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
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.
neuroeducational.net

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.
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."

Brain Training 101

I used to struggle to keep up with my friends at school. Then my parents found the cause.

Brain-Based Learning

Brain-based learning is also known as brain-compatible learning. It is the explicit acknowledgment 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...

Related topics at Questia

Learning Theory
Constructivism in Education
Memory
Memory Research
Motivation
Student Motivation
Teaching Elementary School
Teaching Middle School
Teaching in High Schools
Teaching in Colleges

My Learning Club

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 actually works

The Official
Hints, Tips and Activities For Teachers to Optimise Classroom Learning
Based on How the Brain Works
Results showed that on average, teachers believed 49% of the neuromyths, particularly myths related to commercialized educational programs.

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?

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

- Neuroscience research
- Evidence for educational significance
  - Classroom salience
- Develop practice
- Develop resources
  - Teacher understanding and implementation
- Uptake through policy
- Educational impact

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 is most effective?”
  – A neuroscientist can’t answer this...
  – But answers will come from research informed by developmental cognitive neuroscience

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

Neuroscience : Education
Biology : Medicine
Physics : Architecture

LEARNUS Workshop, 26.06.13
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)

Working memory training . . .
Sleep to consolidate memories . . .
Diet . . . Aerobic exercise . . .
Meditation . . . Social networking
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."
• 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)
The main practical consequence of neuroscience on education will be on the training of future teachers.

More speculative outcomes

- 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

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

What can neuroscience teach education?

15 MAY, 2013

by Wellcome Trust

Do we really only use 10% of our brain at any one time? And do we use one half of our brain more than the other? The answers are no and no, but that doesn’t seem to stop those claims circulating. The Wellcome Trust's new education and neuroscience project seeks to banish these and other "neuromyths" and identify well-justified, evidence-based neuroscience interventions in educational settings, where and when appropriate. It’s a very exciting project and there are a number of ways that you can play a part in shaping the future of education.

ThInk

We already have politicians vying for educational funds at the expense of the children, and at the demoralization of teachers. All we need is eggheads who have the common sense of a flea destroying the educational system even more. Let’s let teachers teach. Most have the heart for it.
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?