

IMPACT OF NEUROCOGNITION ON TEACHING COMPETENCY

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ABSTRACT

Teachers' can facilitate a life time of successful learning by equipping students with a repertoire of strategies and tools for learning. The teacher plays an important role in the educational process. Effective teaching depends upon the evolution of innovative strategies and also the methodology of teaching. As we gain a more scientifically based understanding about today's novel brain and how it learns, we must rethink about what we do in classroom and school. Neuro scientists are mapping the pathways between body and brain, providing tangible evidence of the benefits of hands-on, experimental learning. Neurocognitive process includes a number of human functions through neuronal networks. Brain cells communicating with each other through on electrochemical process. Neurocognition includes perceiving, recognizing, conceiving, judging and reasoning processes. The neurocognitive approach is based upon certain irrefutable facts concerning brain functions, which are applied to the intervention strategies of student teachers developmental difficulties. The teachers must develop the competencies like content competency, contextual competency, communication competency, classroom management and evaluation competency. In this paper, we discuss how the brain and its functions are helpful to the teachers in teaching and bringing out the dimensions of teaching competency such as induction, content, pedagogy, organisation and assessment. We elucidate the Neurocognitive strategies are how helpful to bring out the secrets of amygdala and hippocampus involving in teaching strategies. We also emphasize that the recent development of designing Neurocognitive programme that focus on both cognitive and social development has theoretical and practical challenges.

Keywords: Neurocognition, Teaching competency, Neuronal network, Amygdala and Hippocampus

INTRODUCTION

Teachers have a big hand in imparting knowledge to the innumerable members in a society. On the caliber of the teacher depends the success with which new methods are employed and adopted. Teacher education is concerned with equipping the future teachers. It includes theoretical instruction and practice teaching in order to develop the skills needed for teaching effectively. Effective teaching depends on the evolution of innovative strategies and also the methodology of teaching. The field of cognitive neuroscience has enjoyed an explosive growth of that specific brain areas could be activated during the process of visual and auditory words. As we gain a more scientifically based understanding about today's novel brain and how it learns, we must rethink about what we do in classroom and school. Neuro scientists are mapping the pathways between body and brain providing tangible evidence of the benefits of hands on experimental learning.

Neurocognitive process includes a number of human functions through neuronal networks. Brain cells communicate with each other through on electrochemical process. Neurocognition includes perceiving, recognizing, conceiving, judging and reasoning processes. The neurocognitive approach is based upon certain irrefutable facts concerning brain function, which are applied to the intervention strategies of student teacher's developmental difficulties. The teachers must develop the competencies like content competency, contextual competency, communication competency, classroom management and evaluation competency. In this paper, we discuss how the brain and its functions helpful to the teachers in teaching and bringing out the dimensions of teaching competency such as induction, content, pedagogy, organization and assessment. We elucidate how Neurocognitive strategies are helpful to bring out the secrets of amygdala and hippocampus involving in teaching strategies.

Teaching Competency and Neurocognition

The teacher competence includes thorough knowledge of the content. Competency means the right way of conveying units of knowledge, application and skills to students (Adrienne kozannaume 2008). The right way includes knowledge of content as

well as the process, methods and means of conveying them in an interesting way. In other words, it means a desired quality of job performance (Sutopo 2010). The training for competency has always been training for creating abilities or qualities that are placed in an actual job situation or context. A teacher competence mainly includes the strategies, understanding of students psychology and the process of thinking. In recent times, cognitive neuroscience researches have demanded the teaching competence to be redefined to meet the challenges.

Neurocognitive functions are cognitive functions closely linked to the function of particular areas, neural pathways, or cortical networks in the brain substrate layers of neurological matrix at the cellular molecular level. Therefore, their understanding is closely linked to the practice of neuropsychology and cognitive neuroscience, two disciplines that broadly seek to understand how the structure and function of the brain relates to perception defragmentation of concepts, memory embed, association and recall both in the thought process and behaviour (Dolors Girbau, 2007). Naturally, the learning process depends on the effective functioning of the brain. Clearly, teaching will be more effective if it uses methods which are aligned with how the brain best attends to understand and retain information (John J. Ratey M.D 2008). Teaching learning process is concerned with the functioning of the brain that facilitates information processing, restoration and retrieval.

Conceptual Understanding

Nuerocognitive process includes a number of human functions through neuronal net work, such as Neuronal Representation, Registration, Retrieval- STM, Frontal Cortex, Content evaluation, amygdala emotional evaluation, neocortex sensory association, thalamus neuronal network communication and sensory stimuli crude sensation (Stephen M. Stahl 2006). Every time we think, learn or communicate, a neuron in our brain sends a nerve impulse down its axon. The axon of one brain cell make multiple thousands of connection with many thousand other brain cells. The point where one brain cell connects to another is called a synapse. When the

nerve impulse (electromagnetic bio-chemical message) surges down the axon, it is fired across the synaptic gap via a chemical messenger called a neurotransmitter into the dendrite of the receiving brain cell. The nerve impulse then travels along the axon of this brain cell, across the synaptic gap to another brain cell and so on. When a neuron activates 'fires' another in this way, it's like a switch being turned on. Neurons fire like a line of falling dominoes. This activity is the process that creates the intricate pathway of thought, also called memory traces or neural pathway. Neuron can either 'excite' other neurons to make them function or they can 'inhibit' other neurons so they don't become active. Therefore there are different types of neurotransmitters that either excite or inhibit other neurons. Neurotransmitters are found in the food we eat. That is why, it is important to eat the right of brain foods in order to improve the effectiveness and efficiency of our mental process (Carl Pacifico, 2004).

The neurocognitive approach is based upon certain irrefutable facts concerning brain function, which are applied to the neurocognitive strategies of student teachers difficulties in their development. The main process of neurocognition is brain plasticity, neural firing, neural pathway, and neural wiring. It is now unchallengeable that the brain is capable of changing its structure and functioning in response to the environment in which it finds itself (Nicole Fiori, 2010). We can see this in the growth of new synaptic connections and the pruning of inefficient ones. The brain takes in information from the sensory environment, through the eyes, ears, nose, mouth and skin. Specific areas are responsible for processing this information and then re-routing it to the appropriate part of the cortex for further attention, evaluation and action. When the brain is working as it should, then all of this is achieved with the maximum efficiency, without us ever noticing what is occurring. However, as we are all aware, the brain does not always work as it should for many student teachers, this sensory information either does not reach the relevant part of cortex at all, or if it does, the signal has been weakened sufficiently so that processing becomes almost impossible. For other student teachers, the sensory stimuli reaches the cortex for processing in a distorted manner and the student teachers is overwhelmed by the world it perceives (J. S. Brekke 2009). What neurocognitive strategies try to do is to manipulate the sensory environment to which the student teacher is exposed in order to encourage the regions of the brain, which are responsible for processing the sensory stimuli to re-tune and to process information more normally. We understand that before we can focus on what we need to learn, and what we need to help us repair our ability to learn (Parimala.M, 2009). The neurocognitive intervention strategies can bring about student teachers competencies and skills.

Brain Function and teaching competency-Overview

Teacher plays a vital role in moulding the minds of the students in classroom activities. Skilled and experienced teachers can do this by their experience. We must remember that the brains biology influences a person is exposed to cuddling or abuse, talking or silence, mentoring or scolding, support or ridicule-alter the brains network of neural connections.

Frontal Lobe

Frontal lobe and amygdala play a vital role in reasoning, planning, problem solving in such way of how we interact with our surroundings, how we react to our environment, our judgments on daily routines, our emotional responses, our expressive language, assigns meaning to words we choose, involves word association, memory for habits and motor activities. It leads the teacher how to execute the competencies of content, contextual, conceptual and transactional, and also it develops the dimensions of induction competent, pedagogy competent and assessment competent.

Parietal Lobe

Parietal lobe which is mainly for recognition, orientation and perception, stimulates the information processing, movement, speech, touch sensation and cognition. Neurocognitive Intervention strategies of visual perception, perceptive pattern and conceptual

retrieval are functioning here and execute the competencies of content, conceptual, management and transactional. It develops the dimensions of organisation competent and assessment competent.

Occipital Lobe

The smallest of all the four lobes, the occipital lobe is located on the tentorium cerebelli that separates the cerebrum from the cerebellum. It is responsible for visual perception system, as it contains the primary visual cortex. The functions of the occipital lobe include visual reception, visual-spatial processing, movement and colour recognition. Occipital lobe interludes all the neurocognitive intervention strategies of teaching and execute the content competency, contextual competency and conceptual competency through visual processing. It develops the dimensions of pedagogical competent, organisational competent and assessment competent.

Temporal Lobe

There are two temporal lobes, each of which are located on each side of the brain; left and right, at about the level of the ears. The functions of both (left and right) temporal lobes include distinguishing and discrimination of smell and sound from other smells and sounds respectively. Between them, they control visual memory (right lobe) and verbal memory (left lobe), and thus, hearing, speech and memory. Temporal lobe and hippocampus lead the intervention strategies of visual perception, perceptive pattern and conceptual retrieval, in teaching and execute the content competency, contextual competency and transactional competency to the learners. Also it develops the dimensions of pedagogical competent, organisation competent and assessment competent.

Limbic System

The Limbic System sometimes called the "emotional brain" This is where our emotions reside, where memory begins and where these two functions combine together to mark behaviours with positive or negative feelings. It's where mostly unconscious value judgements are made. Information going through the Limbic System are filed under "agreeable or disagreeable". It also plays a role in salience (what grabs our attention), spontaneity and creativity.

The Cerebellum

The cerebellum is very much involved with the integration of information and the timeliness, with which the information gets processed all crucial to thinking, learning, balance, equilibrium and memory. Learning requires us to practice, rehearse, and step through the process to develop new skills, thoughts, and ideas. Learning, memory and thought require the manipulation of knowledge. To think, learn and remember, we need to interpret or convert this knowledge in to action. The cerebellum executes the management, evaluation and transactional competencies also it develops the dimensions of pedagogy and organisation competents.

The Amygdala – Centre of Aggression

The amygdala is the part of the limbic system that is located at the base of the temporal lobe and is involved in producing our emotions, especially fear appetite, sexuality and aggression. The upper cortex and the lower limbic structures are in continuous communication with each other. There are many more connections from the small emotional centers than the reverse, which may be the reason the emotions are more dominant in determining behaviour and why we sometimes react or speak before we think (John J. Ratey M.D 2008). The nucleus accumbens is a central player in the reward system. This small cluster of cells is located in the forebrain and is well connected to the amygdala and other parts of the limbic system. It has been identified as the principal pleasure center of the brain. It contains one of the highest stores of dopamine in the entire brain, and is sensitive to other pleasure neuro transmitters such as serotonin and endorphins. These chemicals are key factors in feeling satisfied and rewarded and therefore in providing motivation. In problematic situation, the amygdala, in turn, activates the anterior cingulate and hypothalamus, which then switch on the autonomic nervous system, the motor system and the endocrine

system, which causes body organs to adjust to the demands of the situation.

CONCLUSION

As far as teaching learning process is concerned, the functioning of the brain facilitates information processing, restoration and retrieval. The teachers should be fully aware of all the brain functions to make their teaching effective. Also they aware of the factors like Instructional procedure, model using the strategy, think about, start with simplified material, complete part of the task for the students, present material in small steps, anticipate student errors and difficult areas, provide models of expert work, suggest fix up strategies, increase students responsibility influencing in teaching competency. We suggest that, if the teacher may follow some of the following neurocognitive practice such as Affective education, Relaxation training, Cognitive restructuring, Attribution retraining, Problem solving, Contingent -reinforcement, Neural Modeling, Neural Plasticity, Neural rewiring, Neural firing, Neural tuning and Emotional integration to overcome their inefficiency and this will be definitely help them to take their roles confidently in enhancing their teaching competency in the classroom situation. Hence, there is an urgent need to steer our efforts towards the implementation of neurocognition to enhance teaching competency at all levels of Teacher Education.

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