

The Crowther Centre

Crowther News

Welcome

Special points of interest:

- First Newsletter!
- Launch of website in April 2010
- City base—118 Queen St

Welcome to the first Newsletter from the Crowther Centre Team. The mission of the Crowther Centre is to support innovation and learning at Brighton Grammar School through six strands of operation:

- Generating, codifying and distributing knowledge and information about learning, with a particular focus on boys
- Partnerships with Business and Industry
- Partnerships with Tertiary and other Research institutions with the aim of conducting and fostering educational research
- Professional Development: internal to Brighton Grammar School as well as a wider base such as the parents and local community
- eLearning and online knowledge generation and dissemination
- Partnerships with local, national and international schools and organizations that can provide learning experiences for boys, staff and the community

We will keep you informed of activities within these various strands as the year progresses, but there are some exciting possibilities for our students and staff:

- working in conjunction with Swinburne University;
- various technology companies;
- possible partnerships with schools in other parts of Australia and in the United Kingdom;
- development of a separate online presence that will allow for the sharing of educational material with the wider community.

We are also supporting the Brighton Grammar School staff with a core professional learning program that will establish a solid base upon which to build specific pedagogy and other initiatives.

Andrew Baylis

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Our new logo

The logo has been designed by Michelle Wilson and is representative of a central hub for learning. It shows movement of something which is gaining momentum indicating growth. Thus, it shows 'The Crowther Centre' to be moving forward.

The icon is made up of six dotted arcs, each one representing one of the six strands of operation for the Centre. Each arc/strand is represented in a different colour to indicate change and progress.



Differentiated Instruction



Strike a spark with each learner

*“differentiated
teaching is a response
to the needs of each
student”*

This is the first of a series of articles on differentiation. The aim of the first article is to identify key aspects of differentiation, namely, what it is, what it is based on and how it has become an essential part of teaching and learning.

Further articles will explore the specific elements of differentiation, including planning for and implementing differentiation, differentiating content, process and product and designing units with all learners in mind; creating opportunities for independent and flexible work, using learning profiles to differentiate, differentiated assessment, using ICT in differentiating curriculum, responding to the needs of students with additional needs and practical strategies and tools to use in the classroom. Teachers are invited to send in comments or raise questions regarding their own concerns or successes with differentiation.

Rationale for Differentiation

What is differentiation?

Synonyms: personalised learning, individualised learning, tailored learning, respectful learning

Differentiation is a philosophy that recognises that students are individuals with their own individual learning profiles and needs and differentiated teaching is a response to the needs of each student. In a differentiated classroom differences are celebrated and embraced and quality curriculum is delivered through differentiated instruction to all students. Though differentiation, learning is personalised and individualised enabling all learners to enjoy school and learn.

Teachers who use differentiation recognise that the ‘one size fits all’ and ‘teaching to the middle’ is inadequate in dealing with the diversity of students in their classes. In a differentiated classroom, learners have many opportunities to take in, learn and work with information. Different levels of thinking, readiness and ability levels are taken into consideration when planning and designing units of work. Assessment is varied and different means of expressing knowledge is encouraged.

What is differentiation based upon?

The idea of differentiating instruction to accommodate the different ways that students learn involves a hefty dose of common sense, as well as sturdy support in the theory and research of education (Tomlinson & Allan, 2000).

Neuroscience

One of the most significant and compelling reasons for differentiation comes from neuroscience. With the advances in brain imaging techniques, educators are now armed with very important information about how we learn. The uniqueness of each brain is accepted and suitable brain-based strategies are incorporated into differentiated instruction.

Teachers recognise that through creating multiple paths of learning, they enable all learners, regardless of ability or levels of interest, motivation or readiness, to find suitable ways to learn, use, develop and present new concepts and information. Differentiation is based on the recognition that our classrooms are made up of diverse students and that the diversity will further increase over time. It is now recognised that through differentiated instruction, teachers will be able to provide for learners who require different levels of complexity, depth of learning and differing pace of delivery/absorption of material.

IQ

Differentiation also recognises that intelligence cannot be viewed solely through scores on IQ tests but rather that there is a need to consider additional means of ‘measuring’ intelligence, for example, many teachers are now familiar with alternative notions of intelligence such as Howard Gardner’s multiple intelligences model or Sternberg’s model of analytical, practical and creative intelligences. Educators are much more aware of the need to recognise that students can be ‘smart’ in different ways.



One size doesn't fit all

Differentiated Instruction...

How can teachers differentiate?

- Content
- Process
- Product
- Learning Environment

Teachers can differentiate content, process, product and learning environment; they can take into account respectful tasks, student readiness, interests, needs and learning profiles. (Tomlinson, 1999) Teachers can, based on their student needs, accelerate or enrich learning tasks, as well as provide specific remediation to students who may not have the skills. By being in tune with student readiness the teacher is better prepared to plan for and understand the pace for learning in the class. By taking into account levels of interest or motivation, the teacher is better able to plan for delivery of content. The students' learning profile is an essential ingredient in determining the efficiency and productiveness of students and their preferred options for learning.

When can teachers start to differentiate?

Teachers can start to differentiate as soon as they find out about the students in their classes. Each teacher must know who his or her students are and what their needs are. Teachers can collate data on their students through a variety of means so they can 'meet them where they are' and work from there.

Teachers often use pre-tests, reports, information from the individual differences lists, learning style questionnaires and other means to gather data about their students. Through data gathering teachers then have a sound knowledge of what the students already know, what processes, skills and strategies they do or do not have, and how fast/slow the teaching needs to be. Pre-tests are used not only for knowledge but also for thinking dispositions, research skills and other processes. This information is then used to create how the students will be taught and how they will learn the information.

What roles do the students play in a differentiated classroom?

In a differentiated classroom the role of the student is to increasingly become a self-reliant learner and problem solver. Student interest, readiness and individual learning profiles are frequently tapped in a differentiated classroom. Students actively participate in individual, small group and whole group activities. Students have a greater sense of ownership of their own destiny as learners and become increasingly self-directed making decisions based on their learning preferences.

Radmila Harding

Resources:

Carol Ann Tomlinson, *The Differentiated Classroom, Responding to the Needs of All Learners*, ASCD 1999

Tomlinson and Allen, *Leadership for Differentiating Schools and Classrooms*, ASCD 2000

<http://www.ascd.org/>
http://www.marzanoresearch.com/about/about_dr_marzano.aspx
<http://www.caroltomlinson.com/>

'Come to the edge', he said.

They said, 'We are afraid'

'Come to the edge', he said

They came

He pushed them... and they flew.

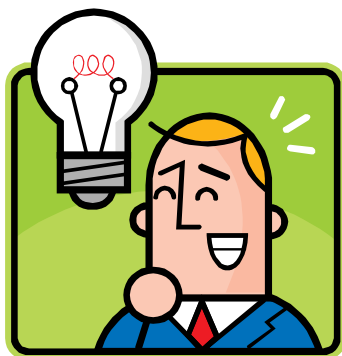
Guillaume Apollinaire Poet



Sea change scuba diving

"the role of the student is to increasingly become a self-reliant learner and problem solver"

Habits of Mind



The Language of Success

Like all professions, teachers rely on a distinct set of skills based on theoretical knowledge unique to their profession. However, generally by the nature of their role, teachers need to concern themselves with a variety of disciplines. To engage students they need a touch of the theatrical. To connect with students they may draw on psychology, sociology, technology, and at times, pop culture.

With such a diverse skill set, it can be hard at times to find commonality in a staff room. The English staff may occupy one corner of the room, the PE staff another and the Maths staff a separate part of the room. Yet, these teachers, regardless of their subject or discipline will all agree on one thing. They want their students to succeed. In fact, while the method will vary from teacher to teacher and classroom to classroom, most of what a teacher occupies their day with aims to ensure the success of the student.

As with any profession, teachers display a varying degree of expertise. A competent teacher will provide their students with a language of success; a more proficient teacher identifies this language when they or their students are using it.

Questions such as:

- What did I do well?
- What do I need to do better next time?
- What will I need to complete this task successfully?

are simple examples of the types of questions heard in classrooms that value success. These questions can be heard before, after or during a task and apply equally to an English essay, a Mathematics problem or a Chemistry experiment.

In 2002, Professor Art Costa, Emeritus Professor at California State University identified dispositions of success that he called Habits of Mind. Habits of Mind are dispositions or behaviours displayed by effective thinkers and were derived from studies on effective, skilful problem solvers and decision makers. Initially Art Costa identified seven Habits of Mind but this list has now grown to sixteen. Costa even says there may be more.

The Habits are briefly described in the table on the next page.

Through the use of a name, slogan, descriptor and icon, the Habits of Mind provide a language of success. While Costa's identification and specific naming of these Habits is a recent occurrence, as already discussed, teachers have always (and will always) value success in their classrooms. Teachers have always known that endeavour doesn't just happen – it is planned for, worked for and constantly evaluated.

The difference made by having Costa's Habits to work with, is that all teachers are able to use the same language and make this explicit for our students. By identifying Habits of Mind in classrooms, all participants are talking the same language, a language of thinking. By identifying Habits of Mind across the school, we are building a mindful community.

A Habit of Mind, like success, is transdisciplinary. While they do so differently, both a scientist and athlete value persistence. For the athlete it may be a training regimen, for the scientist a long series of repetitive experiments to gain a complete data set. A mathematician may be creative but in a very different way to an artist. And, regardless of the discipline, when we apply ourselves mindfully to a task, we all expect to achieve success.

A Habit of Mind, like success, is as good for the teacher as it is for the student as it is for the parent. For success, teachers know how important it is to apply past knowledge to new situations, and the tasks they create to match an ever-changing curriculum reflect this. Of course, a student needs to apply the past knowledge of one year if they are going to move their learning to the new situation of the next year. And a parent will take all the past knowledge they can muster to apply it to the new situation of raising their first child (interestingly, the past knowledge of the first child doesn't mean you can do the same with the second child – you are still applying it to a new situation!)

Perhaps the most practical feature of a Habit of Mind is that the curriculum shift to include it within the classroom is minimal. Once the lan-

“The difference made by having Costa's Habits to work with, is that all teachers are able to use the same language ..”



Try it out

Habits of mind ...

guage is identified; it is then continually practiced and made explicit. It can be identified before, after or during a task. It can be used to set goals, structure tasks or celebrate success. It does not change the content taught but interacts and, at times, assists with it.

A simple example of this could be a teacher asking students to have a specific focus on Thinking and Communicating With Accuracy and Precision before completing an essay (in Science or English or Health etc; the essay is a common task in schools!). The students, knowing the language, will immediately key into all the descriptors, synonyms and like phrases that link this Habit to the classroom. A discussion regarding what this

will mean to the specific task they need to complete will not only ensure they have some key points for success but give them a snapshot of expectations for the task. On one level, teachers are always doing this; but allowing for a specific focus with a common language moves both teacher and student to a more proficient level.

Being mindful is not new; Habits of Mind of mind are. Wanting success in a classroom is not new; having a shared, specific language to discuss success is. It is this language and the ability to practice and be mindful of the sixteen dispositions that can make a change to all those in our school community.

Dale Sheppard



16 Habits of Mind

	Persisting – Stick to it! Persevering in a task through to completion; remaining focused		Thinking and communicating with clarity and precision – Be clear! Striving for accurate communication in both written and oral form; avoid over generalizations, distortions and deletions
	Managing impulsivity – Take your time! Thinking before acting, remain calm thoughtful and deliberate		Gathering data through all senses – Use your natural pathways! Gathering data through all the sensory pathways – gustatory, olfactory, tactile, kinaesthetic, auditory and visual
	Listening with understanding and empathy – Understand others! Devoting mental energy to another person's thoughts and ideas; holding in abeyance one's own thoughts in order to perceive another's point of view.		Creating, imagining, innovating – Try a different way! Generating new and novel ideas, fluency, originality.
	Thinking flexibly – Look at it another way! Being able to change perspective, generate alternatives, consider options		Responding with wonderment and awe – Have fun figuring it out! Finding the world awesome, mysterious and being intrigued with phenomena and beauty.
	Thinking about your thinking (metacognition) – Know your knowing! Being aware of one's own thoughts, strategies, feelings and actions and their effects on others.		Taking responsible risks – Venture out! Being adventuresome; Living on the edge of one's competence
	Striving for accuracy and precision – Check it again! A desire for exactness, fidelity and craftsmanship		Finding humour – Laugh a little! Finding the whimsical, incongruous and unexpected. Being able to laugh at yourself.
	Questioning and problem posing – How do you know? Having a questioning attitude; knowing what data you need and developing questioning strategies to produce that data. Finding problems to solve.		Thinking interdependently – Work together! Being able to work in and learn from others in reciprocal situations
	Applying past knowledge to new situations – Use what you learn! Accessing prior knowledge; transferring knowledge beyond the situation in which it was learned		Remaining open to continuous learning – Learn from your own experiences! Having humility and pride when admitting we don't know; resisting complacency.

“Being mindful is not new; Habits of Mind of mind are”

Brain Based Learning



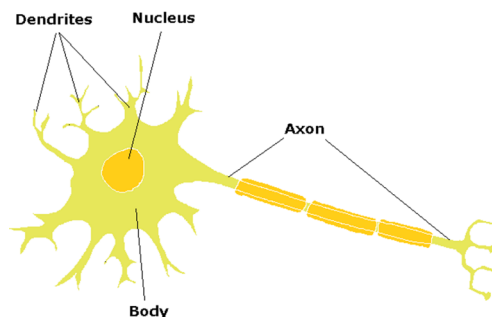
The typical adult brain has a mass of 1.4 kg

“It is only after adolescence that the cognitive processing in the frontal cortex is up to the speed of the other sections of the brain.”

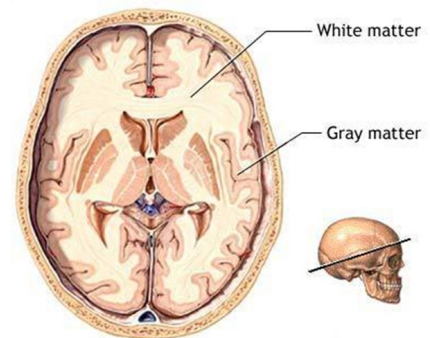
Advances in understanding the structure and function of the brain are becoming increasingly useful to educators. The tools we use to understand learning have evolved from behaviourist models (B.F. Skinner) in the early days, to meta-cognitive scaffolding (e.g.: Bloom and Gardner) and now to MRI brain scans and other neuroscientific information.

Structure of the Brain

There has always been a fascination for the mechanical aspect of the brain – how it works and how it provides a home for ‘mind’ and consciousness. Our sense of self, personality and intellect reside in a few kilograms of matter that absorbs about 20% of the food and oxygen our body ingests. The key cellular structure within the brain is the neuron (brain cell) which has a cell body, dendrites to connect to the axons from other brain cells via synapses and an axon (nerve fibre) that takes messages over comparatively long distances to other cells.



In a mature nerve cell, the axon is wrapped in a fatty sheath of myelin which acts as an electrical insulator, allowing the electrical impulses to pass along the axon very fast. If the sheath is damaged or immature, the message speed is slow and can also “leak” into the surroundings. Myelin is typically white in brain scans and the main cell body a darker colour, leading to a simple characterisation of White matter and Gray matter in the brain.



It appears that the myelin is added to the axons as the neuron develops and the degree of myelination varies with age. Axons fully coated with myelin will transmit signals up to 100 times faster than those without a solid coating.

Sensory and motor brain regions become fully myelinated in the first few years of life, but axons in the frontal cortex continue to be myelinated well into adolescence.

It is only after adolescence that the cognitive processing in the frontal cortex is up to the speed of the other sections of the brain. The typically active boy during adolescence has great difficulty with impulse control as so much of his movement is being triggered by the fast, mature, sensory centres while the higher level cognitive areas that provide for control and inhibition in adults are still working far too slowly.

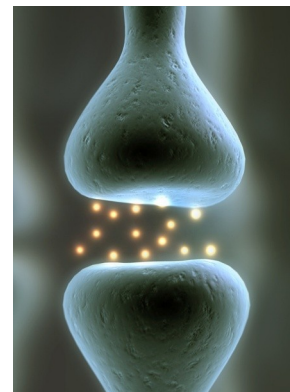
Gray matter density shows noticeable changes as a child ages. One of the main changes is the density of synaptic connections. Soon after birth, the brain forms many new synapses, well exceeding that of an adult brain. As a child gets older, the brain goes through a number of stages of synaptic pruning where frequently used connections are strengthened and infrequently used ones are eliminated. The process of synaptic pruning is driven by experience and the challenge to educators and parents is in providing the right mix of experiences to allow the child to fully develop his sensory and cognitive tools.

Brain Based Learning

MRI scans are starting to show age based trends in development of white and gray matter. In the frontal areas of the brain, the gray matter seems to increase in volume, reaching a peak at around age 12 for boys and age 11 for girls. The volume then declines until adulthood.

Similarly, the mid section of the brain (parietal lobe) shows a trend of growth until age 12 for boys, age 10 for girls, followed by a decline to adulthood. The regions that exhibit the greatest decrease in gray matter density between adoles-

cence and adulthood also show the largest increase in white matter density. This suggests that the most active areas of pruning are also engaging in active connections with other neurons, increasing the complexity of the neuronal networks in these areas. Importantly, there are strong differences in the rates of change in gray and white matter for boys and girls leading to significant differences in overall brain structure.



Synapses can pass information via chemical signals

Brain Based Learning ... What can teachers do?

While extrapolating behaviour and learning from knowledge of the base structure of the brain is still a long way off, a couple of interesting possibilities arise:

Puberty represents a period of synaptic reorganisation in many parts of the brain.

As a consequence, the brain might be more sensitive to experiential input in this time and so learning strategies based on actions, strong emotions and social interaction could have longer lasting effect than the more abstract and intellectual approaches suited to adult learners.

Behavioural habits and learning strategies formed in this stage could be very hard to shift once the brain moves out of puberty and the neuronal networks are less malleable.

There is significant delay before full myelination in the frontal areas of the brain.

This starts to explain the impulsive behaviour of most adolescents and also suggests why they often don't know "why they did it". Processing in the frontal parts of the brain is linked with the higher cognitive functions and so learning strategies that give greater 'pause time' will give students a better chance to utilise deeper thinking –

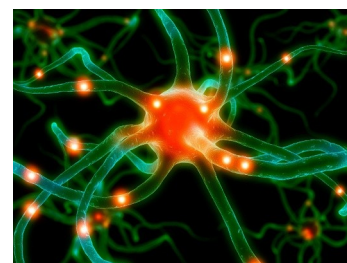
teachers who demand quick responses will find students reverting to instinct or giving up, and certainly be unable to explain their reasoning (as the slower message speed between neurons hasn't given them time to do any!)

Teaching strategies suited to developing brains:

- Active, experiential learning at younger ages
- Increased pause time to allow the slower cognitive structures to be used and so strengthen these networks early
- Management of impulse behaviour by training instinctive behaviour appropriately and giving boys a chance to stop and allow the higher level cognitive areas to "catch up"
- Increasing the variety of tasks to support correct synaptic pruning – once sections are lost, it is much harder to regain those skills (for example, language and musical skill development occurs much more easily while young).

Andrew Baylis

“Increased pause time to allow the slower cognitive structures to be used and so strengthen these networks early”





*Visit our city base at
Level 6, 118 Queen St
Melbourne 3000*

Would you like to participate?

Research

- Boys' reading habits
- Validating the use of technology in Science
- Designing and testing applications for the Apple iPad
- Tamper-proof packaging - a problem solving approach

Projects

- Review current articles and provide abstracts for our website
- Network of students around Australia and in the United Kingdom
- Online learning - extension courses / forums

Newsletter

- Write article or share what is working in your classroom

Conference

Boys and Technology - September 2010

Parent seminars - various stages throughout the year

Current members of the Crowther Team

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To participate, just have a chat with any member of the current team