“CELEBRATION OF THE NEURONS”; THE APPLICATION OF BRAIN BASED LEARNING IN CLASSROOM ENVIROMENT

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ABSTRACT

The purpose of this study is to investigate approaches and techniques related to how brain based learning used in classroom atmosphere. This general purpose were answered following the questions; 1. What is the aim of brain based learning, 2. What are general approaches and techniques that brain based learning used? 3. How should be used brain based learning on learning-teaching process in classroom atmosphere.

Keywords: Brain based learning and teaching, strategies, neurons, neuroscience.

ÖZET

Beyin araştırmalarının eğitime uyarlanışının sonuçları, başarılı bir eğitimin insanın öncelikle kendini tanıması ve keşfetmesine; nasıl öğrendiğini öğrenmesine bağlı olduğunu gösteriyor. Her öğrenme düzeyine sahip tüm öğrenciler için başarılı, yaratıcı, yapıcı, eleştirel ve olasılık temelli bir öğrenme ortamı ve süreci yaratmak için zenginleştirilmiş ve bütünleştirilmiş bir metodolojinin kullanılması gerekmektedir.

Zenginleştirilmiş bir metodoloji ise bilişsel ve nöropsikoloji gibi beyin araştırmalarının bulgularına dayandırılmalıdır. Çünkü beyin saniyede 100 bytlık veri işlem kapasitesine sahiptir. Bu bilgiler sınıftaki öğrenme-öğretme sürecinin uygulamalarının doğrudan bir doğurgusu, sonucu ve ürünü olması gerekir. Her uyarıcı beyin hücrelerinde değerlendirilmeye tabi tutulmaktadır. Peki bu uyarıcıların ne kadarını bilinçli bir yöntemle işe koşuyoruz? Öğrencilerin bilgiyi paylaşabilmeleri için her on dakika da bilginin işlenmesinde öğrencilere iki dakikalık zaman verilmeli midir? Neden? İkincil ve önemsiz ya da çevresel bilgi ve bilinti, öğrenmeyi kolaylaştırmak için amaçlı olarak nasıl organize edilebilir? Fizyolojik fonksiyonlarımızı etkileyen her şey nasıl olurda akademik başarılarımızda öğrenme ve bellek kapasitemizi artırabilmektedir?

Bu çalışmanın amacı beyin temelli öğrenmenin sınıf ortamında nasıl uygulanması gerektiğine ilişkin yaklaşımları irdelemektir. Bu genel amaç çerçevesinde; 1. Beyin temelli öğrenmenin genel amacı nedir? 2. Beyin temelli öğrenmenin uygulanmasında kullanılan genel yaklaşımlar nelerdir? 3. Beyin temelli öğrenme sınıf ortamında nasıl uygulanmalıdır? Bu çalışma tarama türünde bir çalışmadır. beyin temelli öğrenmeye ilişkin literatür taranarak sınıf ortamında nasıl uygulanabileceğine dair bir çalışma örneği sunmaktadır.

Anahtar Kavramlar: Beyin temelli öğrenme ve öğretme, stratejiler, nöronlar, nöropsikoloji

GİRİŞ

It's important to understand the complexity of the human brain. The 1990’s were recognized by the President of the United States and the Congress as the Decade of the Brain. The two past 10 years, known as the Decade of the Brain, a number of scientists have been using new technologies such as Magnetic Resonance Imaging (MRI), Functional MRI (fMRI), and Positron Emission Topography (PET) scans (Pinker, 2000; Sylwester, 2000; Jensen, 2000; Sousa, 2000,) Those tests help scientists explore how human brains process memory, emotion, attention, patterning, and context -- among other areas in this vast area of inquiry. We have learned more about the brain in the past five years than in the previous one hundred. Almost ninety percent of all neuroscientists who ever lived are alive today (Roberts, 2002).

Brain-based research deals with learning teaching processing in classroom concerns, such as all of the sensory perception, consciousness, unconsciousness, attention, attitudes, behaviors, memories, and how emotions affect learning and how the brain works and learning (Goleman, 1995; LeDoux, 1996; Pert, 1997; and Sprenger, 1999). and a "celebration of neurons-an educator's guide to the human brain" and how the brain works (Sylwester, 2001). Significant work by Petitto (2003) and Zull (2002) led to the discovery of the principles of the brain works related to the biology, chemistry, and psychology of learning. Indeed, brain researches on teaching-learning studies can enable educators in a multiply intelligence and enriched environments setting to understand and apply strategies of teaching and learning-for example, it is discussed what are the effecting factors on students’ achievements in teaching-learning processing in classroom (Dhority and Jensen, 1998;Jensen, 1998; 2000; Genesee (2000);
According to Zadina (2004), the objectivities of brain research studies include that teaching to individual differences, diversifying teaching strategies, and maximizing the brain's natural learning processes. Neuroscience is based on information obtained through autopsies, experiments, and different types of scans -- MRIs, EEGs, PET and CAT scans, as well as the most recent brain research lab studies in neuroscience. Thus, technologies in medicine have paved the way for many new learning innovations, and determine how brain learning actually occurs (Duman, 2006; 2007).

The nature of cognition, the functioning of the human brain, and the construction of knowledge are tied to one another. Neural scientists and educators are identifying how an understanding of the brain can improve pedagogy and increase the potential of students of all ages (Slavkin, 2002).

What is brain based learning? Brain-based learning has been formed using approaches which is neuroscientific research

finding and common sense and derived from an exploration and investigating of many disciplines and are viewed as a framework for thinking and learning to thinking and learning.

Many educationalists are influenced by recent research into how the human brain learns and works and draw on some of the implications of this research for teachers, students, parents, and schools. Bruer, 1999; deBono,1984; Kolb,1984; Kovalik, 1984; Jensen, 2000; Sousa, 2000; Sprenger, 1999;Ciane and Caine, 1994;1997;1999;Cudler, 1994; Sylwester, 1999) have long argued that teaching-learning approaches in schools have not developed in accord with this research.

Brain-based educators tend to support progressive education reforms. They decry the "factory model of education," in which experts create knowledge, teachers disseminate it, and students are graded on how much of it they can absorb and retain. Like many other educators, brain-based educators favor a constructivist, active learning model. Students should be actively engaged in learning and in guiding their own instruction. Brain enthusiasts see neuroscience as perhaps the best weapon with which to destroy our outdated factory model (Bruer, 1999).

Structure of neurons

"The human brain is the best-organized, most functional three pounds of matter in the known universe," says educator Robert Sylwester in his book, A Celebration of Neurons: An Educator's Guide to the Human Brain. The neurons branch and can connect with other nerve cells. The neuron is composed of the dendrites, soma (cell body), axon, and axon end-bulbs.

The basic structures of the neuron are dendrites, the cell body, and the axon. Dendrites are described as multiple branches that typically protrude from the cell body. These branches act as channels for incoming information from other neurons. The dendrites send this information as an electrical signal to the cell body where it is then sent to an additional process called the axon (Beatty, 1995).

The nucleus and other organelles are located in the cell body or the soma of the neuron. The axon is one long continuous extension from the cell body. These basic components of the neuron can be found in various arrangements depending on the location of the neuron in the body (Beatty, 1995). A synapse which is a gap between the cells, an invisible bridge transmits messages between neurons via the axon A synapse that allows the neurons to communicate as information travels through the brain. When neurons repetitively communicate with each other, a neural network is formed (Sprenger, 2002; Stevens & Goldberg, 2000).

The communication between the cells occurs through electrical stimulation and chemical changes. The neuron receives incoming signals through the dendrites. The axon carries the message away from the soma to the branches at the end of the axon and onto the terminal end-bulbs. The message then crosses the synapse to be picked up by the dendrites of the next neuron. If enough impulses reach a neuron, it will fire or generate a nerve impulse. Chemicals in the synapse serve as conductors for the message. These are the neurotransmitters. The neurotransmitter associated with learning is acetylcholine (Walls, 1999). Edelman says: "The nervous system behavior is to some extent self-generated in loops: Brain activity leads to movement, which leads to further sensation and perception and still further movement. The layers and loops between them are the most intricate of any object we know, and they are dynamic. They continually change. Parts of the brain (indeed, the major portion of its tissues) receive input only from other parts of the brain, and they give outputs to other parts without intervention from the outside world. The brain might be said to be in touch more with itself than with anything else."

What is aim of brain based learning?

Approaches of brain-based learning-teaching integrate the engagement of emotions, nutrition, enriched environments, music, thematic learning, integrating curriculum, movement, meaning-making, and the absence of threat for maximum learner participation and achievement. A basic premise is that we are all natural learners.

The aim of the brain based instruction is to pass from memorizing through meaningful learning. It requires these three interactive element; 1. Relaxed alertness. 2. Immersion. 3. Active processing (Caine and Caine, 1990). Instead, brain-based learning emphasizes contextual learning and engages learners in decision-making, forming cooperative groups, locating resources, and applying the knowledge.

How should be classroom environment?

The brain evolves as a result of interactions with the environment (Sylwester, 1994). The brain is designed to perceive and organize patterns. Patterning is part of the brain's physiology. Neural cells form patterns. When previously acknowledge patterns are challenged or changed, learning occurs. Herb's neural learning theory, Lawson's code theory, and Hart's Proster theory are all based on the perception of patterns (Caine, 1994). Brain-based approaches to learning begin with the question, How does the brain respond to this?(Greenleaf, 2003).

What are Key factors of bran based learning activities in classroom?

Brain-based learning requires a more systemic way of conceptualizing how learning takes place and how to facilitate it. Brain based learning-teaching strategies also encompasses such educational concepts and learning and teaching strategies such as: mastery learning, learning styles, multiple intelligences, cooperative learning, practical simulations, experiential learning, problem-based learning movement education (Wilson, 2007).

Brain-based learning strategies can be used by educators. Over ninety percent of all neuroscientists are alive and still practicing today. According to Gray E. Myran and Laura Erlauer (1999, 34-40) these brain based strategies should be used in different levels and content areas in class: using movement, using music, using personal stories, using humor, using metaphors, using colors, using the first 15-20 minutes of the course as an effective teaching time, using brainstorming that is related with knowing, wanting to know, learn and using the learned things, using project presentation…etc.

Absence of threat, Enriched class environment and use of the outside world as an adjunct, Nurturing reflective thinking Meaningful curriculum content, Choices for students - how they learn and how they demonstrate their learning, Adequate time to thoroughly explore and use information and skills, Physical movement, to enhance learning, Collaboration, rather than strictly individualized learning, Mastery and application – using what they learn in real-life situations to cement learning into long-term memory, Immediate feedback (Kovalik,1984).

Learning is based on emotions. Emotions strongly influence learning (Wolfe & Brandt, 1998). Emotions are innate, powerful, and mainly unconscious factors in learning (Sylwester, 2000). Neuro-biologist Patrick Levitt indicates that "Emotion is learning (Greenleaf, 2003).

The amygdale and the hippocampus are two structures in the mid-brain limbic area. Together, they play an active, highly integrated role in our personal actions, reactions, emotions, and motions. The almond-shaped, marble-sized amygdale sits atop the brain stem, interpreting input and regulating emotional and physical readiness associated with negative stress (for example, it prompts the flow of adrenaline into the system for fight-or-flight responses). The small green-bean-sized hippocampus is just behind the amygdale and serves to classify memory input to many brain areas. It is involved in the selection, classification, and storing of experiences and learning into long-term use (memory). Both structures are active in the stress-response system (Greenleaf,2003).

Learning involves focused attention and peripheral perception. To keep the students Attention on; 1. Integrate strong and reformist emotional connections with learning, 2. Use humor, 3. Allow movement, 4. Be aware of internal and external attention (Duman,2006).

Learning is enhanced by challenge and inhibited by threat. Threats can be academic or social. Teachers, authority figures and peers can all be threatening in various ways(Jensen, 2000). Effective pedagogy allows students to control their own learning while making it relevant for cognitive growth (Slavkin, 2002).

We learn best when we are challenged and believe that we can succeed, and we learn worst when we are threatened and feel helpless. Each of these two states comes with different configurations of neurochemical processes in the brain, physical responses in the body and psychological states of mind. Feeling threatened or helpless causes stress (Jensen, 2000).

Learning must be authentic. The physiology of the brain changes as a result of experience. The curriculum is current with real world problem solving. The context is useful and meaningful (Noe, 1998). Many teachers agree that the most effective way to teach students is to give them opportunities to make knowledge meaningful and relevant (Dozier, 1992; Guild, 1997; Sylwester, 1993/1994).

Classroom experiences should also be organized around real-world skills and practices, not just teaching information for the sake of information or rote memorization. Real-world experiences also improve motivation, increase knowledge retention, improve the authentic nature of the material, and reduce boredom in students (Slavkin, 2002). Learning should be structure around real problems and in teams.

Learning is dependent on enrichment processes. Enriched visual learning environments are important for **brain-based instruction.** Jensen (1998, 2000) and Sousa (1995; 2001) provided a wealth of information on how to create an appropriate learning environment. As a result of these studies, Diamond and others suggest that enriched environments encourage students to think in more complex ways, to improve their metacognitive skills, and to increase their ability to think for themselves (DArcangelo, 1998; Diamond & Hopson, 1999). Meaningful content is ones of the elements of a brain based (compatible) learning environment (Sousa, 2000; Kovalik, 1984).

Learning should be integrated. pedagogy allows students to show what they know, collaborate with one another on projects, incorporate thematic curriculums, reflect, and create goal-based learning opportunities that build upon themselves over the school year(Slavkin,2002). The multifaceted human brain learns best when there is multifaceted input activating the

brains pathways. Learning is always embedded in a complex array of external environmental stimuli and internal neurological, physiological, and psychological processes (Jensen, 2000).

Thematic instruction encourages students to connect meaningful activities to relevant practice. Through the application of evocative experiences and the relevance of complex situations in which learners are immersed, thematic instruction builds on prior knowledge and enhances comprehension (Caine et al., 2005; Caulfield, et al., 2000; Pool, 1997; Slavkin, 2004; Wagmeister & Shifrin, 2000; Wolfe, 2001).

Learning should be cooperative. Collaborative Learning–creating synergy. "If brain-based pedagogy could be summed up in one sentence, it would be, Knowledge should be socially created" (Slavkin, 2004). Have multiple resources available. Provide educational, physical and a variety of setting within the classroom so that learning activities can be integrated (Wilson,2007)

CONCLUSIONS

Understanding of the human brain is continually evolving, thus our interpretation of the implications of findings from brain-based research for teaching and learning should also continually develop. The brain is not only the control center of the entire human body, organizing our behaviors, emotions, movements, and biological functions, but it also is the seat of our humanity. Brain defines who we are, how we act, and the very nature of our species.

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