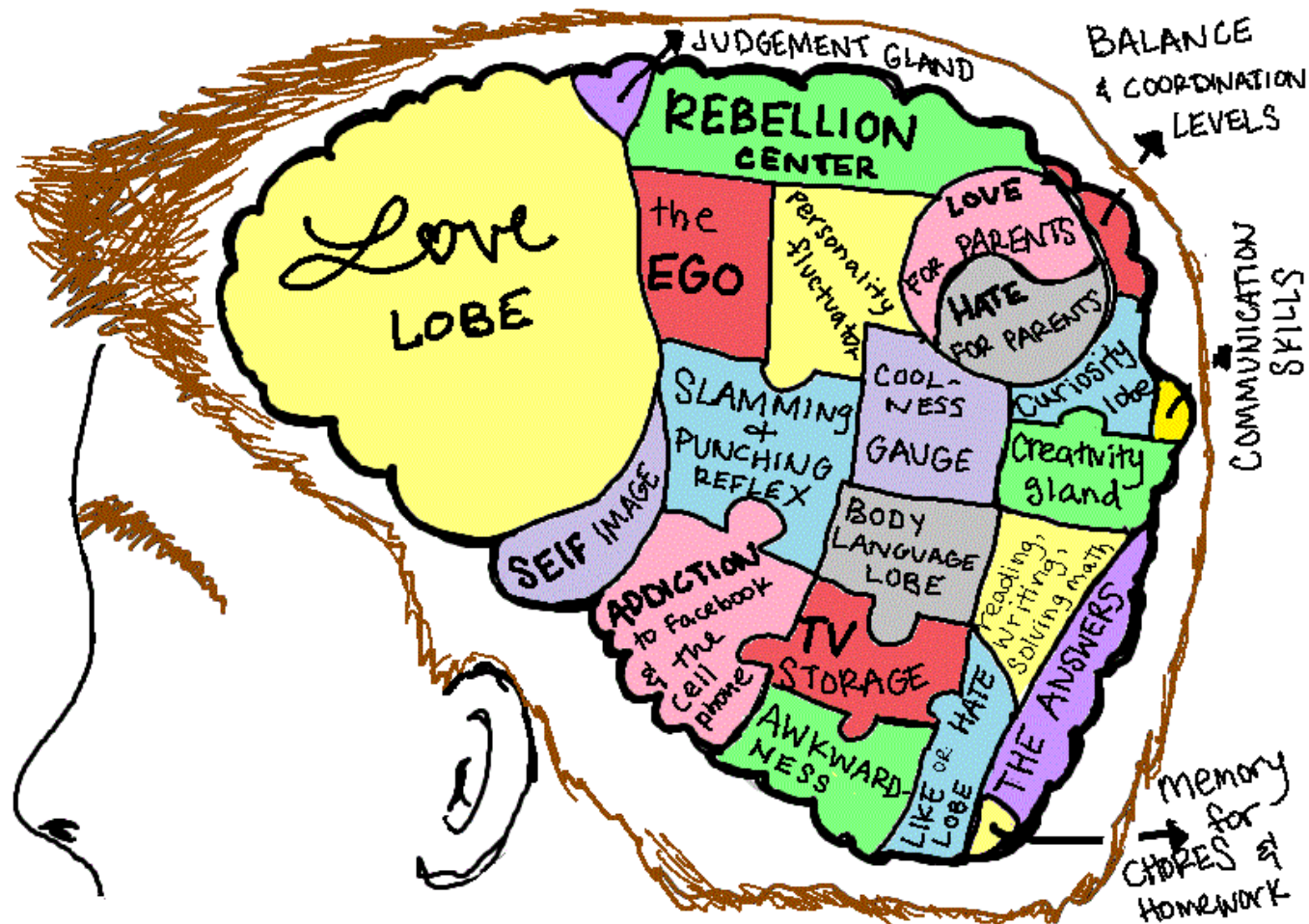


# The Adolescent Brain

## What you need to know to help survive the teenage years



# Background

- Fifteen years ago, it was widely assumed that the vast majority of brain development takes place in the first few years of life.
- In the past decade or so, mainly due to advances in brain imaging technology such as magnetic resonance imaging, or MRI, neuroscientists have started to look inside the living human brain of all ages.

# 2 Types of MRI

- Structural MRI if you'd like to take a snapshot, a photograph, at really high resolution of the inside of the living human brain, and we can ask questions like, how much grey matter does the brain contain, and how does that change with age?
- Functional MRI, called fMRI, to take a video, a movie, of brain activity when participants are taking part in some kind of task like thinking or feeling or perceiving something.

# What has been learnt?

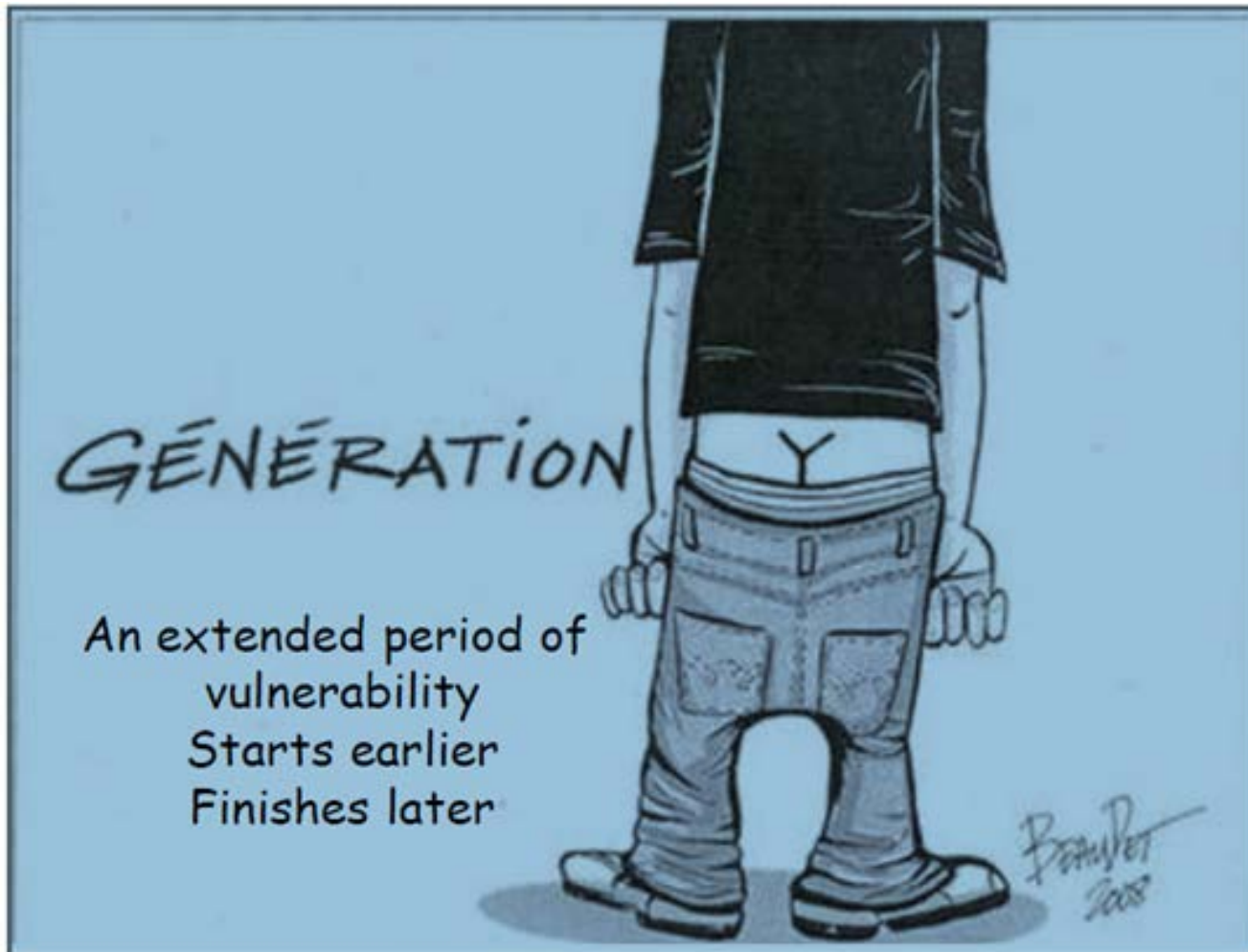
- We now have a really rich and detailed picture of how the living human brain develops, and this picture has radically changed the way we think about human brain development by revealing that-
  - it's not all over in early childhood, and instead, the brain continues to develop right throughout adolescence and into the '20s and '30s.
  - And that adolescence is defined as the period of life that starts with the biological, hormonal, physical changes of puberty and ends at the age at which an individual attains a stable, independent role in society.



- Sadly- It can go on a long time.....

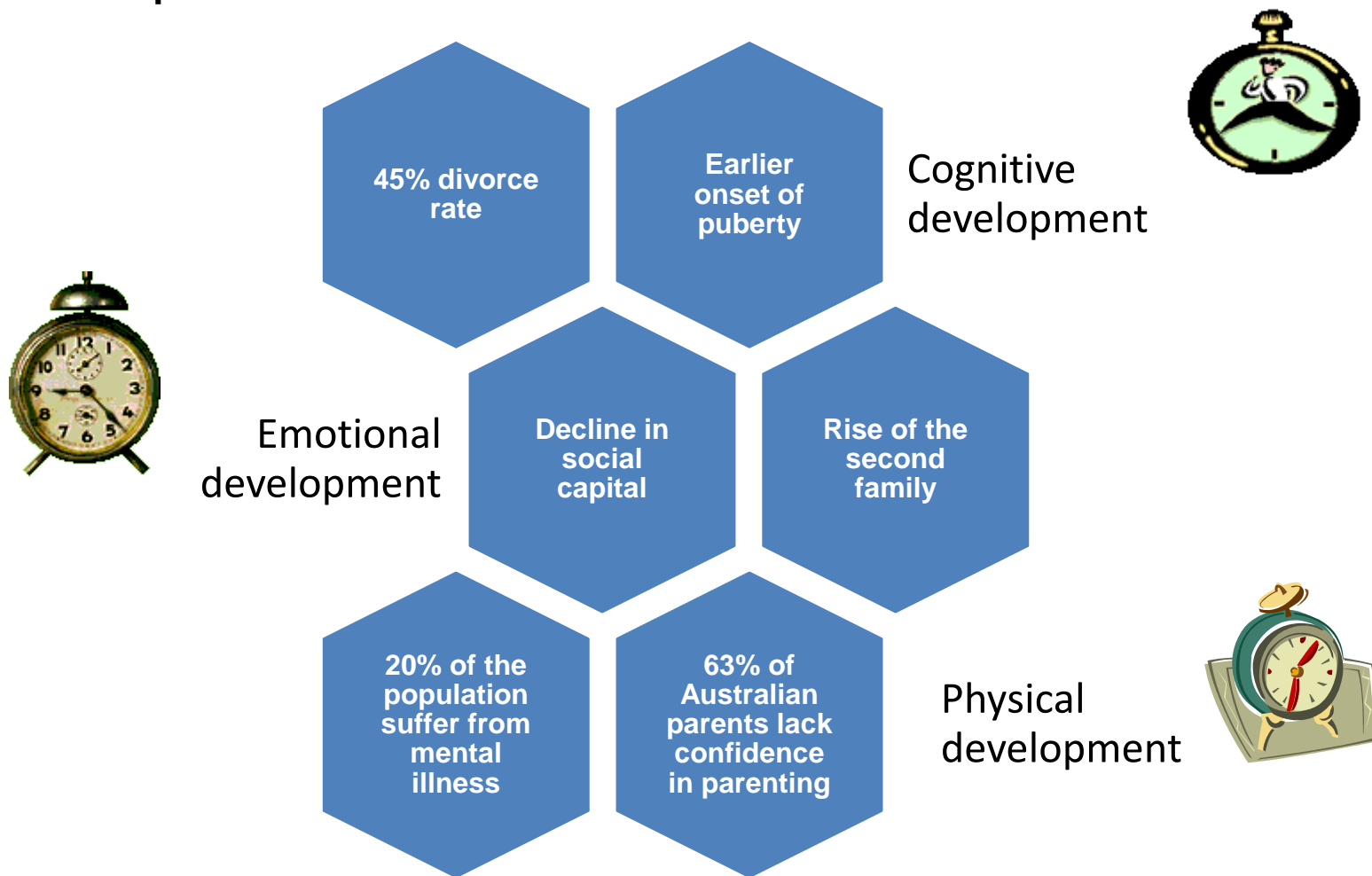


# Adolescence.....



# Being a teen in 2014

## Three developmental clocks of adolescence





# Understanding the adolescent brain

Associate Professor Michael Nagel



# The Brain

## Executive Function

- reasoning
- problem solving

## The Conductor

- judgement
- impulse control
- emotions

## Frontal Lobe

under development

The last part of the brain  
to mature  
(at about 24 years old)

- numbers
- processing sensory input
- language
- analytical abilities

## Parietal Lobe

under development

## Occipital Lobe

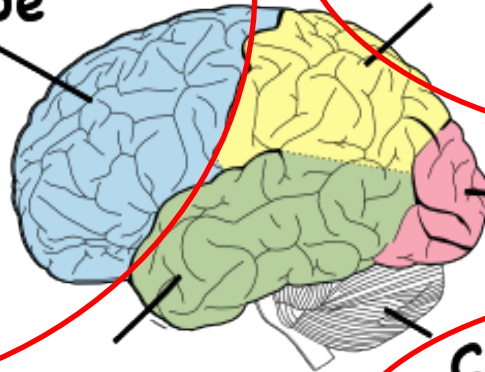
visual processing

## Temporal Lobes

hippocampus - long-term memory  
amygdala - emotional center

## Cerebellum

supports higher learning  
- math, music, advanced social skills  
under major development



**It develops from the back to the front, from  
the inside out.**



# Nature of Young Adolescents



Young adolescence is a distinct, significant and unique period of life characterised by the physical and sexual changes of puberty, and psychosocial and cognitive changes, including the following:

- Psychological – acquiring independence and autonomy
- Social – dealing with changing family and peer group relationships
- Emotional – shifting from narcissistic to mutually caring relationships
- Cognitive – moving from concrete to abstract thought (supported by brain development)
- Moral – developing a set of moral beliefs and standard.

# Early adolescence as a distinct phase of development



Stage 1: Early adolescence	Stage 2: Middle adolescence	Stage 3: Late adolescence
Physical changes Anxiety about body/sexuality Same sex friends Breaking childhood ties Developing adult thinking processes	Peer-focused Identify with music & icons Risk-taking behaviours Seeking individualisation	Facing up to reality Staying at home longer

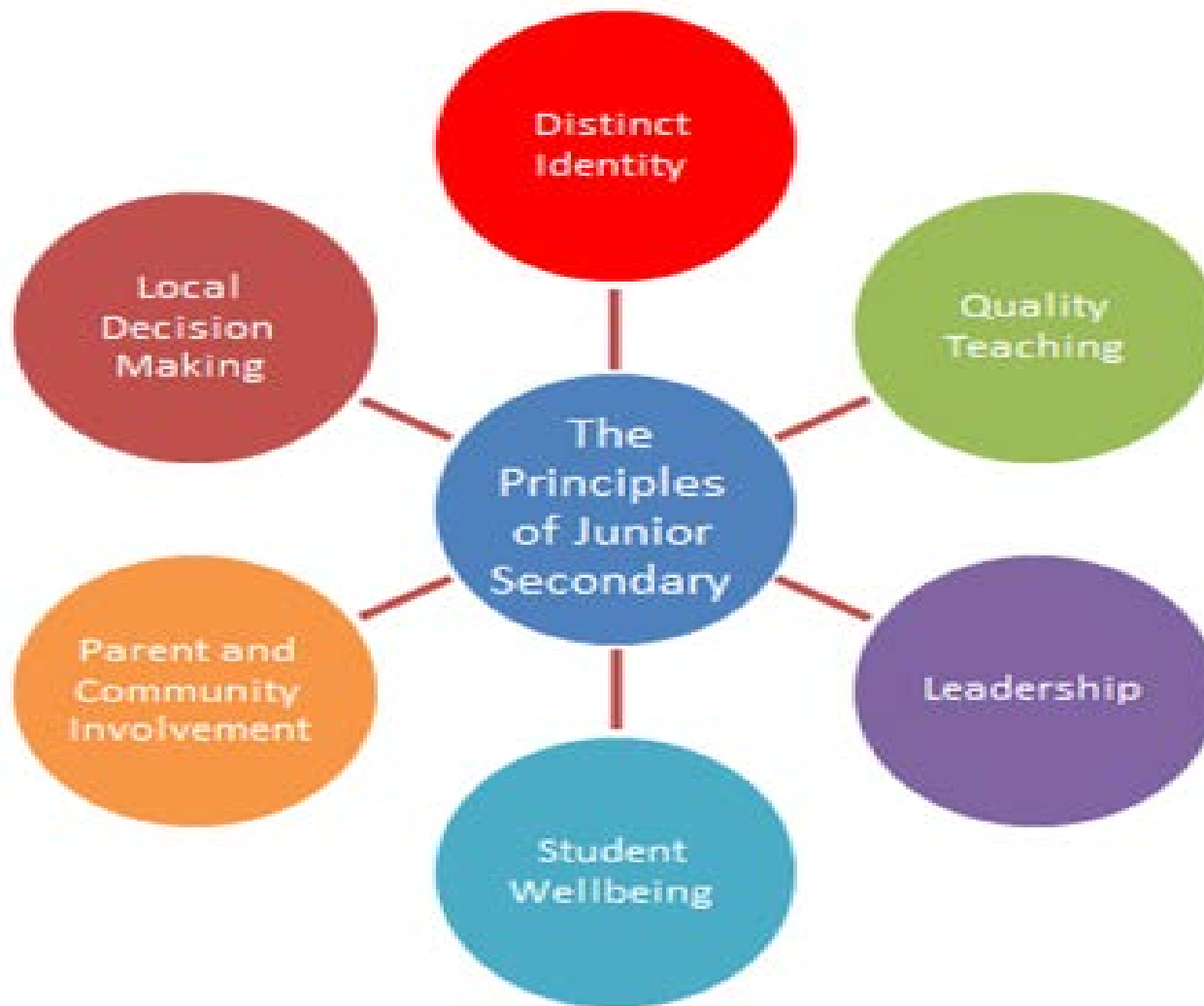
## TASKS OF ADOLESCENCE:

1. Consolidation of identity.
2. Achievement of independence.
3. Establishment of relationships/love objects outside the family.
4. Acquiring economic independence.

# Key Summary

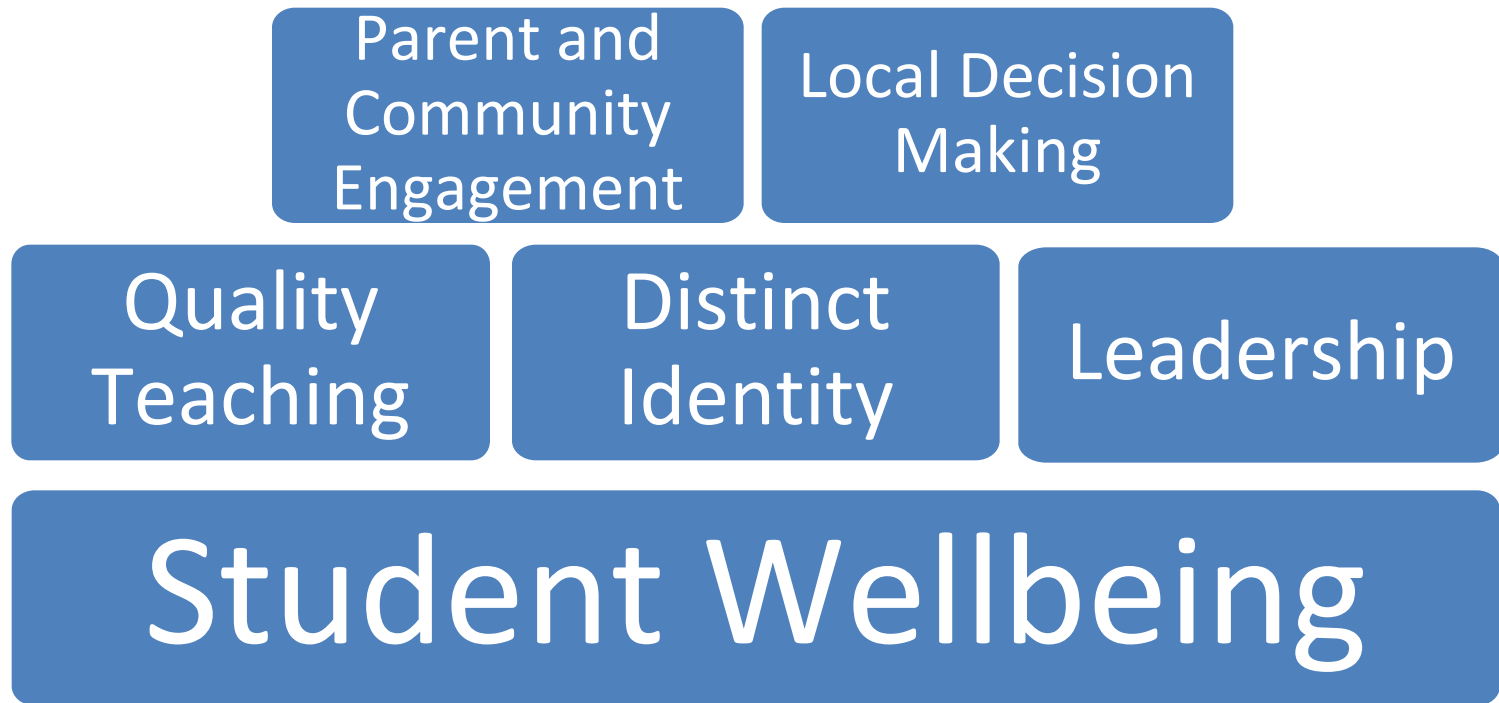
- Positive emotional connections react in the Limbic centre of the brain- causing dopamine and serotonin to be released- engaged adolescents
- Large portion of developmental resources allocated to self perception
- Same size as an adult brain, lowered factual recall, less connective thought and with logic and reasoning missing.....
- Neuro-linguistics what is the effect of the language we use

# The Six Principles of Junior Secondary





# The Six Principles Reorganised



Strong Foundation...which is context and site specific-  
your challenges are not the same as everyone else. It is  
not a “one size fits all approach”

# What happens in the Junior Secondary years?

On entry into secondary school, there is often a decline in:

- positive attitude towards school
- satisfaction with school
- perceived support from school
- perceived levels of respect by teachers
- interest and engagement in learning (Hill and Russell 1999).



Image by Lime Photography

# Wellbeing + Involvement = Engagement

- Research has determined that there are different dimensions to engagement which focus on whether students are:
  - interacting with and disposed to their learning — this is the dimension of wellbeing
  - involved with their learning — this is the dimension of involvement.
- Both wellbeing and involvement are necessary in order for effective learning to take place: they influence the engagement of learners and, therefore, the outcomes of their learning (Goldspink 2009).
- Year coordinators have a key role to play in enabling the link between wellbeing and involvement in school.

## WELLBEING

The process of learning is dependent upon the learner making complex neural connections. Positive learning environments allow the connections to be made within learners' brains and, consequently, learning flows (Sylwester in Weare 2000). However, 'within safe, secure learning environments, where basic needs are met and, furthermore, wellbeing is addressed, stress and anxiety lower' (Caine and Caine in DECS 2007, p. 10).



## INVOLVEMENT

Deeper learning occurs when young people are provided with experiences and environments which encourage active involvement with their learning, so they are invited and supported to explore, negotiate meanings and transform their learning. The most profound influences on involvement are the relationships teachers have with their students, the classroom environment, and the quality of the experience teachers provide for their students.

# Engagement = improved learning outcomes

## ENGAGEMENT

When we are engaged, we are receptive, alert, happy and eager to participate. We are keen to do more, to know more, and to continue with a task we are enjoying at a deeper level. It is in this state of engagement that deep learning occurs.

Optimum engagement occurs when we take on a task which offers a challenge, but sits just beyond our existing range of skills: it therefore offers us a learning opportunity.

Australian and international studies have shown that it is the relationships, dialogue and mutual understandings — in other words, what teachers do and the quality of the experience they provide—that have the greatest bearing on whether students are engaged or not.

We know therefore, that educators make a positive contribution to learner wellbeing.

### Signals of wellbeing

- confidence and self-esteem
- sense of self-identity
- vitality
- enjoyment and sense of humour
- ability to rest and relax
- social initiative
- assertiveness
- responsibility
- persistence/robustness.

### Signals of involvement

- concentration
- energy
- complexity/creativity
- persistence
- precision
- satisfaction

**Improved student outcomes**

# What are High Schools doing?

## **Schools are reviewing under the Six Principles-**

- **Curriculum**
- **Timetable and rooms**
- **Management, Resourcing and Facilities**
- **Pedagogy**
- **Relationships and Connections**

**As a result, there are some challenges, but- there is significant opportunity to enact change. Schools are very aware of this.**



Thank you, any questions?