Learnus™

Understanding Learning

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"Understanding Learning - is it all in the brain?"

Mediated Workshop

Wednesday June 26th

Drama Studio, Institute of Education

How could neuroscience influence education? (and vice versa!)

Prof. Michael Thomas

Director, Centre for Educational Neuroscience

LEARNUS Mediated Workshop

26 June 2013

Outline

- The emergence of educational neuroscience (EN)
- What some teachers would like from EN
- Neuromyths
- How teachers and neuroscientists might interact
- What the future might hold
- Today’s discussion topics

cen

Centre for Educational Neuroscience

An inter-institutional transdisciplinary project

UCL

Neuroscience

IOE LONDON

Leading education and social research

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Cambridge University

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Centre for Neuroscience in Education

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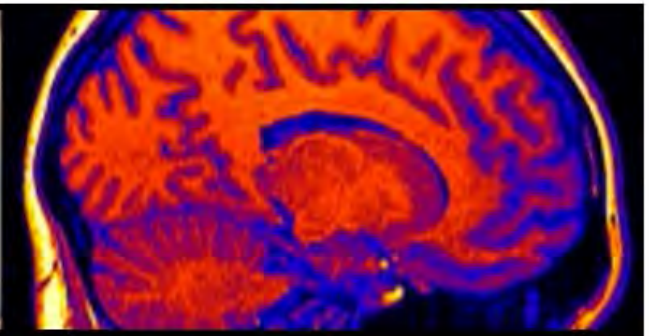
University of Cambridge › Centre for Neuroscience in Education

The Centre was established in 2005, and was the first of its kind in the UK. We are based in the School of Biological Sciences (Department of Psychology) on the Downing Site but we also have strong links with the Faculty of Education. The Centre's aims are to apply the substantial advances in understanding the brain to education.

The main research goal of the Centre is to establish the basic parameters of brain development in the cognitive skills critical for education. For example, we aim to understand how the brain functions and changes during the development of reading and maths, exploring the development of related skills such as language, memory, numerosity and attention.

Bristol University

neuroeducational.net



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NEnet is an information network hosted by the Centre for Mind and Brain in Educational and Social Contexts (M-BESC) at the Graduate School of Education, University of Bristol. NEnet seeks to distribute neuroeducational information and resources that educators may find helpful.

Dr Paul Howard-Jones

LearningRx Train the brain. Get smarter. Guaranteed.

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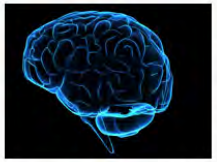
Brain Training 101

The Science Behind Brain Training | How Brain Training Works | How Do We Know Brain Training Works? | What Can Brain Training Mean to You and Your Family? | Brain Training Rewires Brains & Changes Lives

Brain Training 101: How Brain Training Works



Whenever you think, learn, or remember, groups of neurons in your brain physically work together to accomplish the task. If what you're trying to do is difficult or unfamiliar, nearby neurons are drawn into the process to help you out.

LearningRx brain training exposes each student to a customized series of intense mental workouts. To perform these workouts, the brain is forced to strengthen, reorganize and even create new neural pathways. In other words, brain training "rewires" the brain to perform more efficiently than ever before.

How important is it to force your brain to work hard? According to Dr. John Ratey of Harvard Medical School, and the author of *A User's Guide to the Brain*, using your brain keeps it vital and growing, and *not* using it leads to decay. Dr. Ratey concludes that, "for the first time, we are learning to see mental weaknesses as physical systems in need of training and practice."

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Brain-Based Learning

Brain-based learning is also known as brain-compatible learning. It is the explicit acknowledgement that learning is fundamentally linked to the biological and chemical functioning of the brain. This may seem like a redundant concept but historically the role of the brain in the learning process has been overlooked. The revolution of education through brain-based learning is due to developments ...

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Selected full-text books and articles on this topic at Questia

The Brain-Compatible Classroom: Using What We Know about Learning to Improve Teaching — Read preview
Laura Erlauer. *Association for Supervision and Curriculum Development, 2003*

Research-Based Strategies to Ignite Student Learning: Insights from a Neurologist and Classroom Teacher — Read preview
Judy Willis. *Association for Supervision and Curriculum Development, 2006*

Brain-Based Learning: A Synthesis of Research — Read preview
Bellah, Kimberly A.; Robinson, J. Shane; Kaufman, Eric K.; Akers, Cindy; Haase-Wittler, Penny; Martindale, Lynn. *NACTA Journal, Vol. 52, No. 2, June 2008*

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Learning Styles & Brain Preference

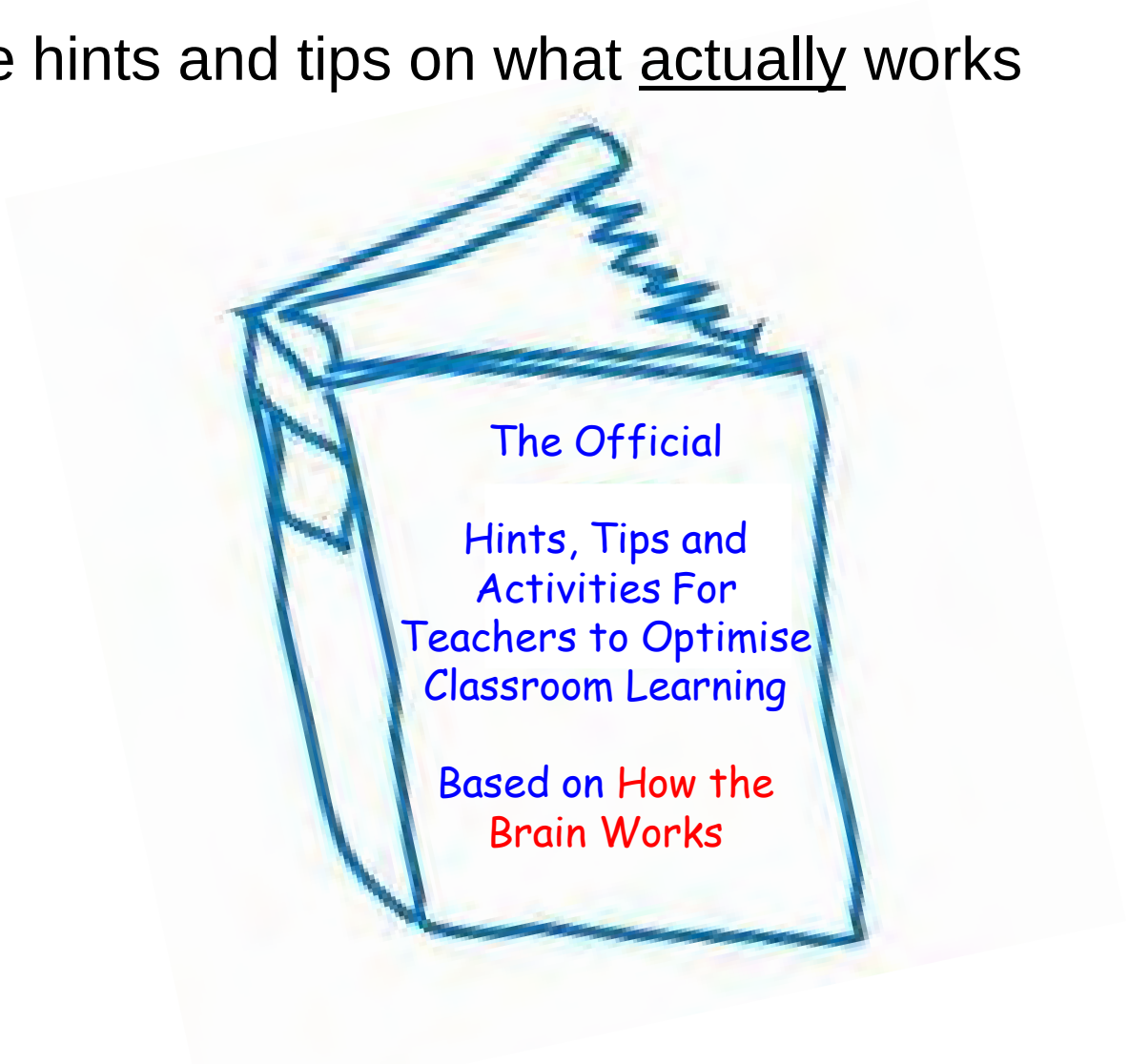
Experts have identified four unique learning styles — visual, auditory, tactile and kinesthetic, and two brain preferences — right and left hemisphere.

Learning Styles
Learning styles are how students receive information from the world, remember and understand it best.

My Learning Club has clearly identified each learning style and assigned it a fun, friendly mascot:

What do (some) teachers want?

- Some hints and tips on what <u>actually</u> works



Neuromyths

Results showed that on average, teachers believed 49% of the neuromyths, particularly myths related to commercialized educational programs

Nature Reviews Neuroscience | AOP, published online 12 April 2006; doi:10.1038/nrn1907

SCIENCE AND SOCIETY

Neuroscience and education: from research to practice?

Usha Goswami

Abstract | Cognitive neuroscience is making rapid strides in areas highly relevant to education. However, there is a gulf between current science and direct classroom applications. Most scientists would argue that filling the gulf is premature. Nevertheless, at present, teachers are at the receiving end of numerous 'brain-based learning' packages. Some of these contain alarming amounts of misinformation, yet such packages are being used in many schools. What, if anything, can neuroscientists do to help good neuroscience into education?

Front. Psychol., 18 October 2012 | doi: 10.3389/fpsyg.[illegible].00429

Neuromyths in education: Prevalence and predictors of misconceptions among teachers

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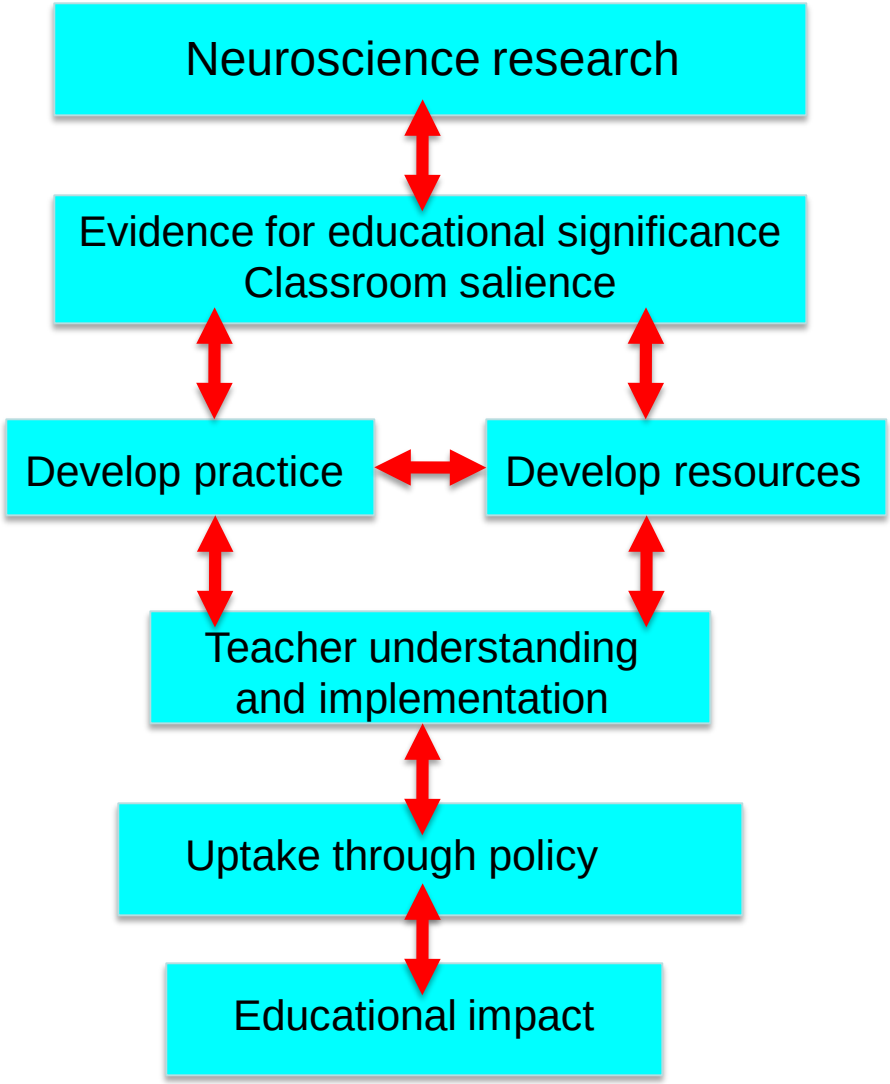
[2] Graduate School of Education, University of Bristol, Bristol, UK

The OECD's Brain and Learning project (2002) emphasized that many misconceptions about the brain exist among professionals in the field of education. Though these so-called "neuromyths" are loosely based on scientific facts, they may have adverse effects on educational practice. The present study investigated the prevalence and predictors of neuromyths among teachers in selected regions in the United Kingdom and the

How neuroscience and education might interact – Paul Howard-Jones



Scientific studies

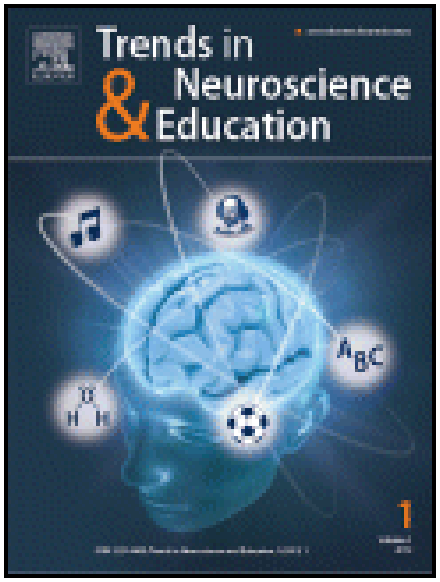
Bridging studies

Practice-based studies

↓ Communication →

What the future might hold

Mission statement of a new journal



- “200 years ago, medicine was little more than a mixture of bits of knowledge, fads and plain quackery without a basic grounding in a scientific understanding of the body
- In the middle of the nineteenth century, Hermann von Helmholtz, Ernst Wilhelm von Brücke, Emil Du Bois-Reymond and others drew up a scheme for what medicine should be (i.e., applied natural science)
- We believe that this can be taken as a model for what should happen in the field of education
- We believe that we know today more about the neuroscience of learning than Helmholtz et al. back then knew about the body”

Reasonable skepticism

- "You claim all learning is taking place in the brain. If that's so, which type of preschool
  - A neuroscientist can't answer thi
  - But answers will come from rese cognitive neuroscience

Biochemistry alone is not enough to cure a patient, and physics alone is not enough to build a bridge…

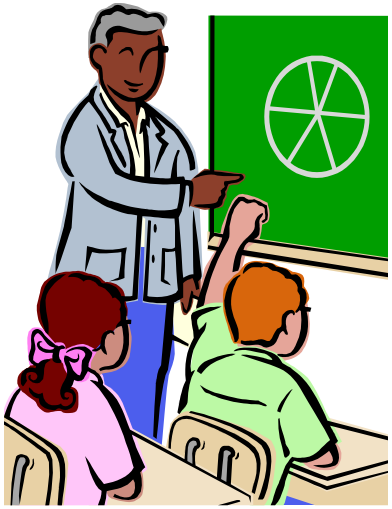
Neuroscience : Educ on

Biology : Medicine

Physics : Architecture

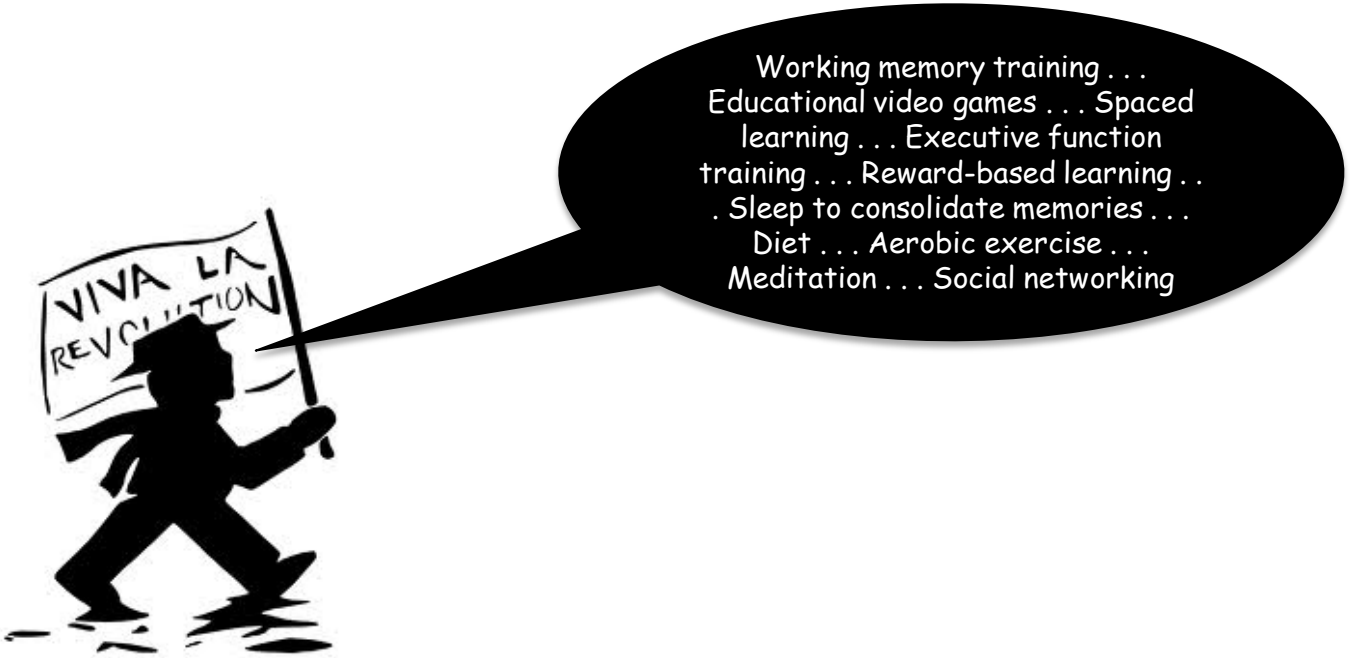
Predictions from the analogy to medicine

- Initial contribution of neuroscience will be to understand *why the educational methods that work do work* – only later: *and here's what else might work*



Predictions from the analogy to medicine

- Few magic bullet insights (penicillin, vaccination)
  - Instead an accumulation of small improvements that eventually add up to a revolution
  - Multiple small effects (risk factor model)



Predictions from the analogy to medicine

- The first findings to exert significant influence will be broad not topic specific
  - Factors bearing on brain plasticity, role of diet and exercise, role of sleep, hormones, emotions, vigilance and stress, social hierarchy effects…
  - The kinds of things that are general across species
  - Relevant findings from animal models or other primates (for whom education, per se, is not relevant)

More speculative outcomes

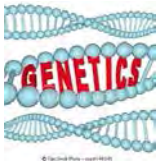
- Will there be a placebo effect in educational interventions?
  - This will make the evaluation of educational techniques much harder

The Hawthorne Effect

Wikipedia: The central idea behind the Hawthorne effect … is that changes in participants' behavior during the course of a study may be "related only to the special social situation and social treatment they received."

More speculative outcomes

- Possible unpalatable conclusions from neuroscience
  - The better teachers do their job, the more different their students may become



  - Optimal teaching would require full genotyping of children

  - Interventions may have side effects

  - Not all aspects of children's abilities may be as manipulable as educators hope (e.g., motivation)

More speculative outcomes

- The main practical consequence of neuroscience on education will be on the training of future teachers

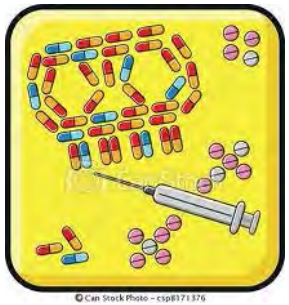
How do I establish what actually works in my classroom?

Analogies aren't perfect

- Education is intrinsically a social, classroom-based phenomenon, compared to the dyadic phenomenon of the doctor-patient relationship

Analogies aren't perfect

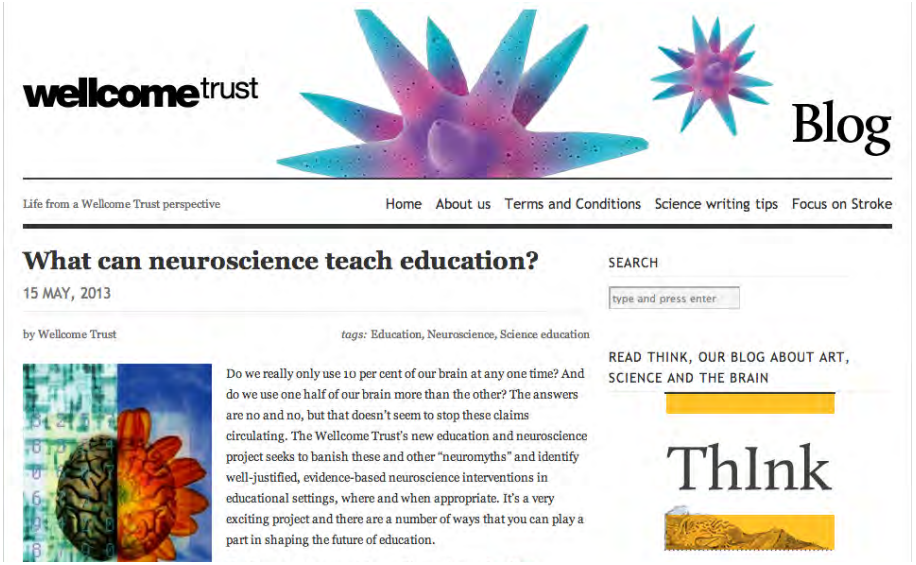
- Ethical issues surrounding educational interventions may be more complex than those surrounding medicine
  - Drug treats disease
  - Education is a pathway out of poverty

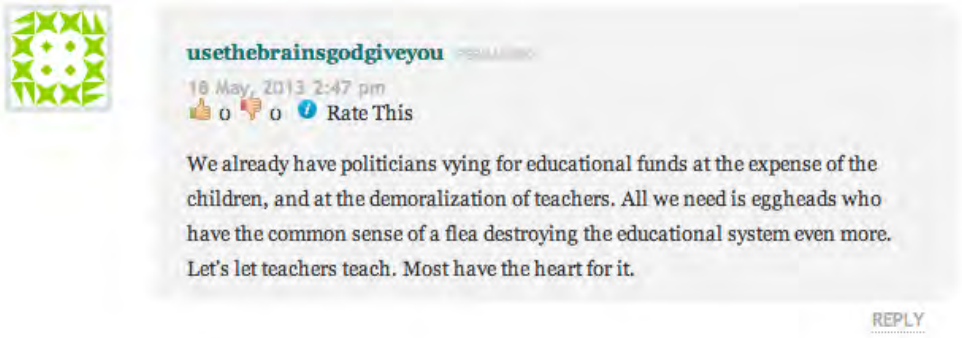


Analogies aren't perfect

- Medicine is about the mind as well as the mechanisms of the body
  - Doctor-patient relationship
  - Attitudes to health (exercise, diet)
  - Role of the community

Attitudes to scientific input to practice





VS

GP doctor

- Looks to science for new treatments
- Observes, listens, probes, diagnoses, prescribes…
- But doesn't lean over patients' shoulders as they take their pills
- Supported by nurses and health visitors

Workshop Discussion Topics

- Evaluating evidence: how do we know something works?
- Learning through life: does it change?
- Improving memory: how does training help?
- Impact of teaching: how does it affect the brain?
- Subliminal Learning: what role does it play?

Thanks for your attention

- Questions?