There is a long history of successful people having fairly dodgy adolescent years and this has been reflected in their school reports. For example, the headmaster of English comedian Stephen Fry wrote on his report in the early seventies, 'He has glaring faults and they have certainly glared at us this term'.

Norman Wisdom, an actor, received a report that said, 'The boy is every inch a fool but luckily for him he's not very tall'.

His teacher who commented, 'all glib cleverness and humbug' similarly dismissed Carl Jung.

So let's take a walk through the brain and mind of your average adolescent. Now this is dangerous territory indeed. It's not just the likelihood of tripping over the odd torrid sexual fantasy, encountering an obsession with privacy that would baffle the most secretive hermit or the risk of being crushed by the wild pendulum of mood swings.

No, even more dangerous than that is the knowledge that this is an area of research that is expanding so rapidly that in a few short years much of what I am about to say may well seem laughable in its simplicity. Oh well, fools step where angels fear to tread and as I'm certainly no angel, here goes...

It is an exciting time to be involved in education. For the first time we can link the research that emotionally supports young people and protects them against suicide, drug abuse and violence with our growing knowledge of how they think, develop and learn.

At the same time, there is a great risk. Some of you will clearly remember the Professor in Gilligan's Island. A brilliant man, able to invent coconut compasses, a wind-powered generator of electricity not to mention a thousand other quirky creations but somehow never found time to either work out a way to patch the hole in the ship or build a new ship entirely.

Too often the discussion about education risks becoming a debate about which side of the ship we should patch first. But what would happen if we built an entirely new ship?
Cycles of development

We have probably learned more in the past few years about the way people learn than we have in the past 50 years. Much of this upsurge has been due to the proliferation of PET scans (Positron Emission Tomography) and FMRI (functional magnetic resonance imaging) studies.

The three-pound blob of grey matter that sits on the top of your neck is the most complex, adaptable, regenerating object we know of. And it's busiest when we are children.

The way the mind develops is not as neat a sequence of events. Recent research is confirming what two of the great thinkers of child development (Jean Piaget and Maria Montessori) postulated — that children’s minds develop in fits and starts followed by periods of consolidation. These processes were labelled as assimilation and accommodation by Piaget and were described as cycles of learning by Montessori.

In terms of brain development, there appears to be times of overproduction or exuberance during which we may be highly receptive to new information and able to gain specific skills more easily. During childhood and adolescence, this seems to be the way the brain develops, overdoing it in terms of production and then cutting back on what is not needed later. It’s a pretty nutty system because it’s precisely that overproduction that allows us to choose to hone and specialise our skills.

If we saw a diagram of key social competencies at different ages, we would get a map of approximately three-year cycles. Of course there is individual variation as well as gender differences but nevertheless a map such as this can be used to help target specific behaviours and learning processes at different times.

Children’s brains are much busier and quite a bit cleverer than adults. From birth, the brain is busy setting up connections. At birth each neuron has 2,500 synapses and the number and accommodation by Piaget and were described as cycles of learning by Montessori.

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We are born to learn about new places and people and to adjust to what we find there. This means children already know a whole lot more about learning than adults do.

Then at about three or four years of age, something happens and it all stops. It is almost as if four-year-olds stop in their tracks, look around in bewilderment and express this puzzlement by asking the question why?

It is estimated that a four-year-old asks a why question every two or half minutes!

These are the wilful years in which children learn impulse control. Children who do not learn this at this time can learn how to control their impulses later, but it is harder.

And the age of six, there is a second surge as the brain starts to use language in increasingly complex ways. Aggression management is an important social competency at this time.

Up to the age of nine or ten the brain continues to be twice as active as an adult’s. Around the age of nine years peer relationships seem to predominate.

Primary schools often find that bullying increases around this age as children settle for position with peers. For this reason, it makes sense for schools to have bullying prevention programs that include bullying prevention, emotional intelligence and resilience.

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The frontal lobes are ‘closed for construction’. Expecting teenagers to show a lot of forethought, planning, consideration and impulse control is like expecting a goldfish to recite Shakespeare.

The brain is re-structuring to become more efficient. Therefore we need to capitalise on this re-structuring. Help them to develop the habits and routines that allow them to work smarter not harder.

Parents need to be their teenage children’s frontal lobes. Asking an adolescent to do a lot of forward planning is like asking a dog to study physics. This is also the reason why too much homework is frowned on. Adolescents do not seem to help too many young people.

Use it or lose it — synaptic pruning

Between ten years of age and puberty, the brain starts to change; it starts to specialise our skills. The brain starts to use language in increasingly complex ways. Aggression management is an important social competency at this time.

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Handy Hints for Improving Learning in Teens

- Most learning doesn’t happen at school! Children spend only 15% of their time at school. They spend more time asleep (33%) than they do at school. Most of their time (52%) is at home, awake, mucking around, playing, and learning about life and it’s what they do with that time that is important.

- Most of their future learning also won’t occur in school. An estimated 70% of the jobs that will exist in the year 2020 do not exist now. Knowledge is doubling every three years. Fifty years ago a high school graduate left school knowing about 75% of what they would need to know in their working life — today’s high school graduate will leave knowing about 2%!  

- Limit TV watching, video and computer games. Bad news for those of you with older children! At 17 years of age the optimal amount of TV viewing is half an hour per day. And while some exposure to computer games is good, too much can be toxic.

- More than nine hours of sleep. Teenagers need as much sleep as children, partly because their brains are doing so much development. Always remember there is no such thing as a sleep bank. So just because you slept 10 hours one night doesn’t mean you can get away with only sleeping six hours the next night. Students who don’t get enough sleep have to work much harder to do well at school.

- Eat a good breakfast and drink water. If your Mum ever said have fish or eggs for breakfast because it’s brain food, she was right! As long as it’s medically safe to do so, a breakfast that is high in protein (think cheese, milk, bacon, eggs) and lower in carbohydrates (think cereal, orange juice and toast) promotes concentration and learning. Also encourage your child to drink lots of water; the brain runs on it!

- Use aromas. The aromas most often associated with improvement in concentration and memory are lemon, basil and rosemary.

- Limit the amount of part-time work. Senior secondary students should not work more than ten hours a week at a part-time job. If they do, there is clear evidence that their marks will suffer.

From Help Your Child Succeed At School by Andrew Fuller

So if the early adolescents’ frontal lobes have essentially gone missing in action for a time, this means that teenagers’ brains are all tuned up for emotions, fighting, running away and romance, but not so well tuned up for planning, controlling impulses and forward thinking.

This means that when a frustrated parent says to their teenager, ‘Why didn’t you think of the consequences?’, the teenager invariably replies, ‘As if’. By the way you know that ‘whatever’ means yes and ‘as if’ means no, don’t you? Some parents kind of forget this. They wouldn’t dream of giving their teenager free access to their life savings but they will reasonably frequently leave them in charge of a $200,000 house full of fine furniture and still be stunned by the result!

Parents need to be their teenage children’s frontal lobes. Asking an adolescent to do a lot of forward planning is like asking a dog to study physics. This is also the reason why too much freedom too soon does not seem to help too many young people.

Early teenagers are not yet to grown into themselves. The average teenager gains 20 kilograms and grows almost half a metre in the space of four or five years. I’m sure many of you know the sensation of being in a room with a group of young people who seem to be a clumsy jumble of elbows, knees, shoulders and legs... as if they haven’t grown into their bodies, they haven’t quite grown into their brains either.

It’s obvious if teenagers at this stage have a very powerful, juiced up sports car with great acceleration, terrific lines, high intensity, excitement, like, and rosemary.

This is why it is absolutely pointless arguing with teenagers. I like to think that arguing with a teenager is like mud wrestling with a pig — you both end up dirty but only the pig is happy! Not only are they emotionally charged, they are louzy at reading other people’s emotions. This is particularly true of fear in others.

The puzzling thing to me is that if the brain at this time is so tuned into the emotions, why don’t we capitalise on this? Instead it seems that we are yet to grasp in any meaningful way that there is a great deal of crucial learning that simply cannot be accomplished while dressed up in uniforms that promote sedentary learning or timetabled in the itty-bitty episodes we call lessons.

Is the teaching of ‘subjects’ that obliges each secondary teacher to try to cope with success in learning for 150 to

Emotions are in the driver’s seat

A couple of other interesting things are happening in the adolescent brain. The first is that hormones become more powerful and adolescents’ 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. This means that adolescents learn best when there is emotion involved!

Adolescents remember stuff about themselves and stuff that is relevant to their life situations. As Homer Simpson would say, ‘doh!’. Adolescents like intensity, excitement, and arousal. They are drawn to music, intensity and horror films. Around this time adolescents give off exaggerated secondary signals (rolling of eyes, long deep sighs, etc.). Unwise parents and teachers respond to these.

So if the early adolescents’ frontal lobes have essentially gone missing in action for a time, this means that teenagers’ brains are all tuned up for emotions, fighting, running away and romance, but not so well tuned up for planning, controlling impulses and forward thinking.
It may well be that the brain develops best when allowed to play, linger and persist in areas of interest...

240 individual students really the best model we can come up with? Is a system that divides learning into multiple areas suitable for a group of young people who essentially don't have functioning frontal lobes and therefore can't transfer information from one setting to another?

It may well be that the brain develops best when allowed to play, linger and persist in areas of interest and that this may especially be so when the early adolescent is in the company of someone they are, to quote Con the Fruiterer, "Looking, looking, looking!"

Friends and more friends

It's not going to come as news to anyone.

Adolescents are harder to motivate and are motivated by different things than adults. They seek out new stimuli, novelty and risk.

Peer affiliation may also promote learning. To learn, humans are hard-wired to do two things:

- Experience differences; and
- To imitate (watch what other people do and copy them).

Imitations are tried out and if successful become patterns or habits.

Teenagers are nothing if they are not great imitators. Fashion, music, lip-gloss, Lynx deodorant — it’s all around you!

As well as being great imitators, they are wary in case they lose peer approval. So they are, to quote Con the Fruiterer, “Looking, looking, looking!”

Needing a lift

Adolescents have more sleep-deprived days than children. They seek out new stimuli, novelty and risk.

The intensity of peer relationships is common among mammalian species and may be evolutionarily adaptive. As Linda Spear points out, most species show an alteration in social behaviour around the time of adolescence. Play fighting and play behaviour increase before declining as sexual maturity is reached.

The intensity of peer relationships may serve two purposes here: an evolutionary advantage as well as a learning purpose. The interest in peers may have traditionally helped the dispersal of adolescents away from the family group thereby avoiding inbreeding. An age related emigration is common among mammalian species and may be evolutionarily adaptive.

Peers and more friends

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It may well be that the brain develops best when allowed to play, linger and persist in areas of interest and that this may especially be so when the early adolescent is in the company of someone whose opinion he or she cares about.

Getting the zzz’s

Adolescents eat more and they sleep less. They have a preference for sleeping and waking later than they did when they were children. Adolescents need more sleep than they did as children — around 9 and a quarter hours. Most teenagers’ brains aren’t ready to wake up until 8 or 9 in the morning. Teenagers who are sleep-deprived do less well at school and are more prone to feelings of sadness and hopelessness. In short, they feel fairly crappy.

Feelin’ stressed

The decision-making ability of adolescents may be more vulnerable to disruptions and the stresses and strains of everyday living than that of adults.

They may also respond more strongly to stressful events physiologically with greater blood pressure and cardiac output response than children.

Adolescents are often sleep-deprived which may in turn increase vulnerability to stress. They may have more negative life experiences (friendship changes, alterations in romantic liaisons, school work) that they tend to view more negatively and have less control over. This may well increase their sense of helplessness.

The more negative life events an adolescent has the more likely they are to engage in problem behaviours and the less likely they are to engage in a wide range of positive activities.

When you’re mad, you’re really mad

Affective behaviour peaks during adolescence in a number of primate species. Aggression has its origins in the limbic areas and particularly the amygdala, which relates to the emotions, and shapes fight or flight responses.

When emotional, adolescents have lower activity in their frontal lobes and more activity in the amygdala than adults. Teenagers who have been exposed to high stress during childhood may habituate to that level of stress and become harder to excite or motivate and use more extreme ways of behaving and relating to others to relieve boredom.

The adolescent brain is in transition, and therefore teens should not be treated just like smaller versions of adults. When we grasp the basics behind their development, it makes it easier to understand how they tick, and what they need from their parents and teachers. Rethinking their education and how we support them as parents so that their experience of adolescence is less stressful and more positive is a good start.

References

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