

Adolescent Learning

Andrew Fuller

Ideally you would like to have a brain that has the organisational skills of Henry Ford, the planning skills of Hilary Clinton, the humour of John Cleese, the spiritedness of Steve Irwin, the gentleness of the Mother Teresa, the ferocity of Mike Tyson, the romance of Casanova and the passion of Martin Luther King Junior. Unfortunately most adolescent brains have the planning skills of a Teletubbie, the humour of Ghengis Khan, the reliability of Lindsay Lohan, the can do attitude of a sloth on a holiday, the cultural sensitivity of Pol Pot and the communication skills of Paris Hilton.

Let's face it, adolescence is an awkward time and it is no more troublesome than for the poor adults trying to guide these gangly, anxious narcissists towards maturity.

Despite all of this, most adolescents get along quite well with their parents and teachers most of the time. Most succeed in school, have positive relationships with peers, do not become addicted to drugs or alcohol, and become productive and healthy adults.

The adolescent brain is set up for being fast and impulsive and we need to help it move towards becoming slow and smart.

Slowing adolescent minds down so that they don't have to do the first thing that comes into their heads requires kind coaching in reflective rather than impulsive decision making.

During childhood the brain develops an enormous number of connections (called synapses) between brain cells. At birth, you had about 2,500 synapses per brain cell. By your third birthday you had 15,000. By the time you were 9 years of age, your brain had more

connections than it needed and so it began a process known as "synaptic pruning".

Jay Giedd and his colleagues scanned the brains of 1000 healthy children and adolescents aged 3-18 years old. Just prior to puberty between 9 and 10 years of age there is a huge growth spurt in the frontal lobes with millions of new synapses. Then around the age of 11, massive pruning occurs. This time of life represents a great opportunity for educators to develop the neural architecture that will lead students on to success.

Mindset

Carol Dweck's research shows us that students' mindsets directly influence results. Adopting a growth mindset enables students to remain engaged and achieve well. Students with a growth mindset outperform controls because they believe in effort and are resilient in the face of setbacks. Teachers who have a growth mindset have students who improve faster.

Changing students' mindsets from a fixed (I can't do any better) to a growth (I can improve) raises their achievement scores.

Our aim should be for each student to develop their potential. To this we need to praise effort not intelligence and improvement over accomplishment.

Momentum

Many students develop rapidly during their primary school years only to slow and falter in the early adolescent years.

We need to get better at capturing the skills, leadership qualities and passions of students as they enter these years.

Planning

Lot's of teenagers would have trouble planning their way out of a wet paper bag with a fine wind behind them. This is because their prefrontal cortex is being refined during these years. Most teenagers should have a sign on their foreheads that says "closed for re-construction".

While the connections in the prefrontal cortex are being refined or pruned, it is also a time of great opportunity. It is in these years that thinking, problem solving and creativity can surge if nourished.

It's all about the frontal lobes at this time and once they are wired, they are harder to change.

Key things we can do to boost the performance of the adolescent brain:

- * structure learning so that most of the initial organisation is done for them. They will absorb the structures later;
- * provide opportunities for mastery learning; and
- * give them activities that develop the frontal lobes- prediction games, anticipation of consequences, mazes, discussions about the long term effects of social issues.

Emotional Processing

Adolescents like intensity, excitement, and arousal. They are drawn to music videos that shock and bombard the senses. Teenagers flock to horror and slasher movies.

At this time, hormones become more powerful and adolescent's brains show more activity in the emotional parts of the brain (known as the limbic system) than they do in the planning and impulse control parts of the brain (known as the frontal lobes and the pre-frontal cortex).

This means that adolescents learn best when there is emotion involved!

Stress

When emotional, adolescents have lower activity in their frontal lobes and more activity in the amygdala than adults.

The amygdala is your own security watchdog. It keeps you safe. If it becomes over-activated, it moves into survival mode and not much learning occurs. This means that classrooms that are threatening, sarcastic, shaming or have teachers who yell are non-learning classrooms.

Adolescents display considerably poorer cognitive performance under circumstances involving everyday stresses and time-limited situations than under optimal test conditions.

Optimal Support

Adolescents achieve improved results when they have deeper relationships with fewer teachers than a variety of teachers.

A pod is a group of 3 teachers who between them care for the learning, emotional needs of a group of students as well as being the main link point for family liaison in high schools. Ideally the 3 teachers continue with the same group- of students throughout their time at the school.

Most students will be able to relate to all 3 teachers. Some students however are unable to hear mixed news (praise as well as suggestions) from the one person. For these students we split the roles of the pod into:



The boundary rider's job is to put consequences in place. The advocate's role is to engage and support the student and to remove themselves whenever possible, from disciplinary processes. The manager's role is to oversee the process and to have the final say in the event of professional disagreements about student management.

Successful teachers of adolescents base their work on relationships rather than power.

Teachers need to "own" their own classrooms so they can develop support and routines, implement guided practice and create a visually interesting, engaging and safe learning environment.

Teach the main skills

As early adolescence is a time when the neural pathways and habits of success are laid down, it makes sense for us to assess and then create improvements in the following skills:

- * Removing unnecessary noise- this means having some moments of a lesson in silence.
- * Identifying similarities & differences- how concepts overlap and differ.
- * Summarising & Note taking – paraphrasing and organising information.
- * Reinforcing effort & providing recognition for that effort.
- * Homework & deliberate practice
- * Presenting new information non- verbally
- * Co-operative learning- teamwork.
- * Setting objectives & providing feedback
- * Generating & testing hypotheses
- * Using cues, questions & advance organizers

Repetition

It takes humans 24 repetitions to get to 80% of competence. Repetition also builds mastery and synaptogenesis.

One major implication of this research is that schools should think long and hard before sacrificing regular (daily) exposure to the information in each subject area for longer learning times but fewer repetitions.

Spaced repetition pays off even more

“Spaced repetition” has a positive impact on learning. Instead of concentrating the study of information in single blocks, learners encounter the same material in briefer sessions spread over a longer period of time.

Spaced repetition produces impressive results. A study completed at the University of California-San Diego in 2007 found that Year 8 history students who relied on a spaced approach to learning had nearly double the retention rate of students who studied the same material in consolidated units.

This research implies that the more times students encounter information the more likely they are to understand and retain it.

Reading

Today’s early adolescents read differently than most adults do. If we track eye movements, most adults read in a zigzag fashion down the page, most teenagers read in a F pattern.

Most teenagers won’t read texts thoroughly in a word-by-word manner. The first two paragraphs must state the most important information. There’s some hope that users will actually read this material, though they’ll probably read more of the first paragraph than the second.

Start subheads, paragraphs, and bullet points with information-carrying words that teens will notice when scanning down the left side of your content in the final stem of their F-pattern.

They’ll read the third word on a line much less often than the first two words.

Expectations for themselves

Teenagers who have lower expectations for themselves ask for help less often and are less likely to use feedback to improve outcomes. While we want to praise effort more than ability, we also want to make sure our students know that we think they are capable and clever.

Numerous teenagers are sapped of motivation by the fear of failure. Shame is toxic to learning. Build a classroom culture in which “having a go” is expected and mistakes are looked upon as steps towards a correct answer.

Tuned into the peer group

Teenagers are highly tuned into the opinions of those around them, especially their peers. They tend to be preoccupied with what others think and will sacrifice success for social acceptance.

This means we need to manage the peer culture by giving all students ways to be helpful, have a go at new activities and succeed.

Nothing overcomes reluctance and low motivation faster than challenges and a whiff of success. In this area we need to emulate computer game designers.

Listening

Between 5 and 10 % of teenagers have hearing and central auditory processing disorders. This often leads to language problems in vocabulary comprehension, speech reading writing and decoding information. These students spend 3 times as much time decoding information and often never store it in long term memory.

For this reason we need to keep instructions simple and deliver them in small steps, repeat them, check that they are understood (for example, “now Harry tell me what we are doing”) and back key messages up with visuals.

Visual Learners

Most early adolescents are visual learners. When new information is presented orally with no image present only 10% of what was presented is retained 72 hours later. If a picture is added the retention rate rises to 65%.

Multi-tasking

Doesn't work.

Memory

Memory is increased by repetition but is also increased when the new information is used to perform some tasks. Describing the new information in different forms and organising the new information so it is meaningful also increases retention.

We need to provide well-structured practice opportunities and frequent reviews.

Graphic organisers outline processes and procedures can also be used to enhance. Aim to create multiple descriptions that can be used flexibly (diagrams, outlines story boards, cartoons, hierarchies)

Sleep Patterns

Most teenagers' brains aren't ready to wake up until 8 or 9 in the morning, Adolescents need more sleep than they did as children and that their circadian rhythms appear to be set later than children's or adults.

Sleep declines from an average of 8.3 hours in Year 8, 7.5 hours in Year 10 to 7 hours in Year 12. Most teens function optimally on 9.25 hours. Sleep deprivation is associated with weight gain, moodiness, poorer attention, and increased use of caffeinated stimulant drinks to become alert.

Adolescents getting only 5-6 hours of sleep lose out on the last two REM cycles and thereby reduce the amount of time the brain has to consolidate information into long term storage.

Assessment

While frequent testing does not improve learning, exposing teenagers to quizzes, puzzles and short challenging tests inoculates them against later exam anxiety.

The most effective study strategy is to review and study the entire subject, test the entire subject, study the items you got wrong, and then test the entire subject again.

Teaching students how to revise and prepare for exams should begin in the early adolescent years.

Passion Projects.

Students learn best when the information is emotionally engaging and is relevant to them. The perceived relevance of the topic is more powerful in improving learning than whether you have a student or teacher centred curriculum. It is more powerful than providing electives or negotiating curriculum.

Shedding some of the “busy” work that plagues most schools to free up time for students to develop passion projects makes sense.

One possible structure of a school day that would suit early adolescents would be to have skill sessions in the morning followed by passion projects on at least a few afternoons each week.

Students completing projects of interest to them results in amazing leaps in learning. The findings of Big Picture Schools, Montessori education and Challenge-based learning are impressive in this area and show that these types of projects can contain rigour and mastery.