
Increasing interest in Maths Science and Technology (MST)

The role of School – Business cooperation

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What I am going to talk about

- n The question of interest for MST
- n Rocard report findings
- n What can be done to help

Increasing young people's interest in MST

A need for:

- n **a sufficient number of high level scientists** and engineers for Europe's future economic and technological development
- n a population and workforce that are **able to think scientifically**
- n citizens that are able to understand science and technology related questions and approach them with a **positive attitude**.

A few facts about young people and MST

- n Over the last few years, the annual number of **MST graduates increased** continuously in the EU-27, overachieving the target set by the Lisbon objectives ¹ (+ 33% between 2000 and 2007, i.e. + **230.000**).
- n In many countries, the **number** of MST graduates increases but the **proportion** of young people choosing to study science tends to decrease².
- n **Girls** account for only 32% of MST graduates in Europe¹ and in most countries females report being significantly less interested in mathematics and sciences than males³.
- n In many countries, the share of '**low achievers**' in mathematics and sciences is a concern³. The european objective (benchmark 2020) is to reduce it to less than 15%.

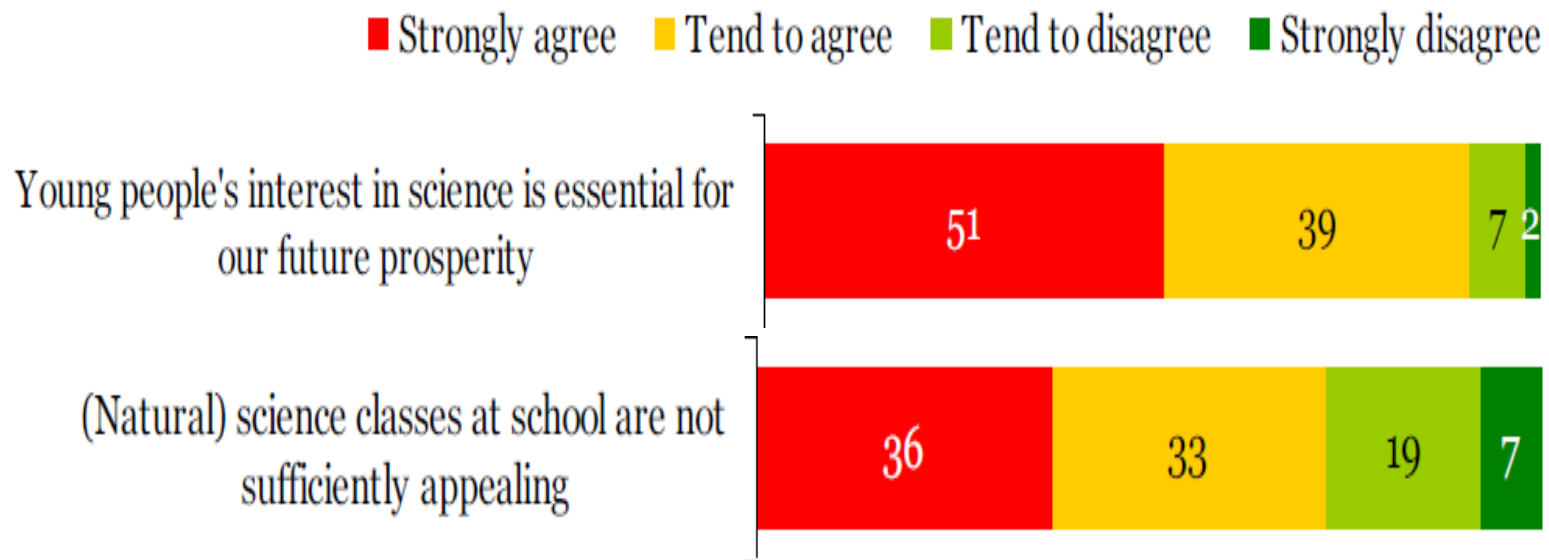
¹ (*Progress towards the Lisbon objectives in education and training, Indicators and benchmarks 2009*)

² (*Evolution of Student Interest in Science and Technology Studies - Policy Report, OECD, 2006*)

³ (*PISA 2003 and 2006*)

Young people and science, Eurobarometer 2008

Opinions about science education



Q14. Could you please tell me to what extent you agree or disagree with each of the following statements? Do you strongly agree, tend to agree, tend to disagree or strongly disagree?

*Base: all respondents
% EU27, DK/NA not shown*

What works in increasing interest for MST?

- n Many initiatives, few evaluations
- n A few leads (from *Encouraging Student Interest in Science and Technology Studies*, OECD, 2008): start young, relevance, self-confidence, depth of understanding vs accumulation of facts, variety of teaching methods
- n The mandate given to the Rocard group: among the existing initiatives, what works best and could be scaled up?

Recommendations from the “Rocard report” (2007)

- n Inquiry Based Science Education (IBSE)
- n Break the isolation of teachers through networks
- n Special attention to girls / self-confidence
- n Involvement of the local community

€60m made available to support initiatives in line with these recommendations



Inquiry Based Science Education

n **What is it?**

- q minds-on vs hands-on
- q Scientific process: question/hypothesis/testing/interpretation and discussion
- q Example: LAMAP/ Pollen

n **What does IBSE bring?**

- q Positive attitude to MST: interest, self-confidence, enjoyment
- q Scientific reasoning, deep understanding
- q Cross-disciplinary skills: reasoning, critical thinking, team work, debate, mastery of language, both spoken and written

What can business do to help?

n **With the students:**

- q Young people need to see the **relevance** of their MST classes to the « real world ». Business can play a key role in showing this relevance.
- q **Enhancement** and enrichment activities
- q **Career guidance:** importance of scientific thinking, attractiveness of S&T careers
- q **Role models** – especially girls and minorities
- q Examples: “engineers/scientists in the classroom”, visits, practical cases and applications of learnt science

n **With the teachers:**

- q **Teachers continuous training**
- q **Involve MST teachers** in the life and activities of professional bodies each time it makes sense (e.g. conferences, forums)

How can business get involved?

- n Conditions of **acceptability**
 - q Goals, values, language
 - q “trust the school, they know what they need”
 - n Organization: dealing with scattered needs
 - n Evaluation
- } → need for mediation
- n **Mediator’s role** - ad hoc structure, academy of sciences, charity...
 - n A few examples of cooperation...
 - q Jet-net
 - q LAMAP
 - q Enthuse (Wellcome trust and Science learning centres)
 - q Stemnet (example of organization dealing with scattered demand. Ambassadors and clubs))
-

What can the EC do to help?

- n Identification, sharing and dissemination of successful initiatives and good practices
 - q National, local and school level
- n Support the emergence of mediators
- n ... to be discussed

A few references:

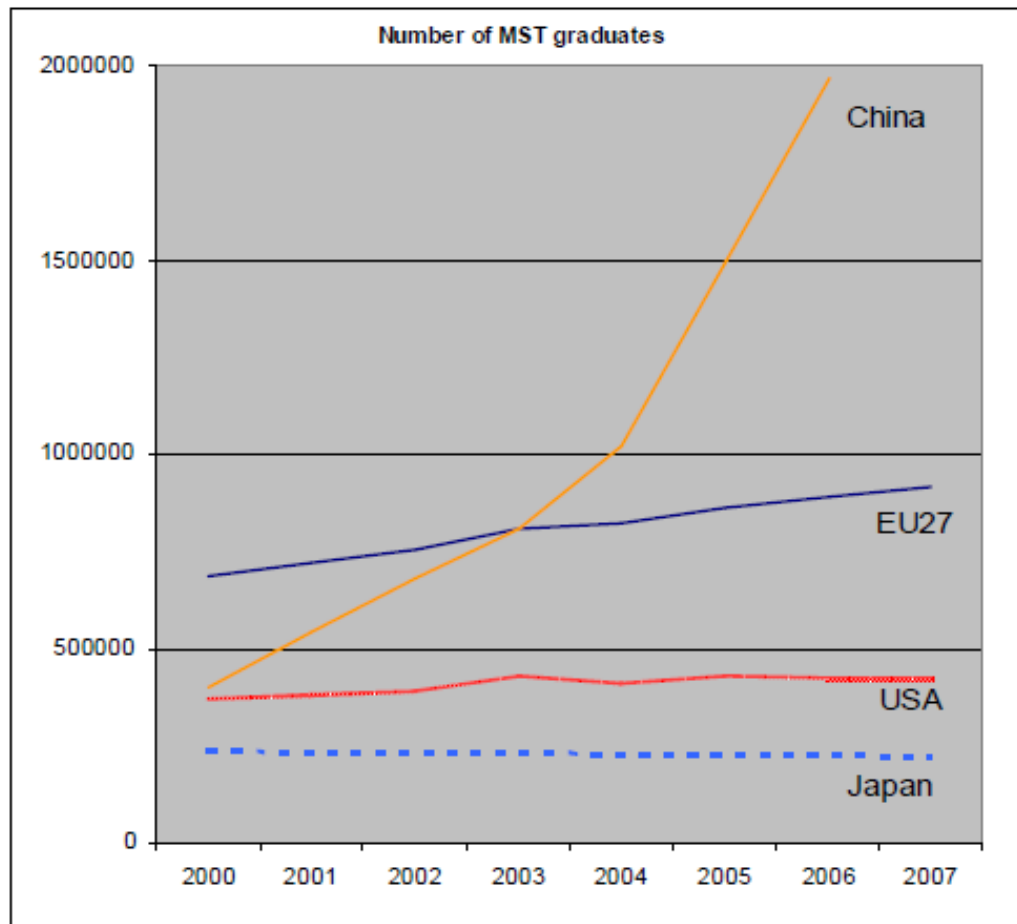
- n *Encouraging Student Interest in Science and Technology Studies, OECD, 2008*
- n *Science Education NOW: A renewed pedagogy for the future of Europe, June 2007, European Commission*
- n *Evolution of Student Interest in Science and Technology Studies - Policy Report, OECD, 2006*
- n www.pollen-europa.net
- n www.stemnet.org.uk
- n *Enthuse: www.sciencelearningcentres.org.uk*

Thank you!

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Total number of graduates in Mathematics, science and Technology – International comparison of trends 2000-2007 (

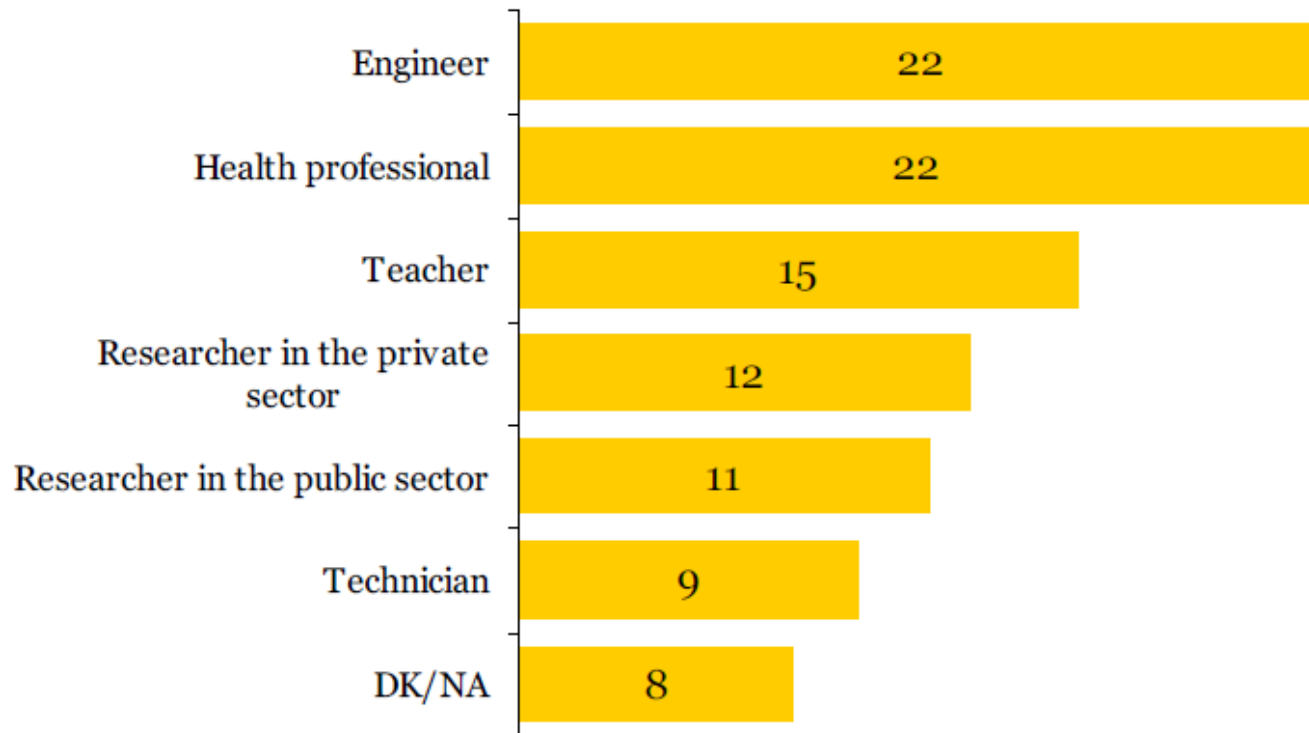
Source: Progress towards the Lisbon objectives in education and training, Indicators and benchmarks 2009)



Data source: Eurostat and Statistical Bureau of China

Young people and science, Eurobarometer 2008

Preferred professions in science



Q13_B. What kind of profession requiring scientific education would you like to do?

Base: those who are considering studying natural sciences and/or mathematics

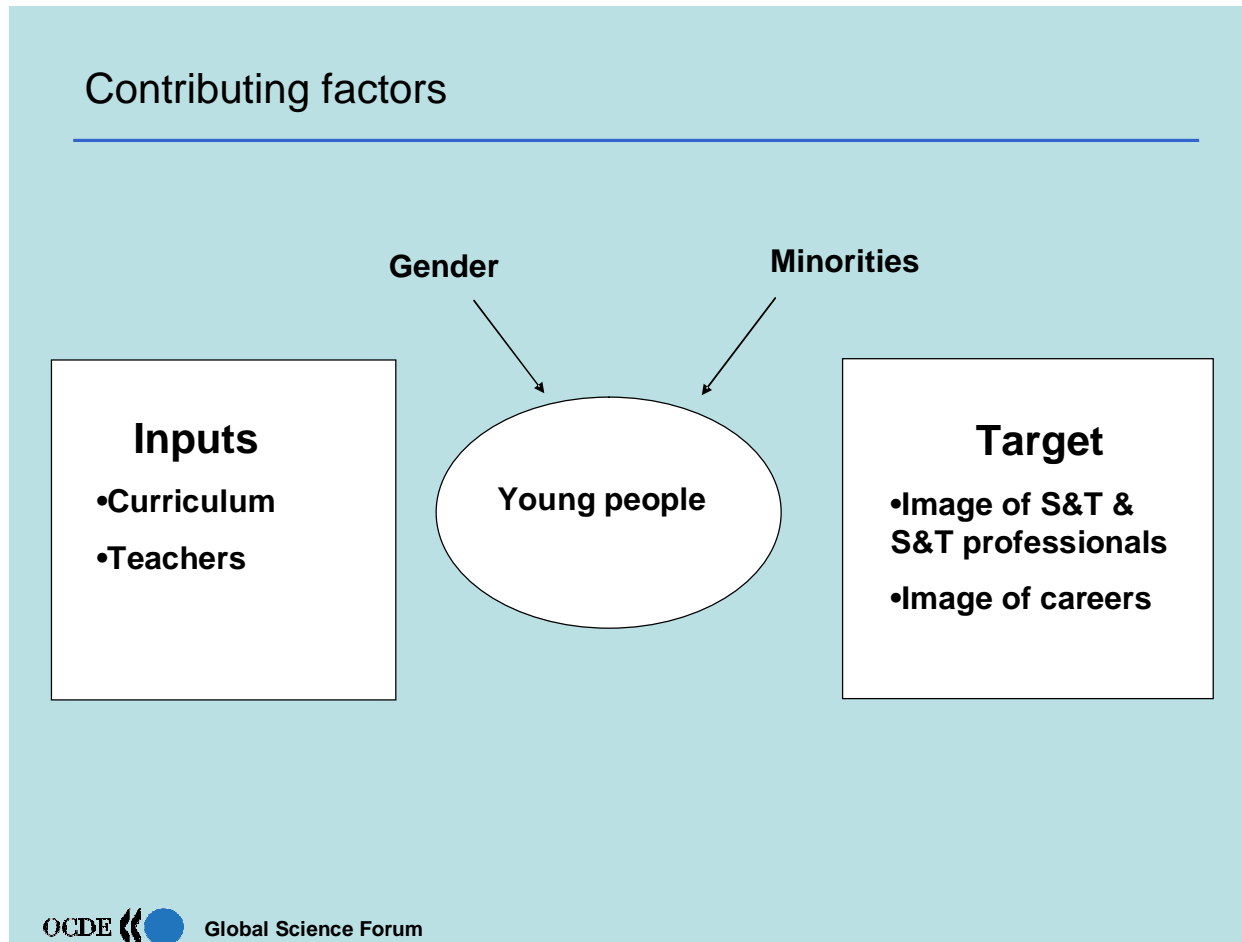
% EU27

“Europe needs more scientists” (‘Gago’

High level group, 2004):

*“It can be argued that science education in schools lives in a world of its own. (...) It is abstract because it is trying to put forward fundamental ideas, most of which were developed in the 19th century, **without sufficient experimental, observational and interpretational background, without showing sufficient understanding of their implications, and without giving students the opportunity of a cumulative development of understanding and interest.**”*

Interest in MST



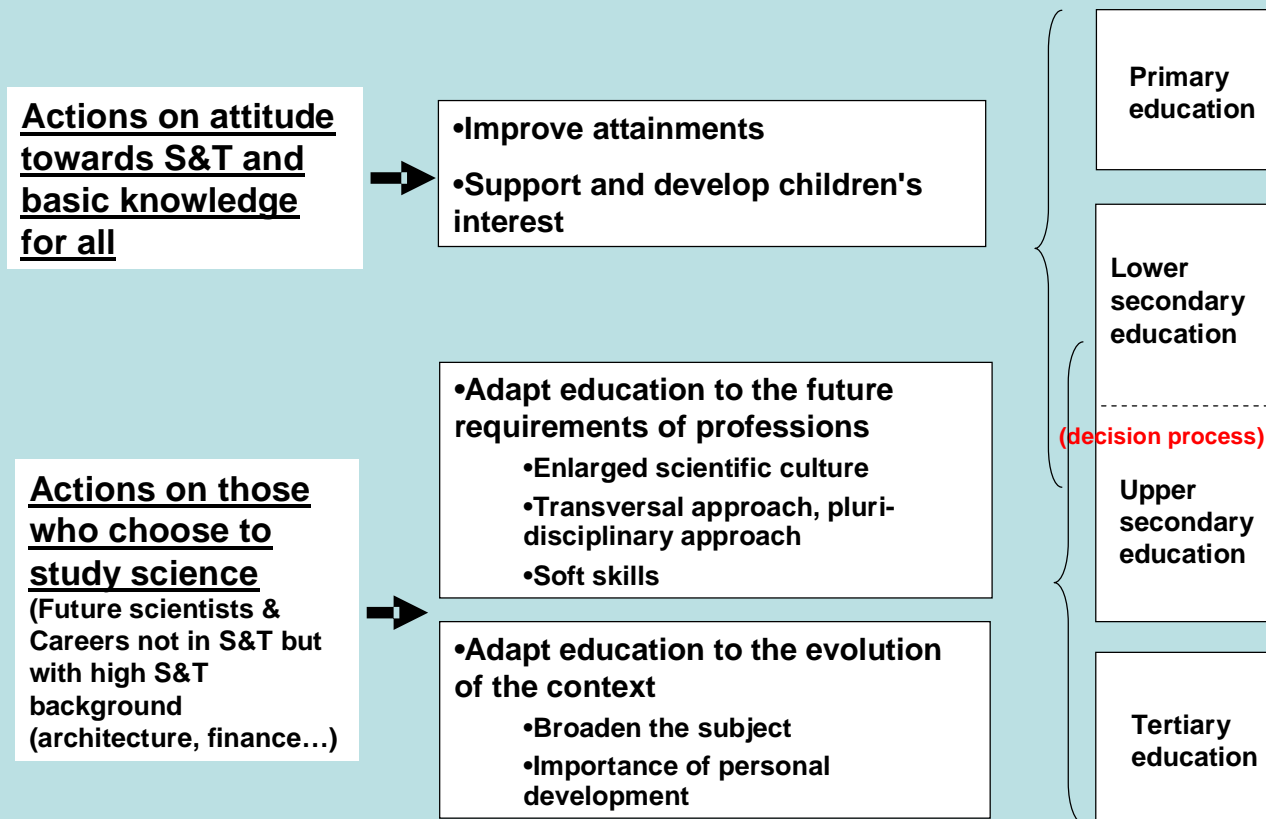
Key factors in interest in MST

(from Encouraging Student Interest in Science and Technology Studies, OECD, 2008)

	To study S&T	To become a scientist / engr
Do I want ?	Relevance to subjects of interest Teaching methods	Career prospects Work conditions Lifestyle
Am I able?	Attainments Confidence	Role models External expectations

Increasing interest in MST

What can be done ?



Two examples of successful initiatives presented in the Rocard report

- n Pollen
- n Sinus transfert
- n common key points:
 - q an innovative pedagogical approach
 - q a pedagogy using an inquiry-based approach
 - q An organisation which:
 - n Focuses on teachers training, support and motivation
 - n Includes pedagogical material and opportunities for teachers to be part of a network while respecting their independence
 - n Promotes rich and long term links with the different stakeholders (students, teachers, parents, scientists, engineers, entrepreneurs, R&D firms)