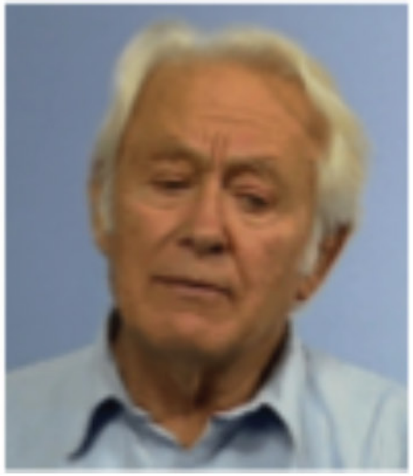
FONDATION
La main à la pâte
POUR L'ÉDUCATION À LA SCIENCE

The Foundation *La main à la pâte*: Some evolution in its activities

IAP/SEP global council
Bangkok Aug 2019

20 Aug 2019

La main à la pâte initiated by G. Charpak



The reality in 1995 in France :

- 3% of teachers actually teaching science
- scientific vocations decreasing
- success of "hands-on" méthods in US (L. Lederman)

Under the impulse from Georges Charpak (Nobel prize in physics), Pierre Léna and Yves Quéré, the Académie des Sciences launchs the program "La main à la pâte" to develop and reinforce sciences at school

Science at school : the brakes

- Hierarchy is not always convinced that science teaching is useful in primary school
- Nor are parents …
- Teachers fear to teach sciences
  - « I don't know / I'm not a scientist »
  - Afraid of doing experimental work
- and using active pedagogy
  - Change their position in the classroom
  - Afraid of losing the classroom control :
    - allowing the children to speak
    - organizing children in groups
    - Keeping things in order, buying material…

Philosophy of IBSE at *La main à la pâte*

Science as an inquiry, as an investigation

Emphasis is put on questioning /Action / Experimentation/ work team…

Something pupils do, not something that is done for them

Teacher helps pupils to build their own knowledge

Presentation in an oral or written way (science notebook)

Lamap principles

- Focusing on children curiosity and desire to learn ;
- Designing & implementing IBSE principles ;
- Involving the scientists/engineers ;
- Opening the school to parents & local community ;
- Helping the teachers directly (bottom-up, in-service) ;

What was done for teachers ?

Website and forum

training and coaching

ressources centres

Collaborative projects

Teacher

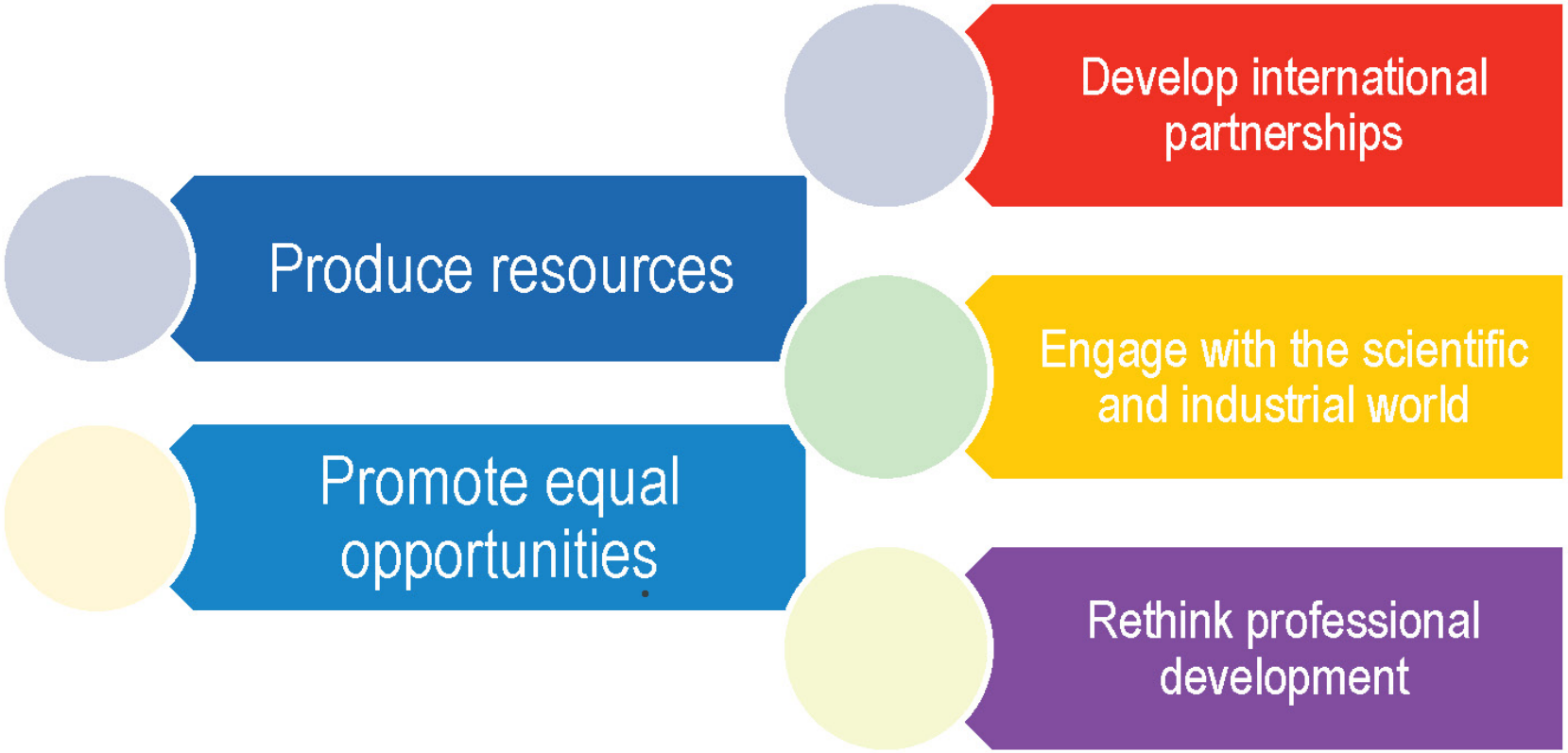
Resources for teacher

Science events

Experimental kits

Meeting and training with scientists

Strategic areas of the Foundation



LAMAP : a 24 years venture

From Primary to Middle school,
in France and abroad

La main à la pâte
(1995)

International action
(2000)

EIST*
(2006)

Houses for sciences
(2012)

Pilot middle school
LAMAP
(2016)

FONDATION
20 ans! La main à la pâte

Created in october 2011

Integrated Teachig of science et technologie in Middle school

Long term goal :
a broad institutional impact in France

(350 000 teachers K-5 ; 7000 middle schools 6-9)

METHODOLOGY

- Introducing **disruptions** in the education system ;
- Using Academy's independency to implement **prototypes** ;
- Developing high quality, free, easy-to-access **resources** for the classroom ;
- Fostering **dissemination** by contagion ;
- Inspiring **in-depth changes** of the public system ;
- Working closely with the scientific community ;

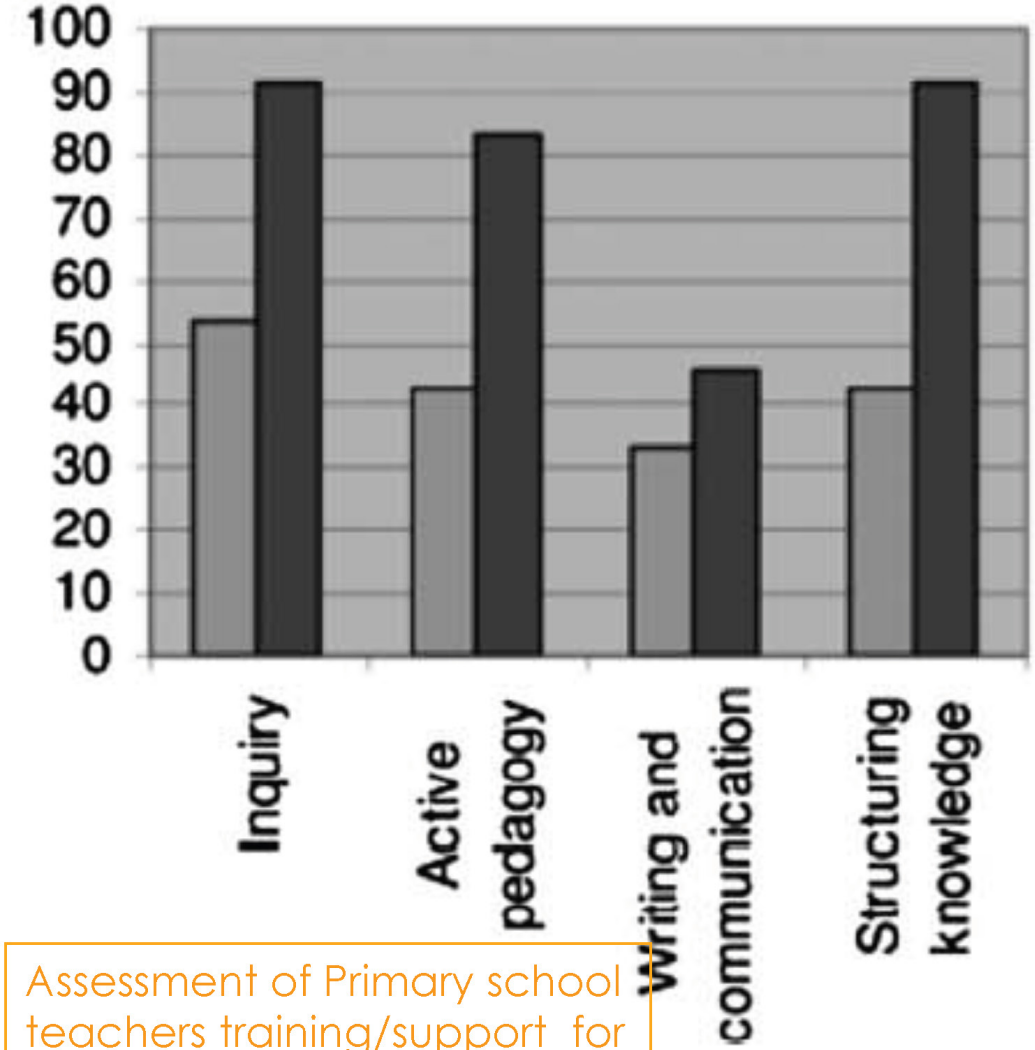
Long term goal :
a broad institutional impact in France

(350 000 teachers K-5 ; 7000 middle schools 6-9)

SUCCESSIVE DISRUPTIONS

1. Natural science in primary schools 1995 ⇨ now
2. Integrated, interdisciplinary science in Gr.6-7 2006 ⇨ now
3. Professional development of teachers (K-9) 2012 ⇨ now
4. Prototype Middle schools in science/engineering 2017 …

Disruption 1 - Natural science in primary schools



In Education 3-13 (2011)
M Delclaux & E Saltiel
La main à la pâte, France

Assessment of Primary school teachers training/support for IBSE practice

Teachers are key

Disruption 2 . Interdisciplinarity in 200 Middle schools

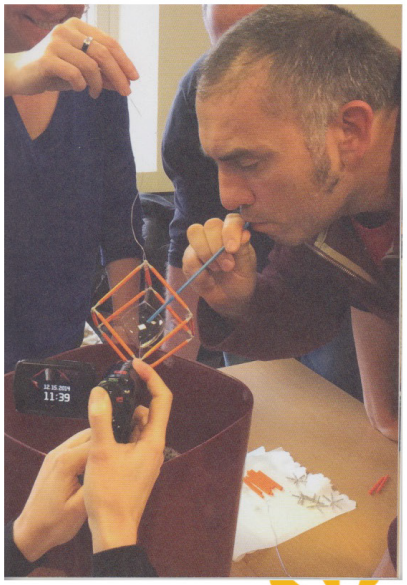
Lamap EIST 2006 -> 2015 Science Interdisciplinarity in Grades 6-7

3 teachers, working together, teaching all 3 subjects (EIST)

Disruption 3 – *Maisons pour la science*
Houses for science, to serve teachers

- Official Continuous Professional Development of teachers almost disappeared since ca. 2000 ;
  - Negative impact on science education K-12 ;

- Creation of 10 (12 soon) Houses, since 2012
  - Based on *Lamap* expertise since 1996
  - Partnership Scientists/Engineers/Pedagogy (50/50)
  - Installed in University
  - Goal (reached): 13 000 teachers/year
  - Production and dissemination of resources
  - A fruitful network w many exchanges

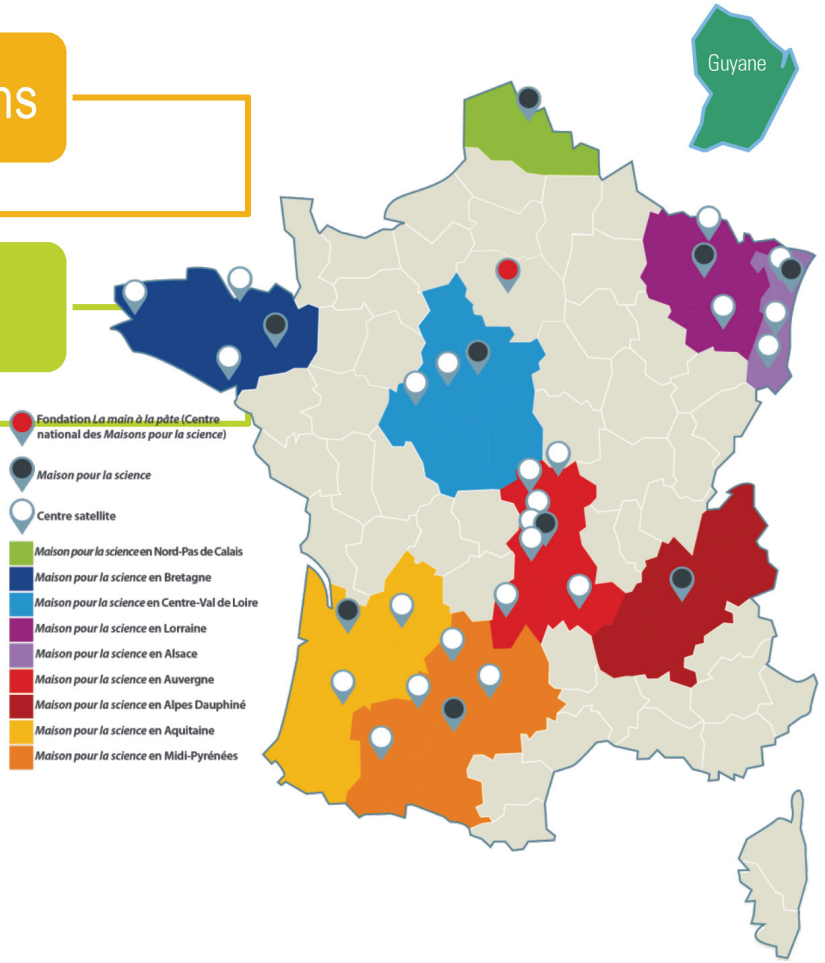


10 *Maisons pour la science*, to serve teachers

national coordination

10 houses in regions

23 satellite centres



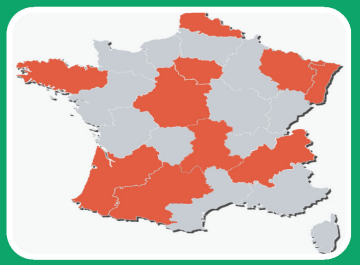
Disruption 4- LAMAP pilot middle schools

Interdisicplinarity + Inquiry (K6-K9)

- energy, biodiversity, robotics…

Opening to science world

- Scientific mentoring, partnership with labs, visit on industrial sites



Expension

- 2019 : 80 middle schools, 450 teachers (70 % disadvantaged areas)
- 2020 : 120 / 2021 : 150 middle schools

The successive strategic plans

1995 :
Science in primary school

2006 : integrated science in middle school

2012 :
House for science – CPD

2016
science : lever of success and citizenship for young people

- Continue our action in primary school
- Increase significantly our action in middle school
- Train to the digital revolution
- Be more engaged in improving "living together".

New projects

-> 24 pilot centers

Pilot middle schools

1,2,3 coding
Youtube

Scientific thinking, critical thinking

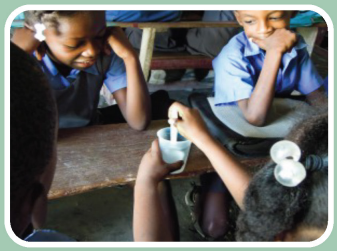
Digital revolution : 1,2,3 Code

In France

- 2 resources for primary and secondary schools
- CPD for teachers

Over the world

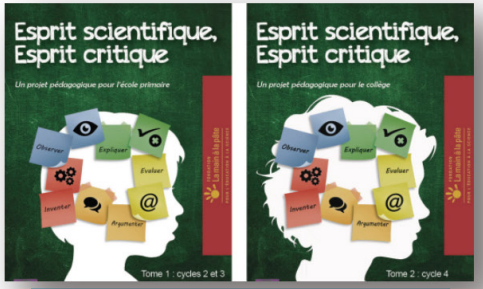
- Translation in 2 languages (English and German)
- CPd in Europe and Malaysia



Impact

- > 10.000 primary teachers
- > 3000 secondary teachers

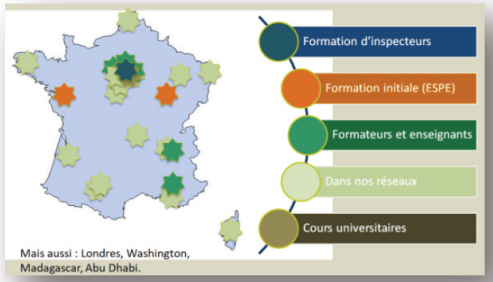
Scientific Thinking / critical thinking



2 **Units**

Dedicated website

MOOC

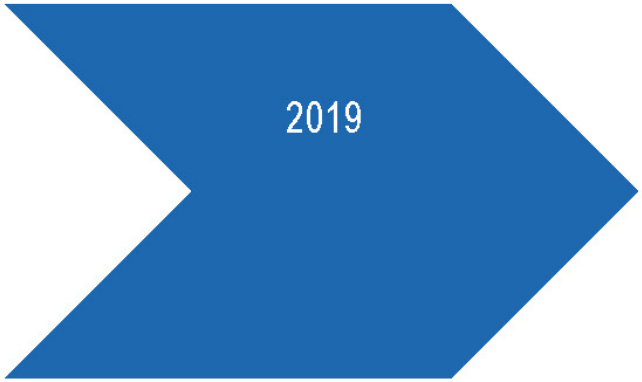


CPD

Training kits

Research

The new strategic plan



- Closer relation w industry
- Emphasis on sustainable development issues
- Enlarge the population and the duration : the STIMULI project
- Benefit from the digital revolution: self-training for teachers

New projects

- New partnership (Chemical)
- Office for Climate Education
- Changing of scale
- Self-training through the web

New partnerships with enterprises

Chemistry

- In partnership with Fondation Maison de la chimie
- Example: *Energy, Matter, . Involving scientists and industry*

3D conception

- National contest for 3D makers – classes organized as start up
- Award for middle school (junior and high school)

Professional development activities in and with industries

- Total, Michelin, Saint-Gobain…

Sustainable development: OCE

Office for Climate Education

Mission

- educating the young generations of today and tomorrow about climate change

Activities

- Resources for teachers and trainers
- CPD sessions
- Conferences

Network

- Several organizations partners of La main à la pâte (special focus on south America)

Change of scale: all teachers on 8 years

Disruption 5 ?

- At the scale of a large region (Great-East)
- Train to IBSE from L1 to 3rd year in-service
- Project *STIMULI* proposed to the government (decision in fall 2019)
  - Connected to R&D in education (short loop)
  - New resources + social networks
  - Local centers + fablabs to support teachers
  - Self-training platform
  - Evaluation of impact

- **Translational**
- Retroaction
- Evidence based

Research

Local CPD centers

- Resources center
- Involving scientists and industries
- Local support

R + D CONTINUUM
STEM and Literacy CPD
From Licence to the 3rd year of teaching
Presential + on line

Dissemination

- Through the Houses for science

Impact

- Impact on teachers and pupils (with the ministry evaluation department)

Paul Durand

My Courses

Badges

Portfolio

+ complétion

+ completion

completion

Calendar

Notifications

Messages

International dissemination

Europe

→ 2016-2019 : LINKS on Science CPD (9 partners)

All over the world

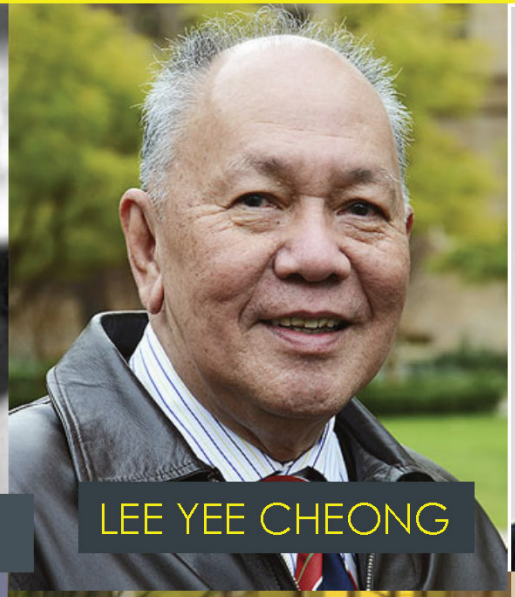
→ International seminar

→ Pluriannual programmes in Africa : Senegal, Madagascar, Mali, Sudan.

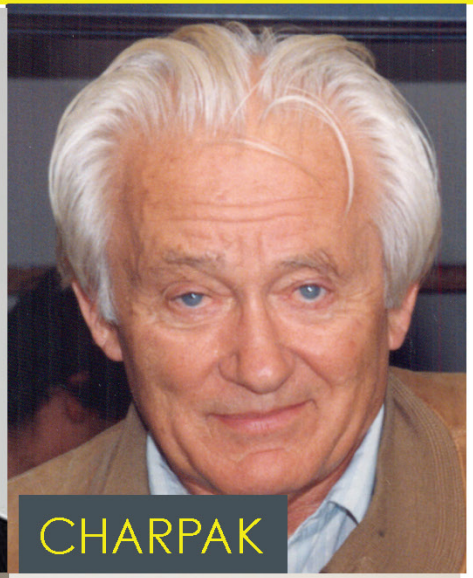
→ Translation of various resources

Scientists are essential to develop IBSE


LEDERMAN


LEE YEE CHEONG


MOLINA


CHARPAK


WEI YU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SAMROO