



FONDATION
La main à la pâte

SLIPPERY SLOPES

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INSTITUT JEAN NICOD

PLAN

My brain and the screens:

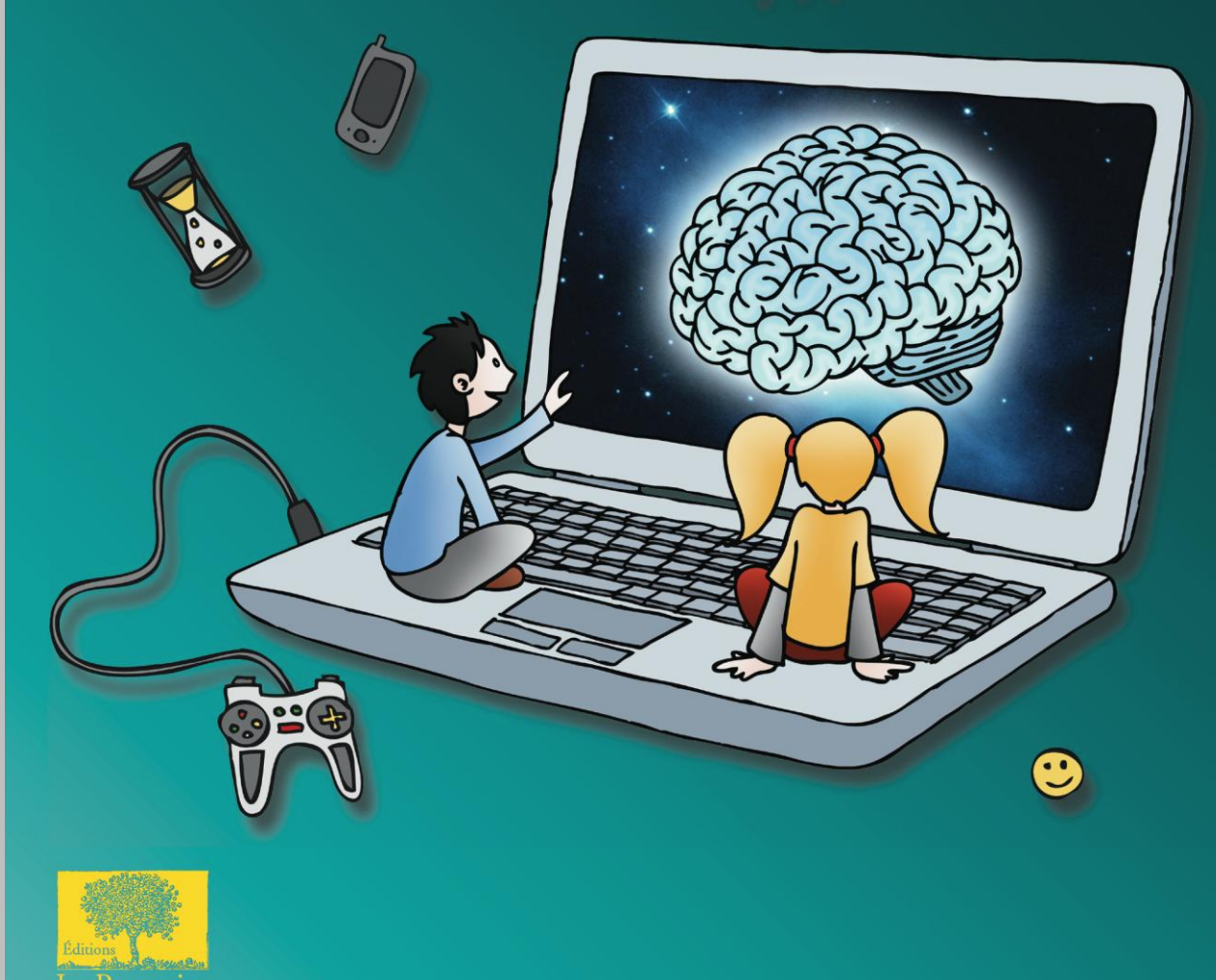
- an instructional program for primary school, aimed at science education and at favoring a better use of the “screens”
- an opportunity for introducing the study of the mind-brain at school

The mind-brain at school:

- expected benefits

How to favor a good marriage:

- predictable risks
- possible strategies



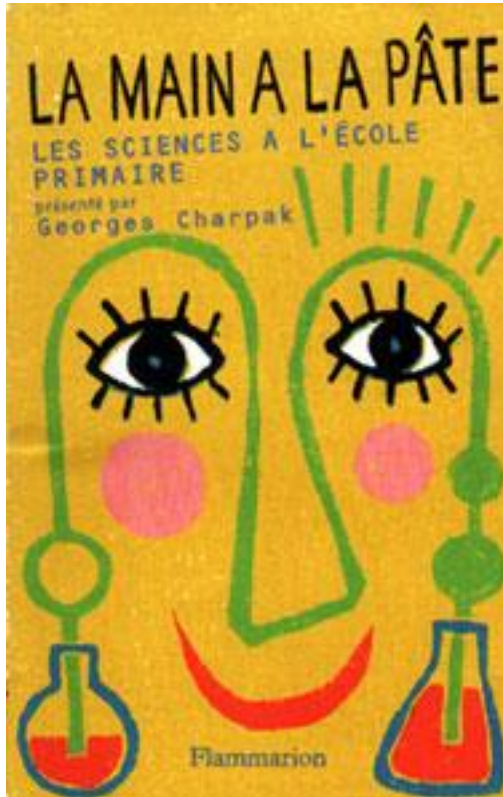
MY BRAIN AND THE SCREENS

LA MAIN À LA PÂTE

(ELENA PASQUINELLI, GABRIELLE ZIMMERMANN, ANNE BERNARD, BÉATRICE DESCAMPS-LATSCHA)

An instructional module aimed at primary school teachers

LA MAIN À LA PÂTE



The *La main à la pâte* Foundation aims at enhancing science and technology education in primary and secondary schools (first level), by addressing the professional development of teachers, at the national and international level.

Founded by the French Academy of Sciences, the Ecole normale supérieure and the Ecole normale supérieure of Lyon, the Foundation pursues the goals of the operation *La main à la pâte* launched in 1996:

stimulating the curiosity of students for science, fostering their understanding of the natural world, developing their skills in the domain of scientific reasoning, expression, argumentation.



THE PROJECT'S BACKGROUND

- *The penetration of media and technologies in the daily life of children has accelerated its pace during the last years, bringing about fears and hopes.*
 - Internet and video games are suspected of possessing disquieting addictive qualities, and of favoring anti-social behaviors ranging from isolation to violence.
 - Meanwhile, educators as well as cognitive and neuroscientists look at the potential applications of new technologies to learning and teaching.
- *A need for evidence*

Both allegations make a case for the production of usable evidence through rigorous laboratory research and methodologically sound in-classroom evaluations.
- *A rationale for cognitive studies*

Even if nothing can replace specific evidence about the effects of new technologies on the different functions of young, mature and elderly brains, theoretical knowledge about the mind and brain can help figuring out ways in which technologies can impact the brain.



THE PROJECT'S STRATEGIC OBJECTIVES

- *Mixing health and science education*
 - The choice has been made to introduce pupils to an elementary understanding of the mind and brain functions engaged with screens and their contents (TV, computer video games, telephone, ...).
 - While discovering their brain, children learn upon the risks and tricks but also the creative uses of media and technology, hence to preserve their well-being.

- *Open issues*

The natural limits of transfer and of adoption following understanding might affect the capacity of using knowledge for putting good practices in place.



THE INSTRUCTIONAL MODULE

- Through 20 lessons centered on an inquiry-based approach, pupils
 - discover some of the **perceptual** mechanisms that make screens work as they do
 - gain a better knowledge about **attention, memory, imagination, time perception, sleep**, the mechanisms that make us feel and express **emotions, communicate** and **collaborate**, while exploring some of the ways in which the screens can enhance these possibilities
 - synthesize their observations and draw a list of recommendations about good practices with the screens.
- Each lesson is paired with a scientific perspective, aimed at the teacher and illustrating the functions of the brain that are addressed by the module.
- Each lesson has been tested in several primary school French classrooms

TEACHERS' LIFE-LONG TRAINING

- By addressing teachers, the project creates an opportunity for providing primary teachers with knowledge on the mind-brain functioning
- The project is paralleled by an activity aimed at the teachers' professional development in the domain of mind, brain, and education





THE MIND-BRAIN AT SCHOOL

Why mind-brain studies should get involved with education



AN OLD STORY

Just as the science and art of agriculture depend upon chemistry and botany, so the art of education depends upon physiology and psychology.

(Thorndike 1910 p. 6)

The foundation upon which education builds is the equipment of instincts and capacity given by nature apart from training ... knowledge of the unlearned tendencies of man as a species is necessary to efficient planning for education in general.

(Thorndike 1910 p. 10)

Psychology is the science of the intellects, characters and behavior of animals including man. Human education is concerned with certain changes in the intellects, characters and behavior of men, its problems being roughly included under these four topics: Aims, materials, means and methods. Psychology contributes to a better understanding of the aims of education by defining them, making them clearer; by limiting them, showing us what can be done and what can not; and by suggesting new features that should be made parts of them.

(Thorndike 1910 p. 5)



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E. L. Thorndike



WITH DEVELOPMENTS



Psychology ought certainly to give the teacher radical help.

And yet I confess that, acquainted as I am with the height of some of your expectations, I feel a little anxious lest, at the end of these simple talks of mine, not a few of you may experience some disappointment at the net results. In other words, I am not sure that you may not be indulging fancies that are just a shade exaggerated.

That would not be altogether astonishing, for we have been having something like a 'boom' in psychology in this country. Laboratories and professorships have been founded, and reviews established. The air has been full of rumors. The editors of educational journals and the arrangers of conventions have had to show themselves enterprising and on a level with the novelties of the day. Some of the professors have not been unwilling to co-operate, and I am not sure even that the publishers have been entirely inert. 'The new psychology' has thus become a term to conjure up portentous ideas withal; and you teachers, docile and receptive and aspiring as many of you are, have been plunged in an atmosphere of vague talk about our science, which to a great extent has been more mystifying than enlightening.

(James 1895)

... old psychology, which began in Locke's time, plus a little physiology of the brain and senses and the theory of evolution ...

I say moreover that you make a great, a very great mistake, if you think that psychology, being the science of the mind's laws, is something from which you can deduce definite programs and schemes and methods of instruction for immediate schoolroom use. Psychology is a science, and teaching is an art; and sciences never generate arts directly out of themselves. An intermediary inventive mind must make the application, by using its originality.

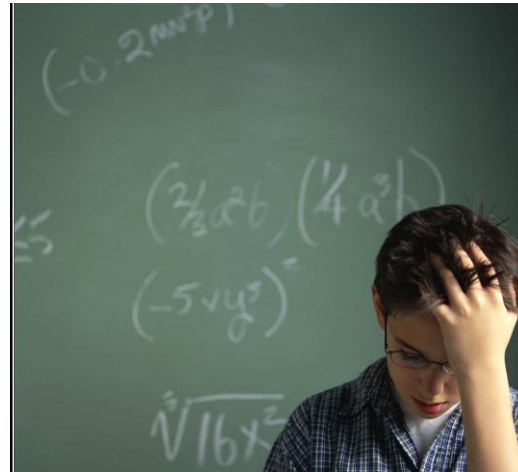
(James 1895)

CONTRIBUTIONS: KNOWLEDGE

Learning mechanisms



Learning constraints



Timing

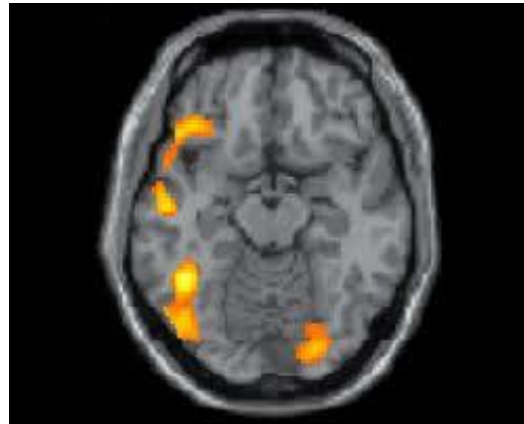
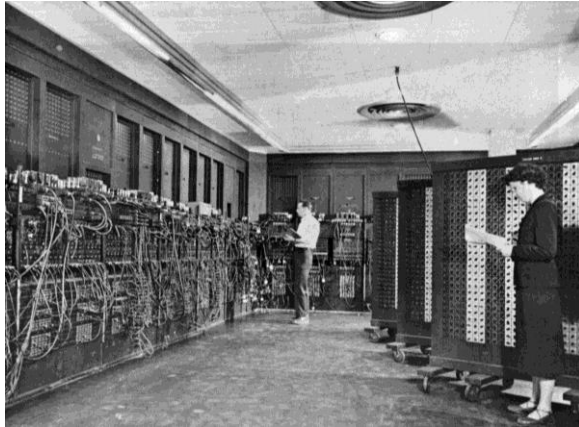


Related functions



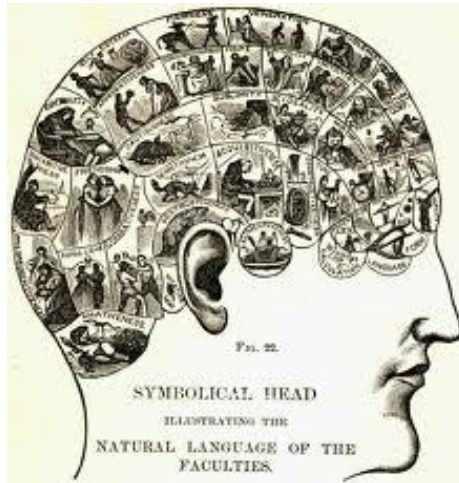
CONTRIBUTIONS: MODELS & METHODS

AI



Cognitive
neuroscience

Cognitive
psychology



Developmental
& Evolutionary
psychology

A VIEW

Education is neither writing on a blank slate nor allowing a child's nobility to flower.

Rather education is a technology that tries to **make up for what the human mind is innately bad at.**

Children don't have to go to school to learn to walk, talk, recognize objects, or remember the personalities of their friends even though these tasks are much harder than reading, adding, or remembering dates in history...

Because much of the content of education is not cognitively **natural**, the process of mastering it may not always be easy or pleasant, notwithstanding the mantra that learning is fun... they are not necessarily motivated in their cognitive faculties to unnatural tasks like formal mathematics.

(Pinker 2002, p. 222)

A SCIENTIFIC VIEW

- **Every one has intuitions about how the mind-brain works**
 - one's own mind-brain/others' mind-brain
 - Not necessarily wrong
- **And uses them**
 - For teaching
 - For learning
 - For taking decisions
- **Even if our science is young and cannot provide a satisfying picture, yet, it's worth providing**
 - a picture of the science that studies behavior, the mind, the brain
 - Healthy, productive doubts
- **Must acknowledge the intuitions!**



HOW TO FAVOR A GOOD MARRIAGE

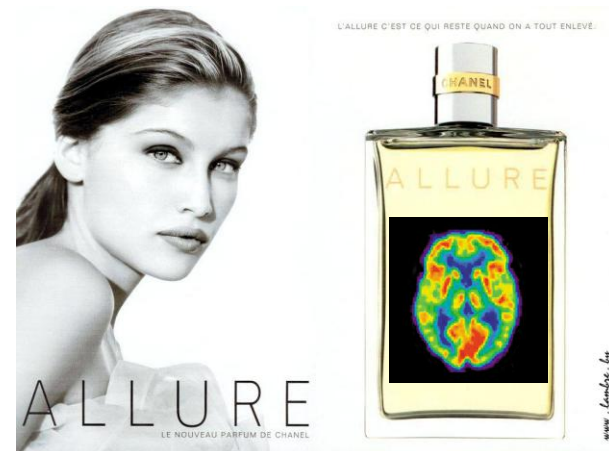
Taking into account what can go wrong

RISKS: CONTENTS

1. GETTING THE SCIENCE WRONG, OR: THE TRAP OF NEUROMYTHS



2. AND THE SEDUCTIVE ALLURE OF NEUROSCIENCE



RISKS: USE

3. NORMATIVE FALLACY



4. AND THE ILLUSION OF DIRECT TRANSFER



RISKS: EVIDENCE

5. CARGO-CULT EVIDENCE



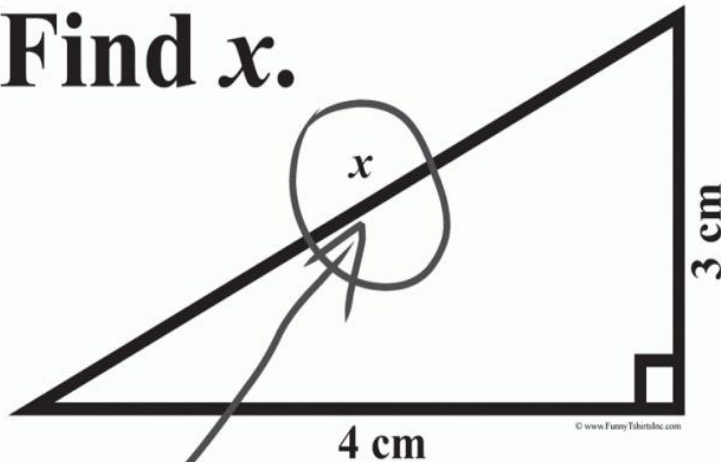
6. AND EMPIRICAL POINTILLISME



RISKS: MEANINGFULNESS

7. TRIVIALITY

Find x .



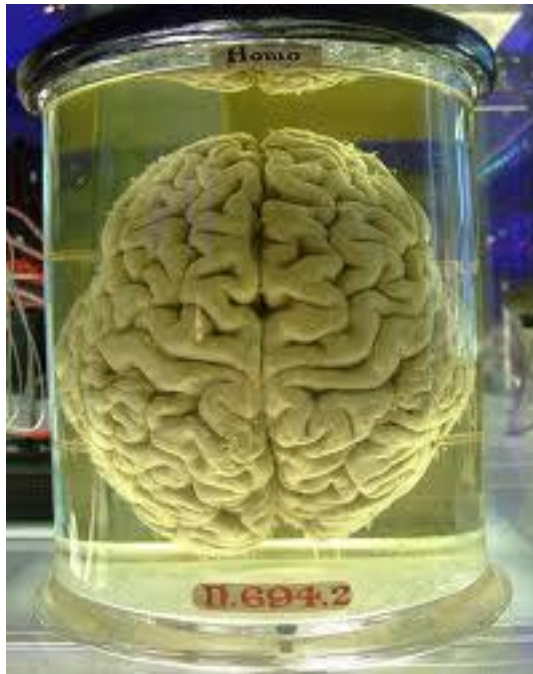
Here it is

8. AND LACK OF INTEREST



RISKS: ISOLATION

9. DISCIPLINARY RESTRICTION



10. AND ONE-WAY ROAD



QUESTIONS

**HOW TO MAKE
EXISTING
KNOWLEDGE
AVAILABLE AND
USABLE?**

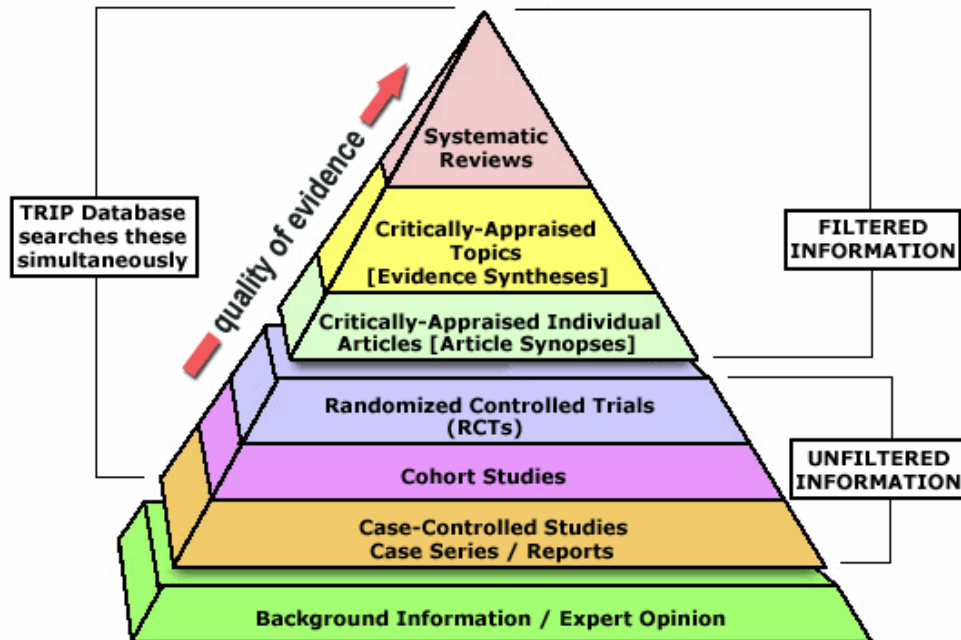
**HOW TO PRODUCE
NEW KNOWLEDGE
THAT IS USEFUL AND
USABLE?**



**HOW TO BUILD A NEW
TRANSLATIONAL
RESEARCH FIELD?**

MODELS

EVIDENCE-BASED



TRANSLATIONAL



A PRECONDITION



- **Include mind-brain studies in the professional development of teachers**
- **Understand what's in the teachers' minds**