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BRAIN BASED TEACHING APPROACH IN SCIENCE - A NEW PARADIGM OF TEACHING

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ABSTRACT

The brain based teaching showing methodology and portrayals could enable understudies' better comprehension of ideas while being especially to appropriate for tending to the guidelines: critical thinking, thinking and making associations. Understudies Cerebrum based educating will help them to see powerfully vital part in their condition, they ought to investigate and explore issues in viable way, make and test guesses, build and utilize models, illustrations, and innovation, utilize inductive and deductive thinking, and discuss their outcomes.

KEY WORDS: *brain based teaching , thinking and making associations.*

INTRODUCTION

In the last 25 years, with the growth of neuroscientific knowledge, some scientists and educators are becoming increasingly aware of the benefits neuroscience is making in terms ofthe brain and its function when students learn (Howard-Jones, 2008). However contemporaryopinions exist regarding the relationship between neuroscience and education on the one hand, neuroscience is believed to have potential for solving many important challengeseducators face and on the other hand, it is thought that neuroscientific knowledge is irrelevant to educators' understanding of learning. This debate continues to be discussed (Bruer, 1998; Geake & Cooper, 2003; Davis, 2004; Goswami, 2004; Howard-Jones, 2008; Bawaneh et al., 2012; Clement & Lovat, 2012). However it is clear that neuroscience provides additional datarelated to human learning and learning deficits. Therefore, educators can benefit from thosedata. However they should avoid direct applications of neuroscience findings to educationsince learning is related to several factors such as social, cultural and contextual (Mason, 2009.)

BRAIN-BASED LEARNING IN SCIENCE TEACHING

The subjects of science courses are inseparable units of various academic fields (e.g. physics, chemistry, biology, mathematics, social studies) and intermingled with real life experiences. Students come across various theories of physical science, definitions of chemical composites, and cell structures. They also come up with anxieties about the ecosystem, earthquakes and volcanic events. Extraterrestrial life, the movements of the planets and solar and lunar eclipses attract students' attention throughout their lives. It is only natural that they are affected by these events. In order to comprehend the continuous developments in the field of science, students should be aware of the basic science terms and they should gain the science skills throughout their schooling process (Fogarty, 2002).

The learning and teaching process in science courses should be based on exploration and inquiry. Since the brain inquires meaning and attempts to set associations in a natural way, exploration and inquiry based science teaching might function compatibly with the principles of brain-based learning approach

(Mangan, 1998). Brain based learning aids teachers in facilitating the learning and teaching process. One way of relieving the process is to give learners more responsibilities for their own learning and encourage them to establish associations with the formerly learned subjects and new knowledge in order to form the learning. In order to establish this easiness in the learning and the teaching process, metaphors, thematic teaching, integrated teaching and open ended questions should be used in the learning environment. Teachers should provide learners with a secure classroom atmosphere which has a rich learning environment challenging learners to learn. To that end, the classrooms should have a bulletin board, an aquarium, various models, computer technology and simulations. Additionally, lesson plans should be flexible and serve learners' emotional needs (Mangan, 1998). Teachers should be able to link science courses with its sub disciplines as well as other disciplines such as physics, chemistry and biology. This integration of courses makes them more meaningful and interesting for learners as well as facilitating them for the learners who have different learning strategies (Mangan, 1998). There are various ways for teachers to integrate science courses with other disciplines. For instance, while teaching refraction of light, teachers might integrate the subject with another discipline's subject, namely the subject of "the colors" in art, or a composition course's subject such as "writing a report." In order to teach and learn science, the brain's thinking processes should be known. Teaching and learning science mostly depends on the use of social and emotional learning processes (Konecki& Schiller, 2003). Brain based learning improves contribution by working different instructing approaches while setting up a protected classroom condition where students are urged to go for broke (Jacobs, 1997). The process of science teaching, according to the brain-based learning approach, should employ thematic learning skills with a rich language which should be natural but complex at the same time. It should also include long-term structured projects and various evaluation techniques (Holloway, 2000). The use of abovementioned elements of brain based learning yields three important effects on learners and learning process. First of all, learners grasp the gist of how learning takes place since they are involved in the learning process actively. Secondly, they discover that learning depends on their abilities to externalize their knowledge rather than focus on the marks they get in their exams. Finally, they understand that knowing how to think will support their studies.

The Brain Based Teaching Approach

The Brain Based Teaching Approach is a strategy implemented based on the Brain Based Learning Principles developed by Caine & Caine (1991, 2003) via three instructional techniques associated with these principles. The Brain Based Learning Principles are:

1. The brain is a parallel processor.
2. Learning engages the whole physiology.
3. The search for meaning is innate.
4. The search for meaning comes through patterning.
5. Emotions are critical to patterning.
6. The brain processes wholes and parts simultaneously.
7. Learning involves both focused attention and peripheral perception.
8. Learning always involves both conscious and unconscious processes.
9. We have at least two types of memory: A spatial memory system and a set of systems for rote learning.
10. We understand and remember best when facts and skills are embedded in natural, spatial memory.
11. Learning is enhanced by challenge and inhibited by threat.
12. Each brain is unique.

The three instructional techniques associated with brain-based learning are:
(i) Orchestrated Immersion - makes a learning situation that completely inundates understudies in numerous instructive encounters;
(ii) Relaxed Alertness - kills fear in the students while keeping up exceptionally difficult situations;

(iii) Active Processing - enables the student to combine and disguise data by currently preparing it. (Caine and Caine, 1991, 2003) Dissimilar to customary strategies for tutoring, which is frequently said to hinder learning by disregarding the mind's characteristic learning forms, the Cerebrum Based Showing Methodology is accepted to support learning because of its comprehensive approach towards the students.

It is an approach to learning which favors the brain's best natural operational principles, with the goal of attaining maximum attention, understanding, meaning and memory (Jensen, 1996.In opposition to the past understanding that learning includes just the "upper piece of the human body", this approach holds fast to the thought that learning includes the entire physiology of an individual (Caine and Caine, 1991, 2003; Jensen, 1998). Understudies will learn best if learning is "credible", as in it manages true issues and applications (Caine & Caine, 1991, 2003; Sousa, 1995, 1998; Jensen, 1998). As brain development and growth is dependent on an individual's experiences, the challenge, really, is for teachers to vary their methods of teaching and shift the paradigm from a "one fits all" to an "enriched environment" for each and every student (Caine & Caine, 1991, 2003; Jensen, 1998; Evan, 2007). The role of teachers is to provide the appropriate classroom climate, which emphasizes on instructions that accommodate how the brain learns, that will enhance brain functionality in processing and constructing data properly, according to the individual learner's level. Although there have been a number of arguments regarding this approach, powerful insights that are significant to classroom learning have emerged from this brain science strategy. They include: 'learning encounters do enable the mind to develop, enthusiastic security influences learning, and making lessons pertinent can help data to stick' (Benard).

Implementation of Brain Based Teaching Approach

The Brain Based Teaching Approach in this research was generally implemented based on the integration of 'Brain Based Learning Principles' (Caine & Caine, 1991, 2003; Sousa 1995; Jen-sen, 1996) through seven brain compatible instructional phases (Sousa, 1995; Smith 2003): *(i) Activation; (ii) Clarification of the outcome and painting the big picture of the lesson; (iii) Ma-king the connection; (iv) Doing the learning activity; (v) Demonstration of student understan-ding; (vi) Review of student recall and retention;* and *(vii) Previewing the new topic*. Optimal learning state integrating relaxed alertness, orchestrated immersion and active processing instructional techniques is the main feature of this approach. In particular;

(i) Activation is the phase where we activate students' memory processor sys-tem (prior knowledge) in order to stimulate their learning transfer process.

(ii) Clarify the outcomes and paint the big picture is the phase where students affirm for themselves their personal performance target, activate the right brain processor prior to the left brain, and alleviate anxieties over the accessibility and relevance of the material.

(iii) Making connection and develop meaning is the stage where the topic or unit of work about to be completed is connected to what has been done before with what is yet to come. It builds on what the learners already know and understand and helps them assimilate and integrate new information. These three phases of teaching activities are thought to be able to create "relaxed alertness" among students.

(iv) Doing the learning activity is the stage for digesting, thinking about, reflecting on and making sense of experience utilizing visualization, auditory, kinesthetic in multiple contexts as well as to access all of the multiple intelligences. Here, students were encouraged to be in the state of "orchestrated immersion", which immerses them in multisensory experiences.

(v) Demonstrating students' understanding is the stage for brain-active processing. This phase allows students to consolidate and internalize information effectively when they are actively engaged with the knowledge itself.

(vi) Review for students' retention is the activity that stimulates working memory to summarize the lesson, which helps to strengthen the transfer process.

(vii) Preview the next topic is the experience that helps the brain pre-processor and the reptilian brain to focus on the new lesson. This is important to prepare the brain for the new learning activities.

CONCLUSION

From this it is understood that brain based learning focuses on concepts that create an opportunity to maximize attainment and retention of information. Also it can be applied to the learning process to understand the structure of the brain by considering the needs and styles of learners to evaluate and improve the course format and content delivery. Brain based teaching approach enhanced learning by enriching an emotional climate in the classroom.Particularly it enhances the science subjects. It is purely learner centered and teacher facilitator approach. This new approach helps to maintain good working relationship with teachers and students and making learning meaningful and a joyfulexperience.

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