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Mining the Middle School Mind

The middle school student may be a walking contradiction, but the opportunity to change the shape of their brains is still one of our greatest challenges—and our greatest opportunities.

by David Vawter

Middle school students are walking dichotomies. They can talk about world peace and then hit the kid next to them. They can recycle to ease global warming only to leave the cafeteria a mess. Why? Well, scientifically, it's because their brains don't work.

When we look at middle school students, we can plainly see the evidence of physical maturity. Some students look as if they could be in high school, and more than one administrator has wondered if the mother of that girl approved her outfit. Other students look as if they snuck in from the elementary school.

But even though we can see the difference in physical maturity, we cannot see the difference in mental maturity. And while we know that physical and mental maturity occur at different rates, middle school personnel often assume that a more physically mature student should also demonstrate an equal maturity in mental processes, just as the less physically mature student is assumed to be less advanced in mental maturity.

Inside the Early Adolescent Mind

Brain research is finally focusing on the early adolescent mind. We now know that, between the ages of 11 and 15, the brain destroys more than 20 percent of all previously built connections. The brain is, essentially, pruning itself (Strauch, 2003). The connections and synapses patterns are so intertwined that some of the previous skills, memories, and learning are impacted. Sometimes students just can't access the part of the brain they want. It is possible that a connection that was present yesterday, or even a few moments ago, is either not working or is no longer in existence.

The brain develops from back to front. The primal brain and the visual centers located in the back of the brain develop first.

The emotional brain, the amygdala, is more centrally located and develops next. The neo-cortex, the executive control portion of the brain—the part that can set goals, make plans, and choose the best course of action—is located just behind the forehead and is the last to develop (Sylwester, 2003).

The emotional brain develops differently in adolescence. We can advance the cognitive function of the brain, but the emotional brain does not necessarily advance with intelligence. For example, consider the case of Michael Kearney, a young man of advanced intelligence who graduated from high school at age 5 and medical school so young he had to wait two years, until he was 21, to practice medicine. He participated in an experiment to study his emotional brain, in which he was shown pictures of faces showing adult emotions. The result? He was no better than his peers at correctly identifying these emotions.

The female neo-cortex develops between ages 11 and 15 years, and from the late teens to early 20s for males. Therefore, expecting the same maturity from middle school females and males is not logical and, in fact, may be the impetus for single-gender classrooms.

What Matters in the Middle School Mind

The most important attribute that middle school teachers and administrators can have is an understanding of preadolescents, mixed with a dose of patience. That's because middle school students don't know why their brains don't work. They lose things, they forget to turn in assignments, and they can get sidetracked walking to their next class. There are many ways to reach and teach the middle school mind, however.

Brain research clearly puts an emphasis on the correct amount of sleep. Middle school students need at least 10 hours of sleep, but they are getting much less. Too many students leave the TV, computer, or cell phone on in their room. The flash on the TV or computer screen, or the ring/buzz of the cell phone can prevent the deepest and most restful stage of sleep. These electronic devices should be turned off at bedtime.

With immature emotional brains, students misread adult expressions and see meanness or anger when none was intended. They hear yelling when voices are barely raised. Middle school brains make bad choices and decisions and, when possible, punishments that have long-term consequences should be avoided.

Middle school brains learn in different ways. The attention span of the average middle school student is 10 to 12 minutes, and there is little evidence that their brains can be trained to develop a longer span. So, direct instruction should be kept to no more than this span of time. Previous wisdom held that, in the normal classroom, students learn roughly 40 percent visually, 40 percent auditorily, and 20 percent kinesthetically. Now, perhaps due to the use of the computers at early ages, these young brains have formed different connections and learn less by listening and more by interactive teaching methods.

Students need consistency of rules, expectations, and novelty, including movement, in the learning environment and teaching methods. Research informs us that movement increases the flow of blood and oxygen to the brain, and this can't wait for PE. Movement in the classroom should include such things as hand signals, gestures, grouping, and music.

The brain must be hydrated. Since a typical brain consumes up to one-third of all the water ingested, office referrals typically increase in the second half of the day, when many students become dehydrated. A simple way to help students learn better and make better choices is to make sure they drink enough water (Sprenger, 1999).

A new synapse pattern is created each time a new skill or behavior is taught. Although there is debate about whether the brain ever forgets anything, at times we all have trouble accessing a piece of information that we know is stored in our brain. The physiological cause for this is a broken connection or a weak synapse. Our goal should be to create new synapse patterns and then make these patterns strong and easily accessible.

How can these patterns be strengthened? The following eight strategies are summaries of a number of steps that can help build the middle school brain. They are adapted from one of the best books on the student brain, *Teaching with the Brain in Mind* (Jensen, 2005).

- **Ready.** Pre-exposure to material can be provided through guided learning or pre-tests.
- **Reorder.** The brain learns better when a structure is presented using concept maps.
- **Reflection.** The brain needs downtime, with no new learning to process.
- **Relevance.** It's important to relate knowledge to students' lives and establish why the learning is necessary.
- **Revise.** Students must be taught the skills they need to learn the information.
- **Reflexes.** Movement gets blood and oxygen flowing to the brain.
- **Reteach.** Varying teaching methods during the reteaching processes will help different kinds of brains learn.

And, finally, the most important strategy to help students learn is to review. It is not how long that a student studies, but how many times the synapse pattern is accessed. Therefore, a long review at the end of class is not as powerful as a number of shorter reviews during the class.

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References

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As middle school teachers, we know that our students are experiencing a staggering amount of change during their adolescent years—particularly in their brain. In fact, our students are experiencing the second greatest brain growth of their lifetime while in our classrooms. I'm personally fascinated by the adolescent mind because I feel like the more I know about HOW my students learn, the better I can TEACH them. In David Vawter's article, "Mining the Middle School Mind" he notes that the average middle school student has an attention span of 10-12 minutes. Scientists continue to study adolescent attention span, but that finding resonates true for me, and I speak from personal experience as an educator having witnessed students "dropping off" ten minutes into my lessons.