The Classical Brain

by Karen Blankenbeckler

Classical education is an ancient approach. How can an educational philosophy reaching back to the 10th century be relevant to students today? Should the methods change to keep up with the ever-changing environment? Neuroscientists have done a tremendous amount of research on the brain in the last fifteen years and some people may be surprised to hear that the research supports the classical approach. While no one would claim that the findings of current brain research can or should completely prescribe teaching methods, there are many exciting discoveries that help us better understand the brain and support methods of classical education.

Perhaps the greatest opposition to the classical approach comes from modern education proponents who criticize the concentration and focus on the grammar stage and on memorization, repetition, skill rehearsal, and general knowledge acquisition. Some educators argue that in this day and age the knowledge that students must master is overwhelming in quantity and it is not necessary to commit it to memory. They claim we must instead teach our students to "access information," think critically, and problem solve. We would all agree that problem-solving skills and critical thinking are important and it is true that students can access information at the touch of a button; therefore, this argument may seem valid at first glance. However, brain research supports the idea that brain development in the early years is critical, and activities such as memorization, repetition, and review can structurally and chemically change the make-up of the brain. The development in the brain that occurs through knowledge acquisition, memorization, and repetition is essential in allowing the type of connections that must happen for problem solving and critical reasoning.

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It is important to start with some basic brain anatomy and then examine what learning does to enrich the brain. The brain is an oblong organ weighing about three pounds. It is surrounded by the cerebral cortex, which is a wrinkled covering of cells about one quarter inch thick. Neuroscientist and professor of neuroanatomy at University of California Berkeley, Marian Diamond, states, "If I had to teach educators what they need to know most about the brain, I would teach about the cerebral cortex. That's where higher cognitive processing occurs."[1] The nerve cells that make up the cerebral cortex cannot increase in number, but studies have shown that the number of branches or dendrites that act as receptors can be increased. This is important because it is these connections that create learning and memory. As students exercise their brains through grammar stage experiences such as memorization, repetition, and review they are actually growing more dendrite branches which allow the brain to build up its strength and ability to acquire more information. Ronald Kotulak, author of the book *Inside the Brain*, uses the metaphor of a banquet to show the importance of the learning environment. "The brain gobbles up the external environment through its sensory system and then reassembles the digested world in the form of trillions of connections which are constantly growing or dying, becoming stronger or weaker depending on the richness of the banquet."[2] When students are learning the grammar of any subject, the banquet must be rich in order to build and strengthen connections in the brain.

Brain research also supports the idea that some abilities are more easily acquired during certain sensitive time periods or windows of opportunity. While we cannot increase the number of neurons within the cerebral cortex, there is an explosive growth of dendrites in the first eight to ten years of life. When the dendrites increase they add to the surface area available for synapses which act as functional connections among the cells. At peak times these connections are built at the

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speed of three billion per second. From birth to age ten the number of these synaptic connections rises rapidly. After that time, if the dendrite branches have not made connections, they die off. The need to increase and strengthen the dendrites highlights again the significance of specific focus on memory, repetition, and review during early learning.

Should this lead classical school educators to the conclusion that all instruction in the early years should be geared toward the grammar stage? While emphasis in grammar is critical for brain development, brain research supports the need for educators of young students to also provide learning activities that are commonly applied in the dialectic stage. As the brain accumulates knowledge, experiences, and information it stores that information in short-term memory. After a period of time if that stored information has not been used in any meaningful way through application, connection with other information, or reasoning then the learner is unable to access that memory. Information that has been used will move into long-term memory and more permanent storage. This supports the need for learning to start with the grammar of a subject area and then move into the dialectic where students are reasoning, problem solving, wrestling with ideas, challenging, considering, and resolving. The most powerful brain activity is happening when the brain has prior knowledge through memorization or experience, reviews that information to strengthen the dendrites and then makes connection through pathways in the brain that require the learner to apply information to new situations, to reason, and to problem solve.

This leads to some recommendations for teachers as they seek to apply brain research to lesson planning and instruction. When approaching content, teachers should begin by helping students acquire new information, knowledge, or skills in an enriched classroom environment. Next, review information through repetition and practice, thereby growing new dendrites and strengthening pathways. Then provide opportunities for the students to apply that information through reasoning, problem solving, wrestling with ideas, and application, which moves the knowledge into permanent memory storage. While this is a very simplified outline of the learning process, it can provide a framework for structuring the approach in a classroom.

Experts in the brain research field advise educators to study brain development in order to have a better understanding of the learners in the classroom and how the teacher may alter the brain by providing an enriched environment. However, neuroscientists caution educators to avoid jumping to quick conclusions and fad approaches, but rather to combine what we know about the brain with what educators know through tested teaching methods. The classical approach is a tested method that has produced many of the world's most influential scientists, philosophers, and leaders. It is fascinating to see how the findings in brain research support this approach.

ENDNOTES

1. Marcia D'Arcangelo, "The Brains Behind the Brain," *Educational Leadership*, November 1998, 20.

2. Ronald Katulak, *Inside the Brain: Revolutionary Discoveries of How the Mind Works* (Riverside, NJ: Andrews McMeel Publishing, 1997), p. 4.

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