We understand best when facts are embedded in natural, spatial memory.
- xi. Learning is enhanced by challenge and inhibited by threat.
- xii. Each brain is unique.

## **3. Instructional Techniques Associated With Brain-Based Learning:**

As Renate Caine illustrates on p. 113 of her book *Making Connections*, three interactive elements are essential to this process:

### ***3.1 Orchestrated immersion:***

Creating learning environments that fully immerse students in an educational experience. This implies creating an environment where a student feels like he/she is a part of the process and is living it. Teachers must immerse learners in complex, interactive experiences that are both rich and real. One excellent example is immersing students in a foreign culture to teach them a second language. Educators must take advantage of the brain's ability to parallel process.

### ***3.2 Relaxed alertness:***

Trying to eliminate fear in learners, while maintaining a highly challenging environment. Relaxed alertness is the idea of keeping a student's fear in check while still providing a challenging environment. Students must have a personally meaningful challenge. Such challenges stimulate a student's mind to the desired state of alertness.

### ***3.3 Active processing:***

Allowing the learner to consolidate and internalize information by actively processing it. Active processing is the means by which a student is given the opportunity to continually and actively process information to internalize, consolidate, and relate it. In order for a student to gain insight about a problem, there must be intensive analysis of the different ways to approach it, and about learning in general.

## **4. Brain-Based Learning Strategies:**

How the brain works has a significant impact on what kinds of learning activities are most effective. Educators need to help students have appropriate experiences and capitalize on those experiences. Knowing how the brain works best allows educators to create an environment that gives the student a higher probability of success in learning. Using the following brain-based learning principles can improve your students' performance in class.

#### ***4.1 Brain Based Learning Strategies:***

- i. *Talking:* The talking internalizes what they've learned. Give the children a few tidbits of information, and then they have "turn and talk" time, where they discuss what they've learned. They love this, and it works!
- ii. *Emotions:* The strong memories are closely related to strong emotional experiences, both positive and negative. The brain performs better in a positive emotional state. Students must feel physically and emotionally safe before their brains are ready to learn. Teachers can create a positive environment by encouraging and praising their students' efforts.
- iii. *Visuals:* Vision is the strongest of the senses. Use posters, drawings, videos, pictures, and even some guided imagery with the children to help them learn. 50% are visual learners and prefer pictures, charts, and written text over lectures. 30% are kinaesthetic learners and need more tactile (hands-on) and movement-based activities. 20% are auditory learners and do best when they talk about what they are learning.
- iv. *Chunking:* That means they need a chunk of information, then an opportunity to process that in some way. Here's where "turn and talk" works, as well as an opportunity to write, draw, or even move. The brain learns new information in chunks. Brain research states that children between the ages of 5 and 13 learn best when given chunks of 2 to 4 pieces of information. Children ages 14 and older can learn up to 7 chunks at a time. Teachers should plan for these limits and teach material in small chunks.
- v. *Movement:* Combining movement with the learning almost guarantees stronger learning.
- vi. *Shake it up:* If you do exactly the same thing, exactly the same way, it becomes boring and the brain tunes out. Have a backwards day, turning the whole schedule around (within reason, of course!) Change the seating arrangement, do one part of the day completely different.
- vii. *The brain needs oxygen:* They say 20% of all the oxygen used in the body is used by the brain. That means we need to get the students up out of their seats regularly and moving! Students need a moment to "rest their brain" from a task. Allowing off-task time between lesson segments often increases a student's focus. For example, allow

students to take time to stand up and stretch, provide a 2-minute talk break, Brain Gym exercises, etc. By providing these moments, the brain will be more ready to stay on task and store information.

- viii. *Brain Breaks:* The brain can only take in so much information at a time. Think of the brain as a cup, once it is full, nothing else can fit and just runs down the side. You have to empty the cup to allow it to be filled again. The brain is similar. Students need to have time to process new learning in order to make room for more. Be sure to give your students a brain break every five to 10 minutes. This could be in the form of a think-share-pair, a movement activity, a well-placed joke...the possibilities are endless. Be creative.
- ix. *Make connections:* Connections are important for the brain. It can't hold random information; it needs to connect to something else that's already there. You can make connections through your own experience and stories. Children learn best when teachers teach new material first and review previously learned material at the end of instruction.
- x. *Feedback:* Practice doesn't make anything better unless the practice is accurate. Students need to hear they are on the right track. It works pretty well for motivation, as well. It is best for teachers to teach in short units (1 to 2 segments at a time) and then provide a student led activity time. Students need time to practice the skills they are learning.
- xi. *Music:* Music can be a powerful tool. We can learn the difficult aspects through music.
- xii. *Acronyms:* Create acronyms for your students, or let them create their own
- xiii. *Hydration:* Allow students to drink water during learning time. Research shows that dehydration causes higher salt levels in the blood which in turn raises blood pressure and stress. Dehydration also causes a loss in attentiveness and lethargy. Ideally, students should drink 6 to 8 glasses of water a day to be properly hydrated.
- xiv. *Time for reflection:* The brain also works on a time schedule. Children ages 5 to 13 learn best in 5 -10 minute increments. Children 14 and older learn in increments up to 10 – 20 minutes. Sometimes, teachers may extend time limits through positive reinforcement. Provide time at the end of a lesson to think about and discuss the topic.

Understanding may not take place immediately, it may occur later. Processing time and reflection are vital to the learning environment.

- xv. *Energy Level:* Take advantage of students' high energy time. There is a high-low energy level cycle that occurs during the school day. For example, most students have lower energy in the morning (especially during adolescence) and higher energy levels after lunch. A higher energy level correlates to an increased level of attention. Teachers should take advantage of the times during the day when the students' energy levels are higher by teaching the most important material during these times.
- xvi. *Space:* Provide adequate personal space for the student. More personal space reduces stress for a learner.
- xvii. *Location:* Another easy thing to implement is location. Memory is very location based. You can vary where you stand in your class as you introduce new content, and/or vary where the students sit or stand.
- xviii. *Positive Environment:* First, it is imperative to set a positive and supportive classroom environment. The brain cannot learn well under stress. Higher-level thinking functions are rerouted to basic survival needs. Mirror neurons in our brains cause us to feel similar stress to those around us, causing the learning ability of the entire class to drop. Be sure to maintain a positive learning environment.
- xix. *Optimism:* An optimistic attitude should be modeled every day. Teacher may be the only optimistic person in a student's life. Be sure to model and talk about optimism their future may depend on it.
- xx. *Choice:* Choice is another important and easy strategy. Students love to have choice. Their brains are more engaged when they have some sort of stake in the task at hand. If you are limited by your district and cannot offer some sort of content, book, or subject choices, here are some choice options you could utilize:
  - ✓ Sit or stand.
  - ✓ Where to sit.
  - ✓ Pencil, colour pencil, or crayon.
  - ✓ Order of lessons.

- xxi. *Anticipation:* Before beginning a lesson, give students some specific information to listen for. Alternatively, let them know they will need to retell some information to a fellow student. They will pay close attention and retain more.
- xxii. *Meaningful learning:* The brain is more likely to retain information that is relevant and meaningful. Students need to know why what they are learning should matter to them. This is especially relevant to challenged learners.

### **5. Conclusion:**

Brain-based teaching and learning can become second nature to you. With careful planning, knowledge of brain research findings, and a little creativity, teachers can offer engaging, brain-based activities that encourage exploration and learning and support learning standards. Teachers and students can build a strong community of learners who see learning as an opportunity to be successful problem solvers while anticipating each new challenge as another exciting adventure.



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