# Neuroeducation and Coaching

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# Corpus Callosum





CORPUS CALLOSUM

# Experiments in the 1950s

#### Types of Epilepsy





# What did you see? "I saw a Square"



Can you draw what you saw? "Yes, I can, here it is:" What is it? - "It is a square."



# How are we taught to remember?

- Educational emphasis
- On verbal skills:
- \_ speaking
- \_ reading
- \_ writing
- Logical thought
- Matematical deduction

# The right brain is left starved!



#### Left and right brain functions

• For example, when a person is brain damaged and loses say movement of one side of the body, the other side of the brain can often be trained to take over the missing brain functions.

• Warning - Oversimplification!

• Take the following conclusions – with the grain of salt!





# Edward de Bono - a brain training pioneer, author of six thinking hats and creative thinking expert



"**If** you wait for opportunities to occur, you will be one of the crowd "

Edward de Bono

•\_ offered thinking techniques to facilitate potential creative abilities

the father of the concepts
 Lateral thinking (sideways thinking) and Parallel thinking

Brain teasers – group work



•Put simply, the brain consists of <u>two hemispheres</u> joined by a bridge of nervous tissue called the <u>Corpus Callosum</u>. •This has shown that anatomical features in one half of the body are controlled by the opposite half of the brain the brain is crossed.



• \_ How?

- 10 minutes to memorize
- 30 minutes afterwards to test yourselves
- Tomorrow\_test!

Simple rightbrain technique - use your Imagination!

Memorizing 30 items

• Visualize... Items on a list being stored in various specific places in your house

Imagination

# Locus method

Greeks, Romans

Memorizing speech ("in the first place, in the second place...")

Medieval times



# 1) Subsystems

Clockwise walk



# 2) Size – exaggerate



# 3) Boredom

- Be dramatic
- Ludicrous
- Imagine something Amusing
- Silly

# Homer and Rgveda





# Patterns

- Principle of primacy
- Principle of Recency
- Principle of specifics

# Von Restorff effect



- \_attention grabbers""
- colourful,, bizzare, too big, too small, funny, vulgar)
- Rabid werewolf

### Memory

- Ability of the mind to:
- Encode info (receive + process info)
- Store info (either in short term or long term by creating neural connections)
- Recollect



#### Mnemotechinques

- techniques
- use and practise the natural potential of a brain to:
  - Encode
  - Store
  - Recollect



# What the brain loves?

- Children laugh about 400 time a day while adults only 15.
   Blog author Susan Camera
- Only 40% of American have a passport.
   Newsweek reporter John Brown
- You can't lose a game if you don't play the game. William Shakespeare
- Future starts today and now, not tomorrow.

#### John Paul II

#### **7 Key Editing Questions**

- 1. Does this make sense?
- 2. Does it flow right?
- 3. Is it important?
- 4. What am I missing?
- 5. Can I condense this?
- 6. Is it interesting?
- 7. Is it grammatically correct?

# Mozzart effect



Music and development of

- rhythm and melody influence learning
  - raise in dopamine
  - brain treats it as reward
  - amagdyala reads this impulse as very positive

#### Stroop Effect

is your job: name the colors of the following words. Do NOT read the words...rather, say the color of the words. For example, if the word "BLUE" is printed in a red color, you should say "RED". Say the colors as fast as you can.

#### YELLOW BLUE RED PINK ORANGE BLUE BLUE WHITE ORANGE BLUE WHITE GREEN YELLOW BLUE YELLOW GREEN ROWN YELLOW BLUE Κ GREEN RED

# What is Neuroeducation?

# Neuroscience and Education

- Relatively new and developing area
- seeks to blend the collective fields of:
  - Neuroscience + Psychology + cognitive science + education
- better understanding of learning
- Creating more effective:
  - Teaching methods + curricula + education policy
- Understanding of attention, stress, memory, exercise, sleep, and music

### The nature-nurture debate

- "We are a product of our genes"
- "We are a product of our environment"
- We opeate through a mix of nature and nurture.
- Some genes have the capacity to express themselves when provoked by circumstances and behaviours in the environment.
- => School has a far greater impact on brain development then we realise.



# Changing the brain

- Neurogenesis
  - Ability to produce new neurons
- Neuroplasticity
  - Ability to create new connections
- Most effective learning involves:
  - Memory
  - Senses
  - Volitional control
  - Cognitive functioning



Knowledge of how the brain works to be effective coaches!

# What is coaching?

- process that aims to improve performance
- focuses on the 'here and now'
- Not on the distant past or future
- Coach ≠ expert
- Coach = facilitator of learning
- Teaching someone ≠ helping someone to learn

"Coaching is releasing a person's potential to maximise their own performance. It is helping them to learn rather than teaching them."



# How does coaching work?



# What does coaching mean?

- From Hungarian word KOCSI
- 1830 at Oxford University (slang for tutor)
- Meaning = <u>someone carrying</u> <u>a student through studies to</u> <u>an exam</u>
- Modern coaching dates to the 70's with Timothy Gallway





# The "Inner Game"

The Inner Game of lennis The ultimate guide to the mental side of peak performance W. Timothy Gallwey

- Revolutionized thinking about coaching
- Described the process using coaching in tennis/ sport. / the power of a leader
- Asked questions and supported his players. / the power of asking questions
- Believed that low results in the game were due to their own limitations and not the abilities they had / everybody has got his/her own potential
- His method was so effective that the interest in using it in other areas raised quickly

# Gallwey's insights

- The biggest obstacles to success and achieving potential are internal, not external
- Coaches could help individuals to improve their game by distracting them from their inner dialogue (in particular, the <u>critical voice</u>)
- Individuals generally have the answers to their own problems within themselves



# Teaching, Coaching, Mentoring and Counselling ? the difference

# Teaching and Training

Expert teacher who imparts knowledge

Teacher as expert "knowing the right answer"



# Coaching

- belief that the individual has the answers to their own problems within them
- coach is not a subject expert
- coach is focused on helping the individual to unlock their own potential
- anyone can take a coaching approach with others



# Mentoring

- mentor is a guide
- helps someone to learn or develop faster
- mentors are often formally designated
- usually have considerable experience and expertise



# Counselling

- closer to a therapeutic intervention
- focuses on the past
- helping the individual to overcome barriers and issues from their past and move on
- the focus may be either internal or external



# Short break!

# SOLUTIONS:

# Mirror neurons and social climate

- Gene experssion + mirror neurons = schools must pay much more attention to their social environment
- Too much attention on academic study and testing
- Too little attention on social and cultural impact on students



- Students need to feel:
  - Welcome
  - Respected by peers and teachers
  - Resiliant to peer preassure
  - Socially accepted
  - Ready to take risks
- Schools need to offer:
  - Openness to communication
  - Appreciation of effort
  - Involvemennt in decision making
  - Degree of caring

# Neurons do regenerate

- Diet
- Exercise
- Learning
  - Rewire themselves
  - Establish new netowrks
- In depth
- In a creative environment
- With low stress



#### New views on memory

- Temporary memory
- Age related capacity
- Often exceeded with too much content
- Lasts up to several weeks (longer than previously thought)
- Contents discarded after they serve no purpose (often after tests)



# Looking at the gifted brain

- Gifted brains and different in several ways
- Due to genetic predispositions
- Due to environmental influences
- Conclusion: School experiences can rise the intelectual level and increase the creativity of all students



# The arts develop the brain

- There is no culture on this planet without music, art and dance
- Although they are discontinued in educational systems
- Through arts students develop critical skills:
- Visual-spatial ability; attention and concentration and creativity
- People who regularly practiced a musical instrument when young display better sound recognition as well as enhanced levels of memory and attention compared to nonmusicians.
- Musical training is likely to enhance both verbal skills and nonverbal abilities.



# **Emotions affect learning**

- Emotional areas of the brain are fully developed by the age 10 to 12
- Regions responsible for rational thought and emotional control mature closer to 22 to 24 years of age
- Students cannot focus on the curriculum unless they feel safe
- Without threats of violence
- Emotionally secure
- Respected
- Cared for



# Adequate sleep, good nutrition, and regular exercise

- common-sense healthy habits promote optimal learning performance in two ways
  - 1) they promote neuroplasticity and neurogenesis
  - 2) they keep cortisol and dopamine (stress and happiness hormones, respectively) at appropriate levels
- All-night cramming sessions, skipped meals, and skipped exercise can actually reduce the brain's capacity for high academic performance. (This is true for instructors as well as students.)



# Sleep is important for retention

- during sleep the brain is incredibly active carrying out processes that help the brain to:
- learn
- make connections
- remember
- clear out clutter

- Sleep deprived:
- has trouble capturing all sorts of memories
- more likely to get poorer grades
- more likely to get depressed

## Movement enhances learning and memory

- the brain is more active when learners are moving around
- movement brings additional fuel carrying blood to the brain
- allows the brain to access more long-term memory areas, which is an ancient survival strategy
- helping students make greater connections between new and past learnings



# The need for meaning

- sense and meaning
- the major criteria the brain uses in deciding what to encode to longterm memory
- Conclusion: use strategies that build links between the curriculum and the lives of your students



# Active learning

- lower cognitive levels understanding and remembering hippocampus - responsible for memory and spatial awareness
- Higher cognitive levels creating, evaluating, analyzing, and applying

   cortical areas responsible for decision-making, association, and
   motivation
- More complex processes are more beneficial for learning
  - Greater number of neural connections
  - More neurological cross-talk
- Active learning
  - Stimulating a variety of areas of the brain
  - Promoting memory



# Stress loop (see Brain – Stress and Coping skills ppt.)

- Stress impulse
- Body reacts with nervous system
- Amygdala blocks prefrontal cortex (logical)
- Reptilian brain takes full control
- Adrenaline rises
- Physiological processes difficult to control

#### Moderate stress



# How do you deal with stress?



# How to deal with stress

- Positive reapprisal
- Exercise
- Communication methods
- Training on personal development
- Self-reflection
- Affirmation
- Good diet
- Respecting differences









# Positive reappraisal

- Redirects thoughts to good
- Creates positive cognitive energy
- Leads to personal growth
- Leads to self-reflection
- Leads to awareness of the power/ benefits of efforts



# Exercise

- Breathing
- Yoga
- Meditation
- ...



# Communication methods

- Better communication = less stress
- Clarity
- Empathy
- Good intentions





## Almonds

- contain vitamin B2 and magnesium, which produce serotonin
- Serotonin regulates your mood and relieves stress.
- the zinc in these nuts helps prevent some harmful physical consequences of stress.
- They also contain vitamin E, which is an antioxidant that battles free radicals associated with heart disease and stress.
- the crunch from chowing down on almonds acts as a psychological stress relief.



### Avocado

- The monounsaturated fats and potassium in avocados lower blood pressure
- Full of potassium



#### Black tea

- contains theanine, which reduces the stress hormone called cortisol.
- Several cups a day will help lower blood pressure.



#### Blueberries

- filled with antioxidants and vitamin C,
   both of which help prevent stress.
- also high in fiber, which prevents the tension/cramping associated with stress as well as helping to regulate blood sugar levels.



## Broccoli

- Best source of vitamin B.
- contains folic acid, which has been shown to relieve stress, anxiety, panic, and depression.



# Dried Apricots

High in magnesium, which helps reduce stress. Magnesium is also a natural muscle relaxer, which makes you feel less tense. Dried apricots are also high in fiber and vitamin C.



# Milk

- A cool glass of milk contains B2 and B12 vitamins
- helps destroy free radicals associated with stress.
- rich in protein and calcium
- helps regulate blood sugar
- Leaves a feeling of satisfaction



## Oranges

- filled with vitamin C, which helps reduce stress.
- Vitamin C also helps body's blood pressure and cortisol levels return to normal more quickly after a stressful situation.
- Oranges act as a barrier against the cumulative effects of stress on the body.



# Salmon

- The omega-3 fatty acids contained in salmon keep cortisol (our stress hormone) and adrenaline from peaking
- also contains magnesium, which aides in relaxation.



#### Whole Grains

- complex carbs
- break down slowly, thus keeping us satisfied longer
- carbs boost serotonin levels, the slow
   breakdown means longer hours of happiness
- also contain lots of healthy fiber

