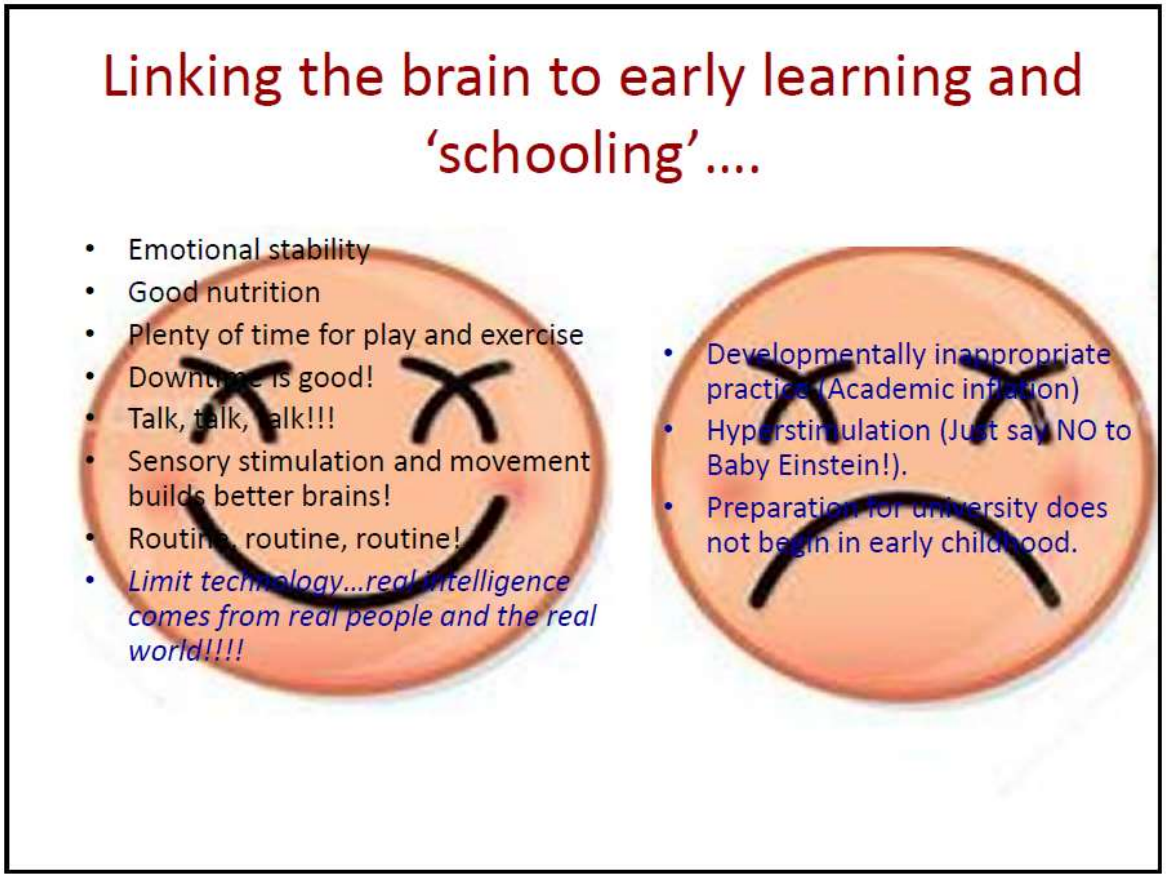
PARENT INFORMATION

A user's guide to the brain: Understanding and educating young developing minds!

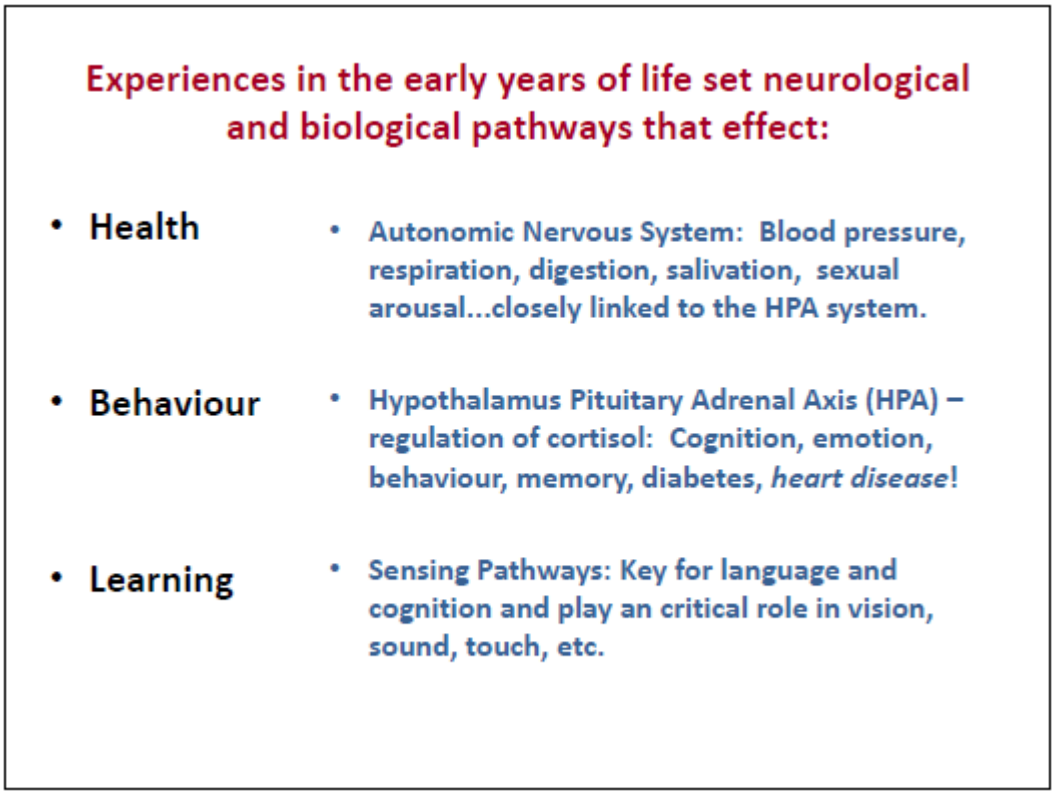
Dr Michael Nagel - Part 2.



Part 2.

Brain development is a very interesting topic. As I stated last week, I would write more abut the lecture by Dr Nagle.

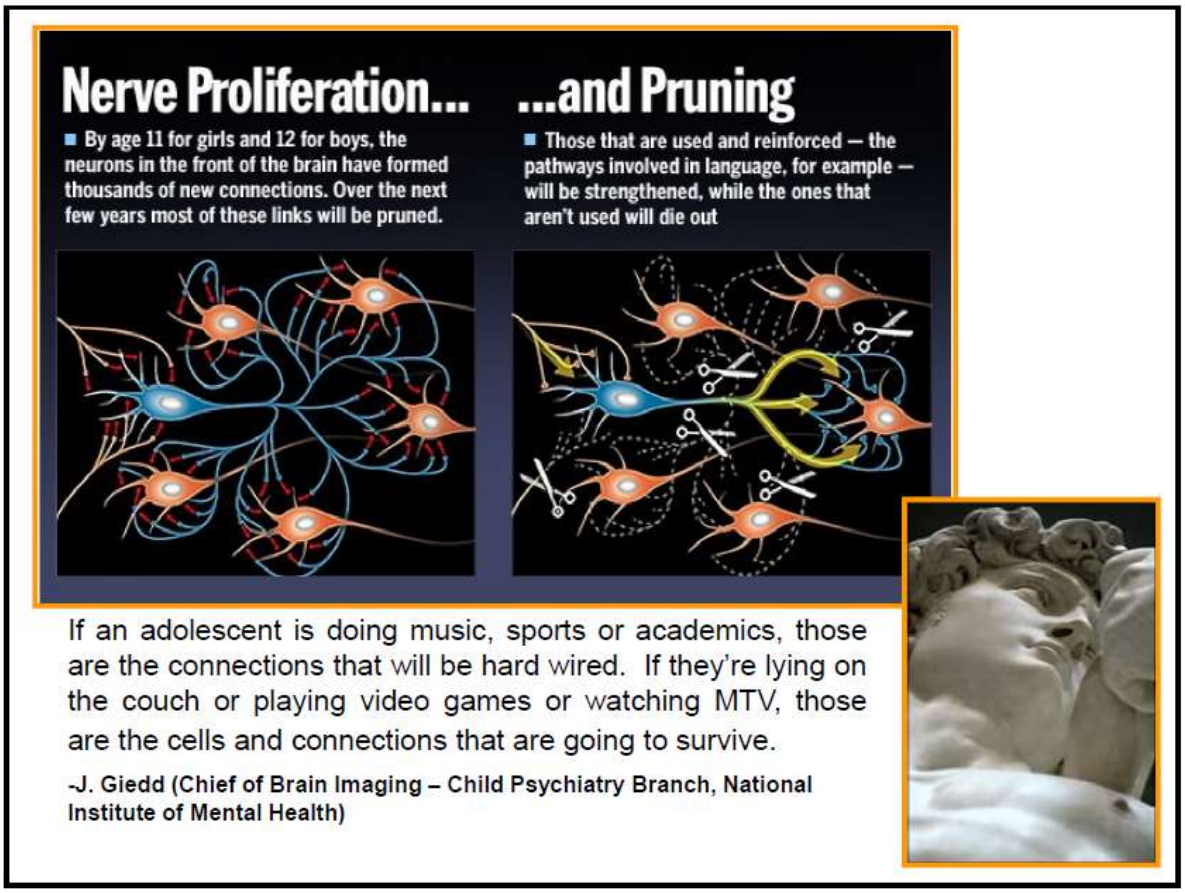
Last week I mentioned that brain development in early life sets trajectories for development thoroughout life. These experiences can affect health, behaviour and learning.



He spoke about the development of the brain and how the stem has the survival section commonly referred to as the fight vs flight mode. This develops early and after that comes the emotion and memory section which can cause a lot of interesting reactions around puberty. Adolescents use less of the prefrontal cortex than adults when reading emotion. This translates to them having more of an emotional response when confronted with a feeling, say, somebody looking at them with an expression of fear. The part of the brain that has a gut reaction will respond to a greater extent than the brain of an adult. One of the implications of this is that the brain is responding differently to the outside world in a teenager compared to adults.

This means adolescents are more likely to misinterpret facial expressions of emotions. They often see anger when there isn't anger. They process emotional stimuli in the amygdala which means they react not think and work from that 'gut' reaction. This means they may react or overract quickly.
The area of the brain that promotes mediation and inhibition of inappropriate emotional responses is the frontal lobe. Unfortunately this part that controls being sensible develops later in life. For males the researchers say it is 24 yrs old (some ladies would probably say longer!)

Last week I mentioned synaptic pruning where the plasticity of the brain is altered. One very interesting part about this is the connections you use are developed and the ones you don't use you lose. Please read the slide below.



The professor also spoke about adolescent sleep and melatonin. He stated that sleep in very important during periods of brain maturation. So while many adolescents get less sleep than younger children, there is actually an incease in sleep needs during the teenage years. (about 9+ hours a night). He stated that most adolescents are in the midst of 'sleep debt.' This can be problematic because adequate sleep is essential for learning and memory development. Sleep loss also increases afternoon cortisol levels which can have an effect on energy levels and mood. So what can we do about it?
The first steps that were sugggested were:-

- **Increasing teenagers sleep hours by decreasing the amount of stimulating activities late at night (TV, mobile phone, computer- blue screens)**
- **Creating broader awareness of the problem among parents, teachers and teens**

There are implications which are explained in the slide below.

Implications of Arrested Development:

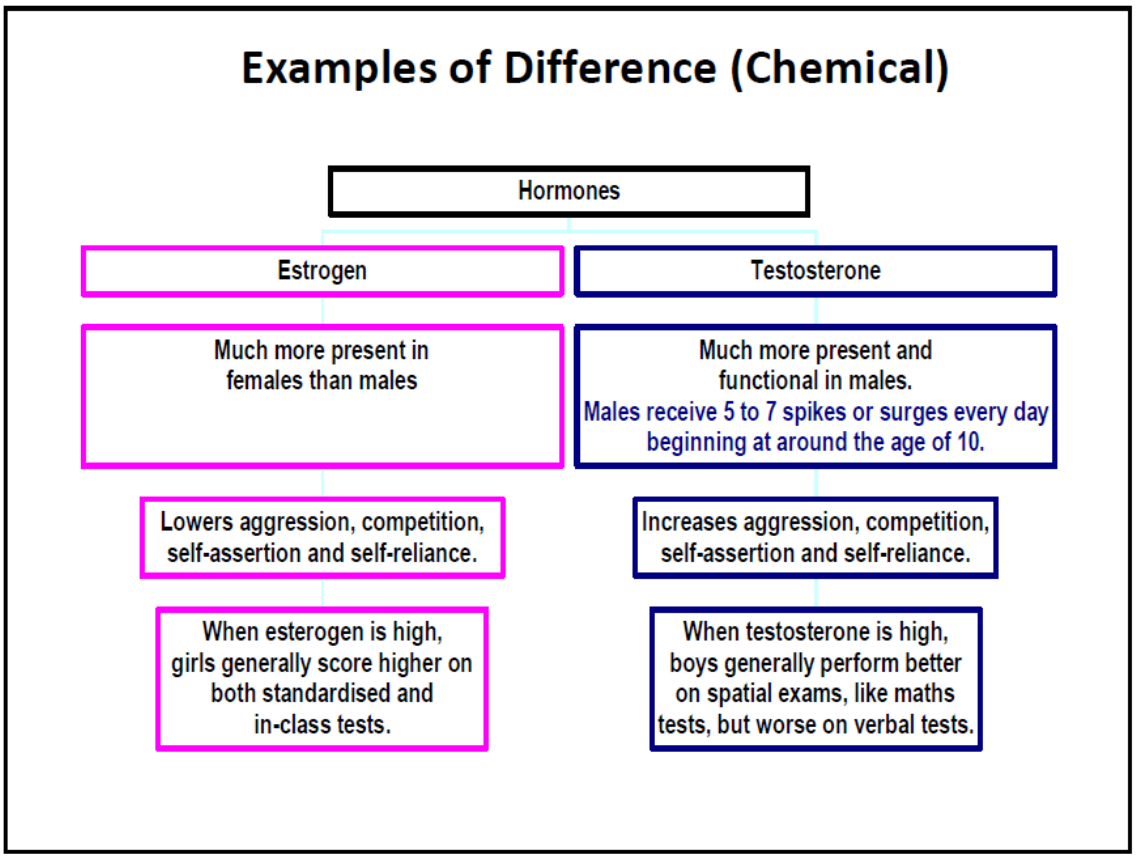
Adolescent Behaviour

Earlier development of the back of the brain and later development of the front of the brain means…

- Preference for physical activity
- Less than optimal planning and judgment
- Minimal consideration of negative consequences
- Activities with high excitement and low effort are preferred
- *Poor modulation of emotions (hot emotions more common than cold emotions)*
- *Heightened sensation towards rewards, emotions and sensation seeking!*
- *More risky, impulsive behaviours*

The professor spoke about many different studies which I can't mention here but there was one where they developed a social isolation event and monitored the results. Anxiety developed the most in the 11 to 13 year olds. He also mentioned that adolescents will have more risky impulsive behaviour among friends so when they are old enough to drive, the risk is higher when they have friends in the car and lower when alone. He also mentioned a very interesting longitudinal Stanford University study where more that 550 children on a number of diverse measures up to and including 2014. The children were given the marshmellow test between 1968 and 1974. They sat in a room and were told not to touch a marchmellow and they would be rewarded. They were tested on a number of diverse measures up to and including 2014. They found out some interesting results regarding impulse control. The more seconds children waited the higher their SAT scores and the better they did on tests of social and cognitive functioning as adolescents. As adolescents they were less distracted when trying to concentrate, had higher IQ scores, were more self reliant, confident and trusted their own judgement. They also handles stress better. The results continued as young adults and at midlife, those who could consistently wait versus those who couldn't showed distinctly different brain scans in areas linked to addictions and obesity. He went on to talk about the fact that men and women have anatomical, chemical and functional differences between their brains.

An example of the chemical difference is in the slide below.



Another example is that emotions activate both hemispheres of the female brain but only the right hemisphere in the male brain. How it applies to learning in the following slide.

Continued …

What's Positive for Boys?

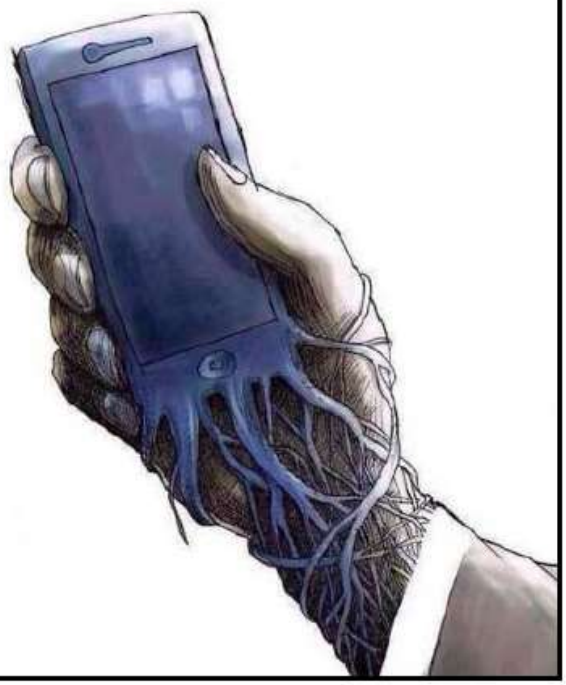
- Lots of movement and hands-on, interactive learning.
- *Less time 'sitting and getting' and more time 'doing'.*
- Competition
- *Boy friendly content in language arts.*
- *Finger manipulation while listening*
- *Procedural literacy.*
- Problem solving, inquiry and activity based learning…problems involving deductive reasoning.
- Experiential learning.
- Greater response time during questioning.
- *One instruction at a time.*
- *For boys, significant male role models are crucial!*

…it is significant to note the plethora of research indicating that boys who grow up with the absence of significant male figures, especially fathers, are more likely to experience abuse and mental illnesses, exhibit behaviour problems at school, receive lower grades or drop out of school, suffer from low self-esteem and motivation and find themselves in trouble with the law.

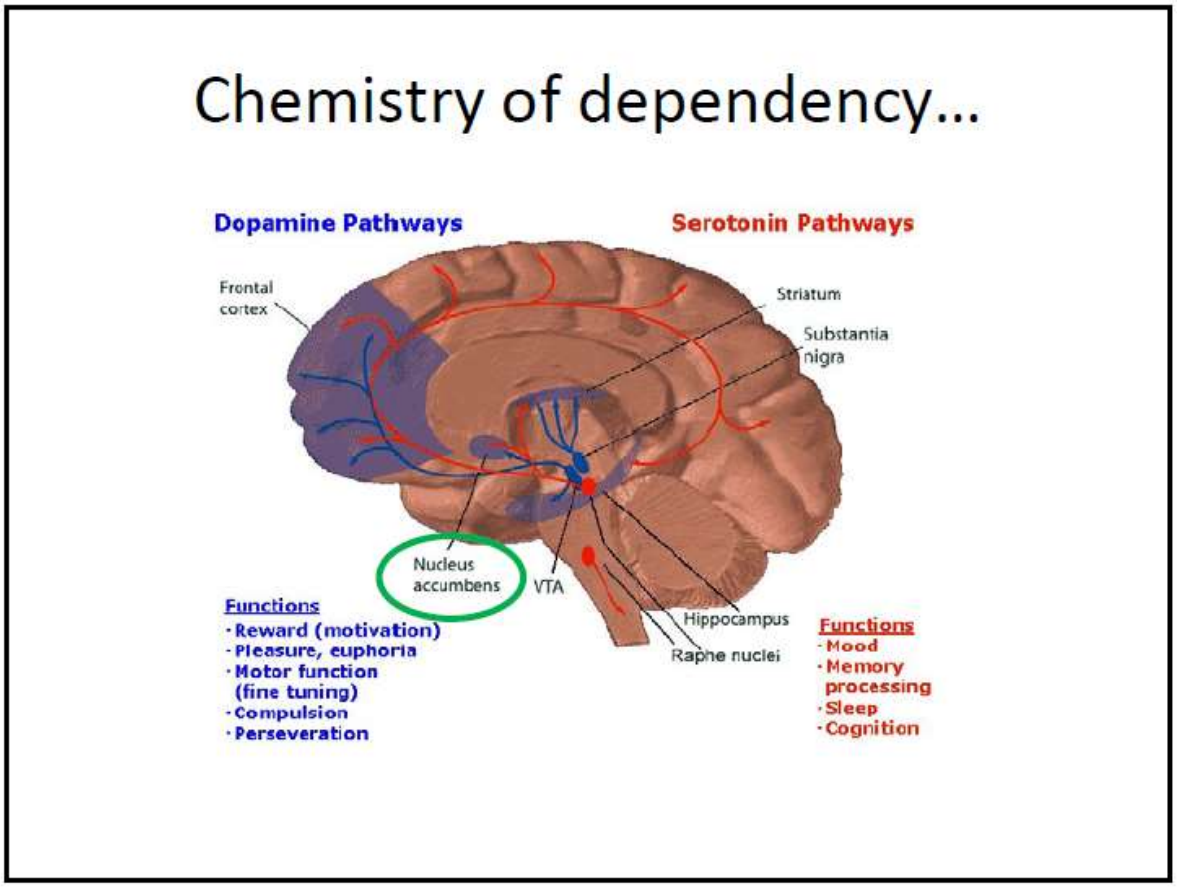
- Nagel (2006)

Smartphones may not be so smart…

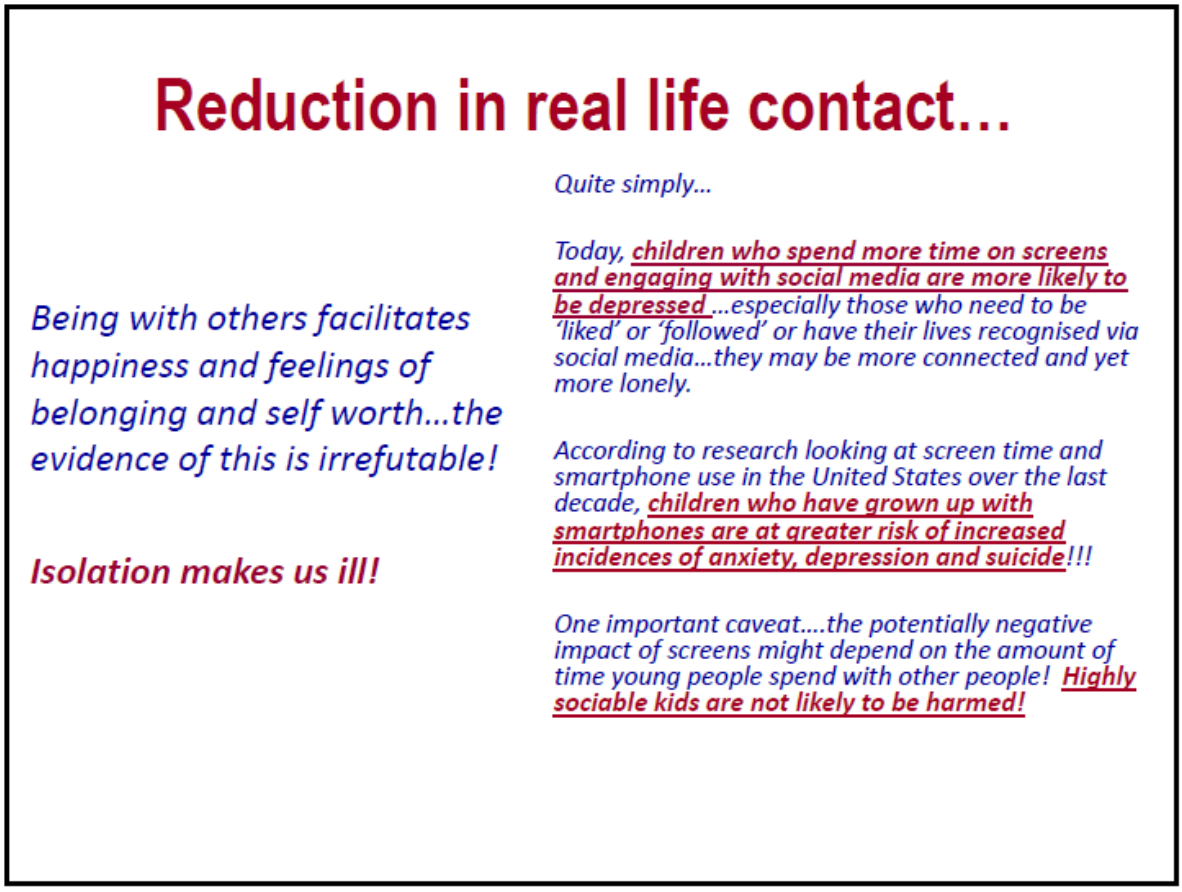
- No evidence to validate use or necessity in schools.
- Growing evidence to suggest they are contributing to physical and mental health issues.
- Smartphones are part of a larger problem associated with 'screen time' and social media.



He spoke about how improtant for young people to have down time. Brain imaging research shows that many screen activities, especially video games and social media can significantly elevate dopamine in the brain. This is best explained in the following slide where the functions of the chemistry ins explained.



It was stated that there is too much screen time which was affecting sleep and causing social isolation which in itself can cause a range of issues around anxiety and self confidence. It is very important for children to be social and balanced. We are social beings and development thrives through positive face to face social interactions.



It was mentioned that app designers are experts in making an app/game addictive. Technology/apps must be designed with 5 important 'science of the mind' principles:

1. **Cognitively active**
2. **Engaging**
3. **Meaningful**
4. **Socially interactive(collaborative learning)**
5. **In the service of a learning goal.**

Take-away messages

- Technology is here to stay, with benefits and risks– we need to critically think through its use.
- Technology use exists on a continuum from healthy to dysfunctional use; educators need to observe and guide behaviour....*(in loco parentis).*
- Some types of excessive technology use does interfere with learning, social relationships, work, mental health, and possibly cognitive development.
- Smartphones are not necessary to achieve scholastic goals!

I hope this gives you some 'food for thought.' I found the lecture very interesting.