

BRAIN-BASED LEARNING: POSSIBLE APPLICATIONS TO ENGLISH LANGUAGE CLASSES

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ABSTRACT

Brain-based learning is a learning approach that caters to ways that the human brain learns best and may enable teachers and learners make smart decisions about their teaching experiences and learning processes. This paper explains briefly about the parts of the human brain, brain-based learning theory, and offers suggestions on how that theory may be integrated with English language classes. The importance of emotion for an optimal learning is discussed. Applications of its roles based on ideas put forth by experts in this brain-based field and experiences of a few English teachers who exercised these ideas are also presented.

Keywords: brain-based learning; emotion; movement

1. INTRODUCTION

The core of this paper is to recommend that educators use brain-based learning strategies. The proponents of this school of thought explore implications of brain research to classroom settings. There are approaches that are deemed vital and can suit the way that the human brain learns best. When educators implement these strategies into their current teaching practices, it is hoped that the educators will help their students perfect their emotions and well-being that are all vital for learning to take place.

Simple explanation of the human brain anatomy is also put forth. This is important in explaining why learners' emotions, body movement and compatible environment are central in learning. The roles and implications of emotions, body movement and compatible environment in learning, and some strategies for eliciting them in learners are also expounded. All this, expectantly, will help in enhancing students' love of learning.

2. SOME FACTS ABOUT THE HUMAN BRAIN

It is useful to know some parts of the brain since brain-based learning emphasizes teaching methods that are closely linked to the brain. It is a theory that states that everyone is born with a brain that is powerful and can naturally store all learning experiences. The brain can process information in many ways, such as analyzing, explaining, relating, synthesizing,

evaluating, judging and deciding (Ayob, 2007). What is important is for teachers to prepare a conducive environment that enables the learning process to happen in a way that the human brain learns best.

The human brain has three parts with specific functions and responsibilities. The three parts as explained by Connell (2005), Butler (1998) and Ayob (2007) are:

- a. *The Brain Stem*. It is also called the reptilian brain or the survival brain. It controls heart rate, breathing, stability, arousal, sleep, reflexes and movement.
- b. *The Limbic System*. It is also called the mammalian brain. It is the feeling or emotional brain. It is the home of emotions, motivation, memory and aggression. It also controls body temperature, hunger and thirst.
- c. *The Cerebrum*. It is the centre of academic learning. It is the seat of intelligence and it controls eyesight, hearing, speech, thinking, reflection, planning and decision-making.

Below is the summary of the brain parts and their responsibilities.

Table 1: The Summary of the Brain Parts and Responsibilities

The Brain Part	Also Known As	Responsibilities
The Brain Stem	The Reptilian Brain / The Survival Brain	<ul style="list-style-type: none"> • heart rate • breathing • stability • arousal • sleep • reflexes • movement
The Limbic System	The Mammalian Brain / The Emotional Brain	<ul style="list-style-type: none"> • emotions • motivation • memory • aggression • body temperature • hunger • thirst
The Cerebrum	The Intelligent Brain	<ul style="list-style-type: none"> • eyesight • hearing • speech • thinking • reflection • planning • decision-making

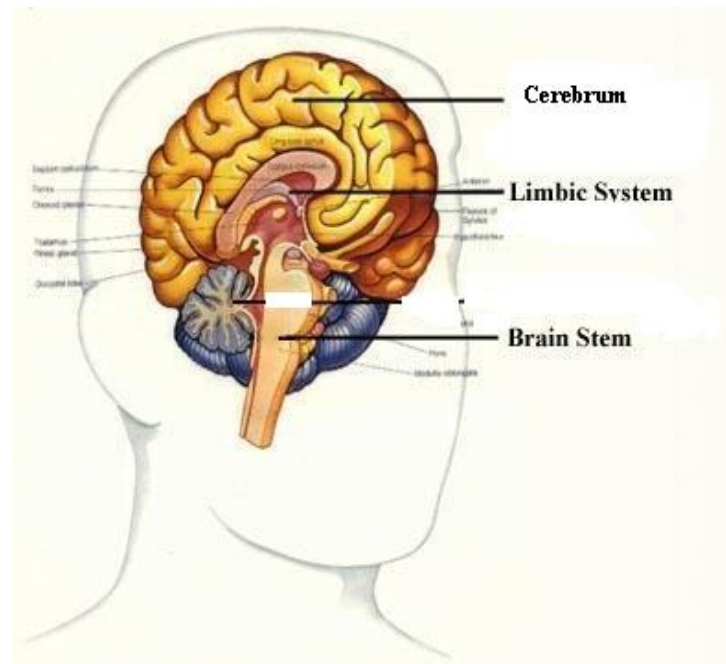


Figure 1: The Parts of the Human Brain (<http://www.chanceandchoice.com/ChanceandChoice/chapter4.html>)

These three parts of the brain, although distinct, do interact and interconnect. The cerebrum integrates the information from the brain stem and limbic system to make a decision. For example, a student who is worried because the exam is near decides to study. He or she stands up and takes a book from the shelf to start studying. The explanation of the brain integration is that his or her limbic system is processing his or her worries, and thus this signal flows from the limbic system to the cerebrum which then decides to study. Next, this signal flows to the brain stem which moves the body to stand and take a book from the shelf.

The description above shows that the learning and thinking processes need the whole parts of the brain, better known as the whole-brain theory or the triune brain theory which is founded by Paul Mclean in 1969 (Ayob, 2007). Ayob (2007) also stresses that this finding is important because teachers in Malaysia emphasize so much on factual learning and seem to ignore the development of emotions, creativity and aesthetical values in students. The time has come for all educators to think about the whole brain learning to help students.

In summation, the information from all our senses first, goes directly into the limbic system that decides which part of the brain needs to respond. Slywester (1995) cited in Butler (1998), explains that when a student feels threatened or experiences strong feelings, such as anger, fear, hatred, jealousy and sadness, his or her abilities to solve problem and think critically are affected. This is an evident that shows the curriculum needs to be integrated with brain-based learning strategies as they can educate students to control, channel, deal with or even manipulate their feelings into something positive.

3. BRAIN-BASED LEARNING

According to Butler (1998), Jensen (2001) and Ayob (2007), brain-based learning is a learning approach that caters to ways that the human brain learns best. It is a learning method that is developed based on research done in neuroscience, biology and psychology. In the

research, the relationship between the brain and learning, and how learning is affected directly by emotions, movement, environment, gender and stress among others are better known and proper actions on learning experiences can be dealt with. Other principal researchers on brain and education are Patricia Wolfe and Geoffrey and Renate Caine (Gerig-Sickles & Schubert, 2011).

Nixon (2012) however is skeptical about brain-based learning and worries that it might just be a bandwagon theory that might appear and soon fade. He is of the belief that the brain responds to our learning in the natural world and creative process of our cultures. He cautions that brain-based learning may be dangerous and may restrict human creativity and imagination. Nixon's doubt is not baseless as brain research is rather new and its implications on learning are still being explored (Gerig-Sickles & Schubert, 2011). Nevertheless, other researchers have proven that brain-based learning has its worth. Muchlis (2012) stated that besides improving teacher classroom management, brain-based learning may also improve student learning achievement in chemistry. He reported that the overall student responses after learning brain-based learning was positive. Mary and Shefali (2012) claimed that it has the potential to stimulate optimal learning among students and that it fosters better study habits among biology students. Saleh (2012) asserted that students receiving physics education in brain-based learning possessed a better conceptual understanding of Newtonian physics if compared to students who did not receive so.

It is argued that the curriculum seems to emphasize more on the cognitive aspects and gives less emphasis on the interpersonal skills. Tests in universities are centred much on the abilities of analytical and mathematical logic and give very little emphasis on other aspects, such as artistic thinking or aesthetic values (Ayob, 2007). The curriculum itself, she argues is too packed with abstract facts that make it hard for students to master. This is further aggravated by the didactic type of teaching (teacher-centredness) that makes learning become very boring to learners. Thus, it is proposed that soft skill development be incorporated into the curriculum where students can participate in activities that boost interpersonal skills, such as problem-solving, decision-making, conflict management, communication and personality enhancement so that our graduates can succeed later in the job market. Curriculum developers should integrate these aspects for the betterment of learning processes.

Brain-based learning may not have all the solutions to our teaching and learning problems, not any one approach has for that matter. However, brain-based learning may enable us to make smarter decisions about teaching experiences and students' learning processes. It may endow students with an environment that is optimal for learning. With that, it is hoped that there will be lesser learning difficulties and absenteeism problems, but more graduation rates and a motivating learning experiences (Gerig-Sickles & Schubert, 2011; Parks, n.d.).

Educators have to make students be aware of the existence of their positive and negative feelings, such as happiness and sadness, calm and anger, and others. Educators too have to make students aware that these feelings are normal and everyone has them. However, these feelings can give impact on themselves and others should they not know how to manage them carefully, especially the negative ones like scolding somebody or getting angry even for small matters. They have to be informed on the negative consequences if these negative feelings are not controlled. They need to be guided in managing these feelings and can be given a real situation that they can identify with. An example of the situation is "You are a dean's list

student but others shy away from you as they think that your good grades are gained through your close relationship with your lecturers. You know that this is not true and your good grades are earned through your hard work. You feel angry and devastated at first but you know you cannot solve the problem if you keep on having those feelings. How do you deal with this problem? What actions do you take?"

The example above is just an example of how brain-based learning can be integrated with the existing curriculum. It is necessary for educators to create an environment that is compatible for students because learning is influenced by many factors. Among these factors are senses, attention, emotion, reflective thinking, and external sources in the environment like the need for break for movement and hydration (Lopez & Alipoon, 2001) and many more. In this paper, the importance of emotion as suggested by Jensen (2001) is discussed. General applications of these elements into students' learning processes will also be put forward.

4. THE ROLE OF EMOTIONS IN LEARNING

Current brain research has discovered that there are some values of emotions in learning. Scientists have realized that it is emotion that inform our logic. Kagan (1990), as cited in Jensen (2001), states that to rely on logic alone and a failure to feel would lead many people into doing foolish things. Besides, it is emotion that enhances attention, creates meaning and memory (Ledoux, 1996), also cited in Jensen (2001).

Goleman (1995) in his book entitled 'Emotional Intelligence' relates to us about two University of Yale graduates, Penn and Matt to show the importance of emotion. Penn is an intelligent graduate but regarded snobbish and not liked by others, especially the ones who have to work with him. Because of his excellent grades, he is sought after by many companies; however, only one offers him a job as he is a real snob. On the other hand, there is Matt who is not as academically successful as Penn. However, he is friendly and well-liked by others who work with him. After his graduation, he is offered by seven out of eight companies that have interviewed him. Even long after that, Matt is successful but Penn is fired only after two years of working.

The stories are told to emphasize the significance of having emotional intelligence or the ability to manage one's emotions. Having it allows an individual to be aware of the people and his or her surroundings. Besides, he or she can communicate well and keep himself motivated in tough times and manage his or her abilities satisfactorily.

In a study done by Ayob (2007), it was found that one reason that led to students' failure was that teachers did not care about students' feelings. 42% of the students interviewed had a negative perspective about their teachers and told that their teachers were fierce. This shows that teachers' actions may result in their students having high emotional problems and it can hamper their learning. This study could also give an indication that educators should ignite motivation and interests in our students and develop a healthy relationship so that serotonin, a neurotransmitter or hormone that allows one to feel calm and happy, can be released while learning. Nobody likes to learn in a miserable classroom.

4.1 Applications of Emotion Management in English Classrooms

According to Caine and Caine (2004) as stated by Gerig-Sickles and Schubert (2011), emotions are important for learning and both cognition and emotion cannot be separated. How students feel and perceive about teachers can affect their learning. Thus, it is crucial that a safe learning environment be present. Gerig-Sickles and Schubert (2011) went on to explain that the hippocampus, a section of the human brain, has more receptors for stress hormones than any other parts of the brain and it plays an important role in forming memories. If the hippocampus experiences stress or threat, it will shut off but if it is reasonably challenged, it will be engaged. This explains why it is important to have a safe learning environment. Positive emotion management can facilitate students' learning, recall and meaning-making (Jensen, 2001). Below are some suggestions put forward by Jensen (2001) to educators on how brain-based learning can be of help in enriching students' learning experiences from the aspect of emotions.

a. Be aware of the learners' emotions and be smart at facing these emotions.

For example, a colleague of the writers, Hazi (pseudonym), dealt with the negative emotions of those students who did not come to class or not turning their due assignment in private, and did not ridicule them in front of other friends of theirs. In return, out of their respect for her, their attendance improved and their assignments were all handed in on time.

b. Celebrate publicly the positive emotions.

It is a norm that only those with the A grades are complimented. Why don't we also compliment the helpful ones who hold the door for others to come into the class or the ones who help their friends understand a concept in learning during group work?

c. Bring forth positive emotions.

Try to include some enjoyable activities, such as language games with students. These games can be short or lengthy depending on the lesson plan for the day. These games can be played to reinforce lessons learnt before. For example, in a language class, a short game can be the one asking all of them to stand and think of an adjective that starts with an 'a' like 'artistic'. To inject an element of fun as well as competition, tell them that the last one to answer will be fined. The writers had witnessed how lively and happy students were trying to search for an answer. You can be rest assured that your class will be popular with your students should you implement the same.

d. Show acts of caring.

Offer them arrival greetings and handshakes or 'bersalam' in the Malay word. Some of the writers' colleagues practise handshake every time they enter and exit the class (female colleagues with female students, and the male colleagues do the same with their male students). They relate that there exists warm feelings between them and their students, feelings that they do not experience with classes that handshake is not a practice.

e. Rejoice student's effort.

In learning, students' effort, not only their achievement, must be rejoiced. Certificates can be issued for students' complete class attendance, for handing in assignments early and for working very hard. England (2001) even suggests that educators have special classroom celebrations for these events.

f. Allow students to work in group projects.

Working in groups can let students learn to work with others and have social contacts with them (Goad, 2001). It may help them learn to communicate well, resolve conflicts, make decisions and boost their confidence.

g. Create stress-free classroom environment.

Students learn best when there are no threats in the classroom (Park, 2006). Allow sufficient time for students to learn, think, reflect and internalize. However, at the same time, challenge their intellect by giving them a difficult assignment of which can be done in specific time and with proper thinking.

Educators who represent these simple warm gestures will indirectly teach their students to better manage their emotions for learning.

5. THE ROLE OF MOVEMENT IN LEARNING

Dennison and Dennison (1994) initiated the brain gym which explains how simple exercises can help the human brain to function better during the learning process and help it stay alert. For example, drinking water before and during class can help combat stressful situations as we perspire under stress and dehydration can affect our concentration negatively. Stevens-Smith (2006) emphasizes that movement activities can have an impact on learning as it reduces anxiety and improves peace of mind. Gurian, Stevens and King (2008) outline several other benefits of movement to the human brain. First is the synaptic connections. Through physical activities, many neural pathways will be formed. Second is the brain integration. Movement helps both left and right hemispheres of the cerebrum to integrate and this improves the connection of the thinking (left hemisphere) and the feeling areas (right hemisphere) of the brain. Third, dopamine, a neurotransmitter that helps the brain keep away boredom and control aggressive behaviour, is released by doing physical activities.

Jensen (2001) also lists several results of studies about the relationship between movement and brain in his book entitled 'Brain-based Learning: The New Science of Teaching & Training'. The studies were done by Greenough (1991), Dr Frank Hagen and Dr James Pollatschek, a group of neuroscientists at the University of California and Dustman (1990). Below are the results of the studies:

- a. Greenough (1991) reported that experiments with rats showed that rats which exercised had a greater number of connections among neurons than those which were sedentary. The active rats also had more capillaries around their brain neurons.

- b. Experiments done by Dr Frank Hagen and Dr James Pollatschek with school children showed that those who were engaged in daily physical education showed superior motor fitness, better academic performance and better attitude towards school as compared to non-exercising children.
- c. Research done by a group of neuroscientists at the University of California showed that exercise may trigger the release of natural substance that enhances cognition by boosting the ability of neurons to communicate with each other.
- d. Dustman (1990) in his study divided subjects into three groups – vigorous aerobic exercisers, moderate non-aerobic exercisers and total non-exercisers. The study found that the vigorous aerobic exercisers showed an improvement in short-term memory, faster reaction times and were more creative than the non-aerobic exercisers.

5.1 Applications of Movement in English Classrooms

Below are other suggestions put forth by Jensen (2001) to educators on how brain-based learning can assist students in their learning experiences from the aspect of movement.

- a. Integrate movement activities into learning, especially when our students are sleepy or lack the energy.

Goad (2001) suggests that we allow our students do some stretches, exercise, walk and talk. We can have a scheduled break, such as after 20 minutes of lecture, or after problem-defining activity, or before idea-generating activity.

quires a lot of energy, and our body can be energized by doing some movement.

- b. Use slow stretching and deep breathing exercises to increase blood circulation and oxygen flow to the brain.

Besides, endorphins, a neurotransmitter that allows an uplifting mood, relaxation and energy, can be released (Connell, 2005).

- c. Allow them to go outside the classroom to do a project.

For instance, in one language class, one of the writers taught her students types of nouns. Students were asked to find any count and non-count nouns outside the classroom for five minutes. They came back happily with all sorts of things like leaves, love grass, small stones and also some food like pounded nuts and others. What was more interesting was that they raced to come back to the class and kept on asking the names of exotic nouns that they did not know.

- d. Let students stretch and change postures when their energy levels are low.
- e. Have a class under a tree sometimes, or anywhere outside the boundary of the four walls.

The writers know two lecturers, Lee and Sabrina (pseudonyms), who love to bring their students to have a class under the foliage of trees in our campus. From the

reactions and facial expressions of their students, it was evident that they enjoyed themselves tremendously.

6. THE ROLE OF ENVIRONMENT IN LEARNING

The focus of this section is to explain how we can help learners optimize their learning based on an environmental influence, such as plants.

6.1 *Plants Can Optimize Learning*

Wolverton (1996) as cited in Jensen (2001) reported that scientists at NASA found plants created a better learning and thinking environment for astronauts. They found that plants removed pollutants from the air, increase the negative ionization (negative ions appears a lot in areas of waterfall, atop the mountain, outside areas after the rain and by the sea) in the atmosphere and charge the indoor air with oxygen, and increased working productivity by ten per cent. He added that some best plants for air cleansing and oxygen in indoor learning environment are bamboo, rubber and yellow chrysanthemums. Besides, plants not only make the air cleaner and richer with oxygen, they also enhance the aesthetic value of a place. Thus, encourage students to breathe in deeply especially when they are stressed or pressured.

Realizing that plants can be a source of supply of oxygen and useful to refresh the brain, as well as beautiful, the Dato' Onn Secondary School in Seberang Perai, Penang had proposed that each student bring a potted plant. These plants were then arranged around the school compound. Indirectly, the students were taught to 'green the earth' and the best part was that the school could cut its cost to buy plants! In a visit to Zainab II Primary School (it is one of the best schools in Malaysia) in Kelantan in 2007, under the BRAINetwork programme, the writers had the chance to witness some wonderful and novel projects done by the school community. One of them is the creation and maintenance of several gardens that are named the 'Bahasa Malaysia Garden', 'English Garden', 'Science Garden' and others. In these gardens, besides seeing the beauty of the plants, herbs and flowers, ones may learn the scientific names of them being printed in Malay and English languages. There are also hanging proverbs, pictures and even a small gazebo for students to sit in to relax or study. The design of the gardens are left to the creativity of teachers and students. For this, the school has been chosen to be involved in a project with a university in which brain-friendly learning centre will be devised and tested.

Campbell (2001) reported some interesting results that have occurred from brain-based strategies in several classrooms whose teachers ensured that students have fresh air, water, exercise, and an emotionally safe place to learn. These classes were made up of two from the primary level and one from the undergraduate level. In the primary classes, it was reported that disciplined problems decreased when a break was given after each 15 to 20 minutes of teaching. During this break, pupils were allowed to stand up, breathe in fresh air, walk three to five minutes, or consume nuts, raisins, raw vegetables or biscuits, or drink plain water. However, there were strictly no carbonated drinks or sweets as they were regarded unhealthy for the brain. In the undergraduate class, students did not fall asleep anymore.

7. CONCLUSION

Brain-based learning is discussed in the hope that educators will use the strategies that can be of assistance for students to learn according to how the human brain learns best. There are no 'out-of-reach' strategies, but ones that are simple and yet effective.

Through results obtained by a myriad of research which have been carried out by neuroscientists for the last twenty years, it is now known that learning is much supported by factors such as emotions, movement and conducive environment which the writers have discussed quite extensively in this paper. First, educators are suggested to bring out the positive emotions from their learners as emotions form logic and memory. Next, educators are also hoped to integrate some movement activities in their classroom so as to allow the brain to be alert and energized. Lastly, the writers have put forth the idea of having a conducive environment in our learning compound.

Brain-based learning strategies do not ask us much should the approaches be integrated with our present practices in teaching. We are all experts of our fields, and being ones we sometimes forget that some of our students struggle to learn our subjects because of various aspects that might be within or out of our control. The least we can do is to help them ease their difficulties by integrating brain-based learning into the current curriculum. We as educators have the professional responsibility to ensure that our students benefit from our life experiences and know how to flourish in life which is becoming ever more stressful with the demands of the 21st century. We must make clear to our students that it is not enough to regurgitate and pass the examinations, but it is more important to learn to think and relate the information and the understanding with the real life out there. Learn to make decision, solve problems, be attentive listeners and not hurt others. If our intention is sincere, just do our level best and we might reap the finest out of our students in later years.

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