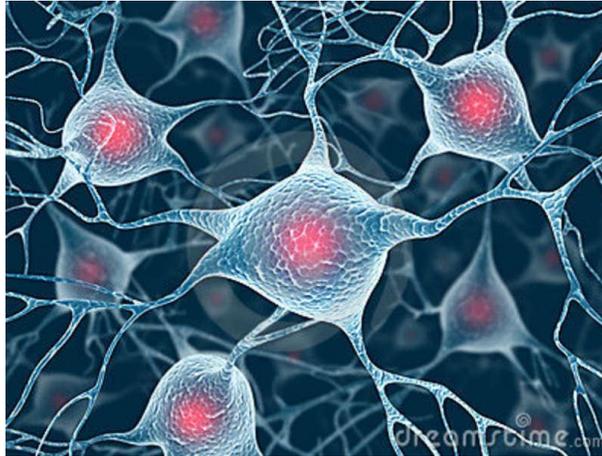


Impact of Neurons in Enhancing Problem Solving Ability



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Abstract

This study is an attempt to discuss the impact of neurons on problem solving ability. Cognitive neuroscience is an academic field concerned with the scientific study of biological mechanisms underlying cognition, with a specific focus on the neural substrates of mental processes and their behavioral manifestations. A neuron is a nerve cell that is the basic building block of the nervous system. Neurons are similar to other cells in the human body in a number of ways, but there is one key difference between neurons and other cells. Neurons are specialized to transmit information throughout the body. The teaching of mathematics presents numerous problems for the teacher of mathematics. The methodology adopted by the teacher in the classroom needs frequent change as the student's aptitude and attitude vary year after year. Education is a continuous process on developing the personality of an individual. It aims at the overall development of teaching techniques to solve the problems. For effective learning of Mathematics subject, constant and continuous understanding is a must. The learner can attain the goal. Only after overlooking his distractions, deviations, disturbances, defects, and discriminating and determining the facts previously. Hence a necessity arises to know about the effective and innovative neurocognitive strategies in problem solving ability.

Key Words: Neuron, Neurocognition, Mathematics and Problem Solving Ability

1. Introduction

Education is a process of bringing about changes in the individual in desired direction such as development of interest, attitudes and skills to carry out the certain activities. The teaching of mathematics presents numerous problems for the teacher of mathematics. The methodology adopted by the teacher in the classroom needs frequent change as the student's aptitude and attitude vary year after year. Education is a continuous process on developing the personality of an individual. It aims at the overall development of teaching techniques to solve the problems. For effective learning of Mathematics subject, constant and continuous understanding is a must. The learner can attain the goal. Only after overlooking his distractions, deviations, disturbances, defects, and discriminating and determining the facts previously. Hence a necessity arises to know about the effective and innovative neurocognitive strategies in problem solving ability.

2. Discussion

Teachers can help an individual to set realistic goals, gain social skills and react full potential. With the proper tools and instructional methods, a good teacher encourages each member of the class to participate directly in the learning experience

- To provide useful alternatives in terms of both curricular materials and instructional delivery.
- The challenges posed by the biological development and the results of neuro-psychological studies demand a comprehensive teaching methodology to adopt a suitable design in the class room.

Learning is an active process in which meaning is accomplished on the basis of experience. We each construct a unique image by combining information we receive from our sense organs.

3. Conceptual Understanding in Mathematics

In the words of the National Council of Teachers of Mathematics (NCTM): A conceptual approach enables children to acquire clear and stable concepts by constructing meaning in the context of physical situations and allows mathematical abstractions to emerge from empirical experience. A strong conceptual framework also provides anchoring for skill acquisition. Skills can be acquired in ways that makes sense to children and in ways that result in more effective learning. A strong emphasis on Mathematical concepts and understanding also supports the development of problem solving. Problem solving is considered as a heart of mathematic learning, because the skill is not only for learning the subject but it emphasizes on developing thinking skills and methods as well. Students can apply their knowledge and problem solving skills to be useful in daily life since the processes of solving the mathematic problem are similar to the general problem solving. Mathematical problem is the tool used as not only to help students develop their thinking ability but it also helps them to develop their basic skills of solving the problems especially a problem in daily life. The goal of teaching Mathematics to be effective was that the students were able to solve its problem. Problem solving is characterized by divergent thinking. The instructor poses a problem and the learner*engages in active inquiry in order to discover one or more solution.

- Encourages active investigation in any direction by the learner.
- Allowing the discovery of possible alternative solutions.

Goleman argue that there exist two separate minds (intelligences), that is the emotional mind, and rational mind. One, that thinks and one, that feels. The emotional mind is far quicker than the rational mind, because the rational mind takes some time to register and respond to the situations.

4. Importance of Neurocognition

Effective teaching in problem solving ability is effective precisely because they are brain based. The first three years of a child's life should be filled with enriching experiences provided by the parents or caretakers. These experiences create connections in the brain that form the foundation for spoken language, reading, comprehension of written language writing and problem solving. Dr.Harry Chugani, a neurologist using PET scans, and MRI's has discovered how the brain can be altered permanently due to lack of parental nurturing and enriching experiences. The brain prefers to input information in a hierarchy depending on the number of senses engaged. The brain takes information in symbolic input found in the form of letters that create words, numbers that create maths problems, equations and formulas found in maths is the most difficult for the brain because it engages only one or two of the 19 senses. The limbic system is the gatekeeper for the brain and filters all information entering. Parts of the limbic system process the information depending on whether or not the person "feels" safe. Teachers can help students understand their emotions on the ability of cerebral cortex to use the information to build mental programs and enhance the ability of the cerebral cortex to process information and create permanent program.

5. Role of Neurons in Learning

Teaching will be more effective if it is use methods which are aligned with how the brain best attends to understands and **retain** information. The sequences of thinking measured across very narrow areas of the brain. Today's research encourages a "whole brain "approach to learning.The sense organs gather information about the 'environment' and through learning this information is coded in the nervous system. What does it mean to gather information and what is The sense organs gather information about the 'environment' and through learning this information is coded in the nervous system. What does it mean to gather information and what is coded in the genetic and nervous systems. A successful theory of cognition would answer both the epistemological and the biological question. The functional organization of the cognizant organism that gives rose to such phenomena as **conceptual** thinking, language and self-consciousness. For the understanding of the functional organization of the nervous system, it is necessary to consider that nerve cells respond at any moment with definite transfer functioning to classes of afferent spatio-temporal configuration s in their input, generating definite states of effector activity and not to particular afferent state. The study of neural oscillations belongs to the field of 'neurodynamics' an area of research in the cognitive sciences that places a strong focus upon the dynamic character of neural activity in describing **brain** functions. Neurons generate action potentials that reflect changes in the electric membrane potential. Neurons can generate multiple action potentials in sequence forming so-called **spike**

brains. These spike brains are the basis for *neural coding* and information transfer in the brain. Different types of coding schemes have been proposed , such as rate coding and temporal coding. In human , brain activity consistent with that of mirror neurons has been found in the premotor cortex, the supplementary motor area , the primary somatosensory cortex and the inferior parietal cortex.

6. Role of Mirror Neurons on Problem Solving Ability

Mirror neurons were first described in 1992 , be the one of the important recent discoveries in neuroscience, in imitation and language acquisition . These mirror neurons may be important for understanding the actions of other people, and for learning new skills by imitation. Mirror neurons have been the potential to provide a mechanism for action – understanding, imitation learning and simulation of other people’s behaviour. The properties of mirror neurons indicate that primate brain is endowed with a mechanism mapping the pictorial description of actions, carried out in the higher order visual areas into their motor counterpart. Motor neuron system provides a motor copy of the observed actions. Thus, it appears to be the ideal mechanism for imitation. In humans , mirror neuron system is involved in immediate repetition of actions done by others.(Iacoboni 1999) as well as in imitation learning. (Buccino et al. 2004 There are two distinct information that one can get observing an action done by another individual One is ‘what’ the actor is doing, the other is ‘why’ the actor is doing it. The functional role of the mirror neurons are action-understanding, imitation, intention understanding and empathy. (Rizzolatti and Craighero 2004 and Galese et as 2004)

7. Rewire Our Brain for Success

We have the capacity to learn and keep learning as long as we live. We only need to know how to rewire the brain’s connections.If we looked at any of the previous excuses with a positive attitude and in a problem solving mood, we could find a way to change. Our thought patterns are formed much like a well-worn path. We have repeated our patterns of behaviour so many times that they become familiar habits formed by regular use. We form our reasoning based on what we’ve experienced in the past and habitually use.If we are not giving attention to our thought patterns, it will be impossible to make changes. If we want to do anything different, explore new territory. Each neuron in our brain responds to the strength or weakness of our decisions. It has the properties of a transducer, a conductor and a transmitter of electrical impulses converting energy from one form to another .As a transducer the neuron converts the stimulus energy from the outside world into electrical signals. As a conductor the neuron propagates or conducts the signals from the dendrites to the cell body and then down the axon. As the transmitter, the neuron converts the electrical signals into chemical messages and transmits them from one neuron to a neighbouring neuron. The flow of information takes place from the dendrites to the cell body and then along the axon to the dendrites of the next cell. The brain is constantly changing. It can alter its structure, generate new neurons, adapt, heal, renew itself after trauma and change deep seated emotions and behaviours throughout life. Brain cells are undergoing continual remodelling and reorganization as a result of thoughts and experiences. Research also teaches us that in order to change the brain, we have to harness the power of the mind and especially focus our will and attention in the right way. The

behaviour changes that we need to make in order to achieve a goal, especially one we have been unsuccessful at capturing in the past, are driven by a strong desire to create a new future for ourselves. That's where our internal motivation starts. If we don't create an unbreakable connection to that new and better future, motivation will quickly fall victim to old habits and behaviours. Think of all the research, effort, thought and visualization we might put into vacation Engagement, Work, Imagination, Repetition, Enjoyment is what it takes to REWIRE our brain for success.

8. Conclusion

Content and Language integrated Learning refers to teaching of non-linguistic subjects like Mathematics through an additional language. It is an excellent way to contribute to the enhancement of thinking processes. Mathematics education has generally sought quantitative relationships between language attainments. According to Vygotsky thinking involves the use of words and notions. Speech is a tool to develop thinking. Hence, language acquisition in the learners their main concern should be to scaffold them on their way towards achieving mathematical competences. The teacher's task is to enable the students develop their individuality different process of knowledge building and meaning construction as well as positive attitudes. Hence, the teacher of Mathematics one who can control his/her class not through fear or high handedness but by virtue of his interest in the learner, good command on the subject matter and the ability to present it interestingly and effectively.

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