1 Teen Brain

Under Construction

Neuroscience has recently put forward the startling fact that teen brains resemble blueprints more than they resemble skyscrapers. Secondary educators who once considered a teenage mind an empty house that needed furnishings would do better to understand it as the framing of a house that still needs walls, wiring, and a roof.

Did you know that . . .

- The brain, not hormones, is to blame for the inexplicable behavior of teens
- Short-term memory increases by about thirty percent during adolescence
- The activities teens invest their time and energy in influence what activities they'll invest in as adults
- Teens are ruled far more by their emotions than by logic

A group of middle school boys was sitting around the lunch table telling "Yo' Mama" jokes. Everyone was having fun until one boy went too far; tempers started to flare. A boy at an adjoining table stepped in to avert the fight that threatened to brew. Before anyone knew it, a fight had erupted between two boys who hadn't been telling jokes in the first place! A teacher, Mr. Kenith, broke up the fight and asked them, "Why are you fighting?" Both boys answered, "I don't know." And they really didn't.

CATERPILLARS TO BUTTERFLIES

Teenage behavior—nothing is more unpredictable, volatile, or intriguing. Teens want more privacy on the computer and minimize the screen as soon as you enter the room. They cycle earnestly through the roles of vegetarian, stand-up comedian, and swing dancer. They streak around the block in subfreezing weather on New Year's Eve. The sweet boy who blushed and hid his head under a sofa pillow when the Victoria's Secret commercials came on now watches and comments on the models.

Common knowledge used to be that adolescence was a phase all kids went through and that adults should wait it out. Quips like "raging hormones" and "rebel without a clue" attempted to explain the erratic thought patterns and subsequent behavior of adolescents. In their frustration, teachers and parents pondered the question, "Why can't they act like adults?" The real explanation provides a remarkable answer: They can't act like adults because they don't think like adults. Neuroscience confirms what we've always thought—the adolescent brain is still under construction.

The implications of the transitioning state of the adolescent's brain are exciting and unsettling. It's a time of great vulnerability. Teenagers' brains are growing and changing by adding gray matter and pruning old synapses. Choices teens make during adolescence potentially affect their brains for the rest of their lives. For parents and teachers, this discovery can be disconcerting. They had a great deal of power and influence over preschool and elementary school brains. Parents could ensure that young children were not exposed to excessive television, videos, computer games, and other passive activities. Teachers could monitor the books students read in class, assign projects for kids to work on (during academic work and during free time), and design a curriculum that applied to every student. But adult influence is much less effective on adolescents; to a great degree, teenagers are the masters of their own destiny and determine the fate of their brains (Spinks, 2002).

Secret Revealed

Hormones are off the list of primary suspects! The teenagers-act-crazy-because-of-hormones theory is incomplete. Think of it this way: Adults have hormones in their bodies, too, yet manage to write memos and grade homework even while thinking about a hot date later that evening. Adolescents aren't victims of chemicals coursing through their veins and

Instructional Strategies

Of Sound Mind and Body

An extensive study of the benefits of active learning was done in elementary and middle schools in Chicago. Classrooms that actively engaged students were compared to classrooms that viewed students as passive receptors, relying on drill and practice to increase learning. The results were impressive. Classrooms that had a great deal of interaction and didactic instruction saw dramatic increases in scores on the Iowa Test of Basic Skills in reading and math over a four-year period (Smith, Lee, & Newmann, 2001).

Active learning doesn't come without challenges: Limited class time, greater prep time, lack of materials, and of course the biggest challenge of all—the possibility that students won't engage, are some of the issues teachers face. Give yourself a break; remember that while creative methods of urging participation are great, simply mixing lecture and discussion creates an actively involved classroom. Whatever method you use to actively engage students, the payback in academic achievement is worth taking the risk.

Teachers come to the same conclusion informally all the time. Mr. Miller, a high school math teacher, was concerned that year after year his students had difficulty understanding the concept of slope. He decided to see if active learning in place of paper and pencil exercises would make a difference. "I had them measuring the slope on the school's handicapped accessible ramps, the football field, and the staircases. I know I had a lot of fun, and I think they did, too. The best news was that their tests showed they had a much better understanding of slope when all was said and done." Active learning works.

So incorporate movement into learning—sit less and move more. Enact simulations, play charades, and do energizers. Choreograph body movements to represent phenomena in nature or the emotions of a character in literature. Allow students to step into the psyche of a new character. Let them act out the experience of being a boring guest speaker, substitute teacher, or the teacher arguing with a student over a grade by stepping into another person's shoes. Compose a song. Create a collage, time capsule, or board game. Conduct a science experiment. Get out the cotton swabs, construction paper, marshmallows, and toothpicks and get busy!

Things to Try

- Have students create time capsules of their lives. "Bury" the collective contributions somewhere on campus (in a safe place) and open them a year or two later. Then, let students take their individual capsules home. The personal connection at both ends of the project will engage all students.
- Simulate a mock Congress. Having representatives from every state will involve every student. Students work individually to gather data but work collectively to present it.
- Make a board game about some lesson in a social studies, English, or math class. Have students exchange games and play them. Small groups of students will form naturally; designing the games is educational, but playing them is fun.

Instructional Strategies

Mr. Toad's Wild Ride

Three middle school boys were running down the street with a computer chair. One would sit on the chair while the other two pushed him down a hill—backwards. Mystified, I observed them for a few minutes before asking them what they were doing. One boy spoke up for the group and said, "We were bored. There's nothing better to do and it's really fun when the chair flips."

I, an adult, stood perplexed by their behavior. The hazards were obvious to me and certainly not worth the second or two of excitement riding a chair down the street provided! None of my friends would think it was fun. Even small children would think it was a harebrained, dangerous idea. But these boys decided, without hesitation, that it was perfectly safe. Teens seem to go out of their way to find thrills and chills. If you can bring the emotions of riding a roller coaster into your classroom, students will find learning (if not exactly thrilling) very exciting.

Things to Try

- Place less emphasis on textbooks and more on projects. Take away sedentary seat time and actively involve them in learning.
- Individualize the members of your class rather than always treating them as a group. Get to know each student's abilities, talents, and interests. Knowing who your students are and what they like is a first step in offering a curriculum that they can relate to and get enthused about.
- Play up problem-solving skills. Don't provide all the answers—let students discover solutions. The process of solving problems is what is important anyway, not necessarily having the correct answer. The ability to think abstractly, engage in reflective thought, hone critical reasoning skills, and develop alternative solutions to frustrating situations will create challenges and allow teens to take the risk of being original.
- Teach a thinking curriculum—content and process. Process will help students learn how to make decisions. Being skilled at a process is as powerful as having knowledge.
- Give students plenty of opportunities for success. Victory is a thrilling sensation, especially after a serious challenge. You don't always have to pit students against each other—pit cooperative groups against a difficult problem or help individual students master a task they've been struggling with.
- Encourage reasonable risk taking. Ask students to try something they've never done before, like inventing a game, composing and performing a song, learning a new sport, or designing a cartoon.
- Advocate involvement in extracurricular activities. An encouraging word can make the difference between taking the risk of personal involvement and sitting on the sidelines.

(Continued)

Electrodes were attached to the monkey's brain as he walked backward and forward on a treadmill. All the time, the electrodes were collecting information from the neurons. Researchers recorded the brain activity, made speculations concerning the pattern of the movements, and forwarded the commands to the robot. The robot walked.

The implications of this study reach beyond the ability to fascinate us. Researchers hope this discovery will lead to robotic leg braces for severely paralyzed people, allowing them to walk again and forever change their lives.

ADOLESCENTS ARE NOT ALL ALIKE

A recent visit to a middle school presented this all-too-familiar scene: A frustrated sixth grader stood with his head against his locker, staring into space, exhausted by his attempts to open the combination lock. According to the sympathetic, eighth-grade witness, he'd been standing like that for half an hour. It is easy for adults to forget what an anxious time these years can be!

Like high school students, middle school students struggle with puberty, the desire for independence, peer influence, and their interest in love and dating. Unlike high school students, they are struggling with a fundamental change in the way they are educated at the very same time. Middle school students go from being part of an established group with a single teacher in an elementary classroom to one of many students with a mix of teachers in a variety of classrooms. To top this off, they also suffer the loss of status as they go from being the top dogs at elementary school to occupying the lowest rung of the social ladder at middle school. No wonder these students and their parents pass more than a few sleepless nights in the days leading up to the change.

A smooth transition from elementary to secondary school cannot be made with one ceremonial tour of the building. The switch is better managed with a gradual exposure to the complex environment of lockers, hallways, and multiple teachers (versus the self-contained classroom and personalized cubbyholes to store class materials). Visiting the middle school well before school starts helps. Students need chances to find classrooms and practice opening a locker—that universal nemesis—with the full support of teachers, administrators, and other school staff. Query parents, administrators, and other teachers about ways to better accommodate new students at middle school