



Broadening access to STEM via gender inclusive teaching,

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ICHEP 2018



The framework – CERN's Teacher Programmes

CERN Teacher Programmes

National Teacher Programmes | International Teacher Programmes | FAQ | Contact

“There is nothing more enriching and gratifying than learning.” [Fabiola Gianotti, CERN Director-General]

Every year, CERN offers various professional development programmes for teachers to keep up-to-date with the latest developments in particle physics and related areas, and experience a dynamic, international research environment. All programmes are facilitated by experts in the field of physics, engineering, and computing and include an extensive lecture and visit itinerary.

Furthermore, CERN's teacher programmes enable you to meet with teaching colleagues from your country or from all around the world. We offer teacher programmes in English or in one of the national languages of CERN Member States, lasting between 3 days and 3 weeks. Take part!

[National Teacher Programmes & International Teacher Programmes](#)

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LINKS

- Visit CERN
- SCool LAB
- Beamline 4 Schools
- Bubble Chambers Website

INTERNAL

- TP Checklist
- TP Calendar

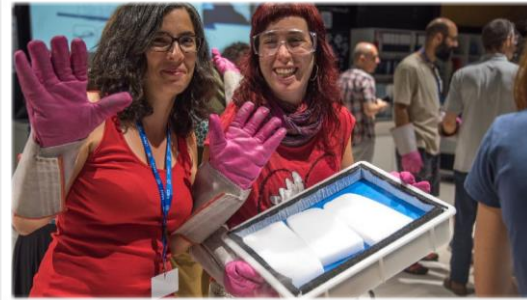
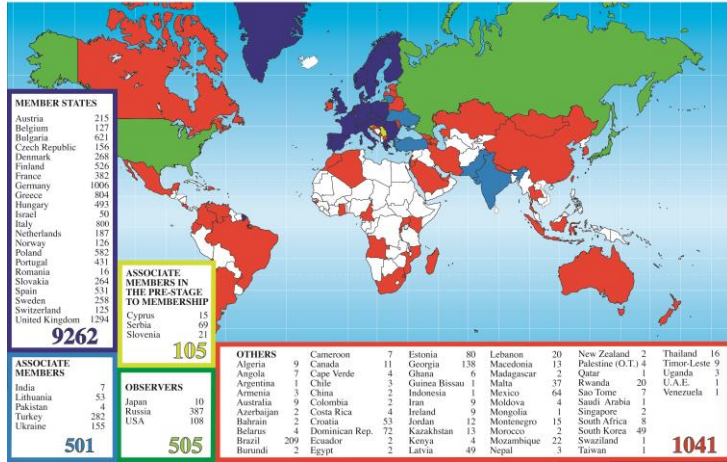
~35 National Teacher Programmes
in native language | 4-6 days

2 International Teacher Programmes
in English | 2 & 3 weeks

teachers.cern.ch

The framework – CERN's Teacher Programmes

Teacher Programme Participants 1998 - 2017 (Total: 11414)



The framework – Collision of ideas



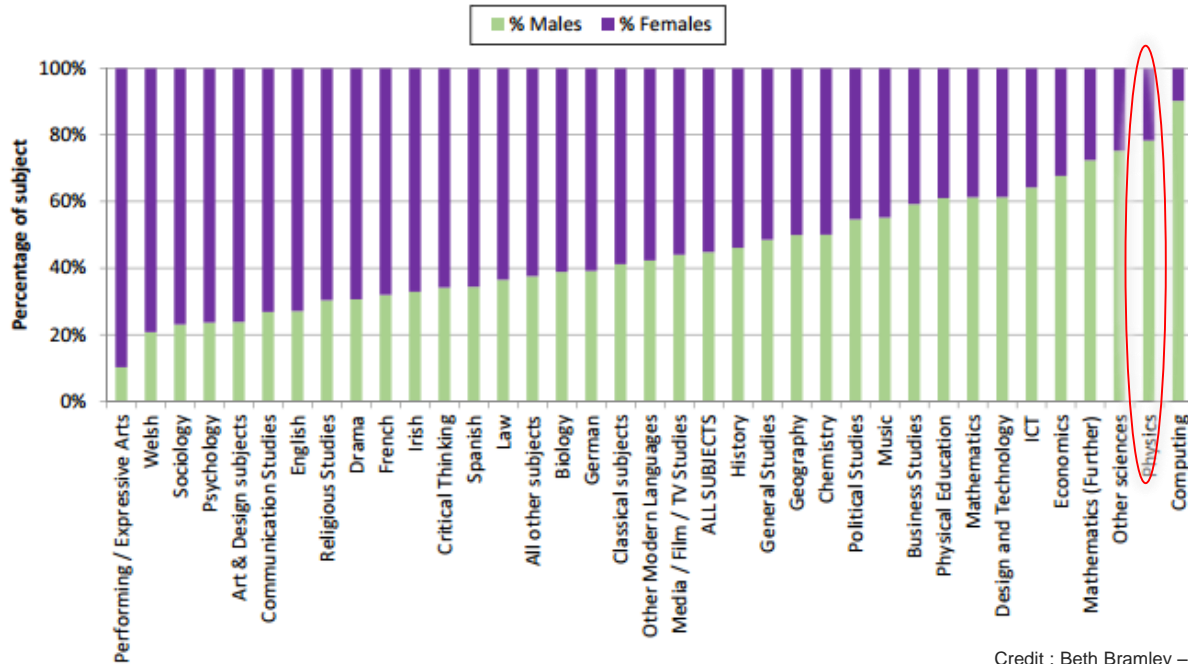
Jeff Wiener
@jeff_active



Credit : Beth Bramley – IOP – June 2018

The context – Choice of study subjects

Difference between male and female A-level subject choices - UK

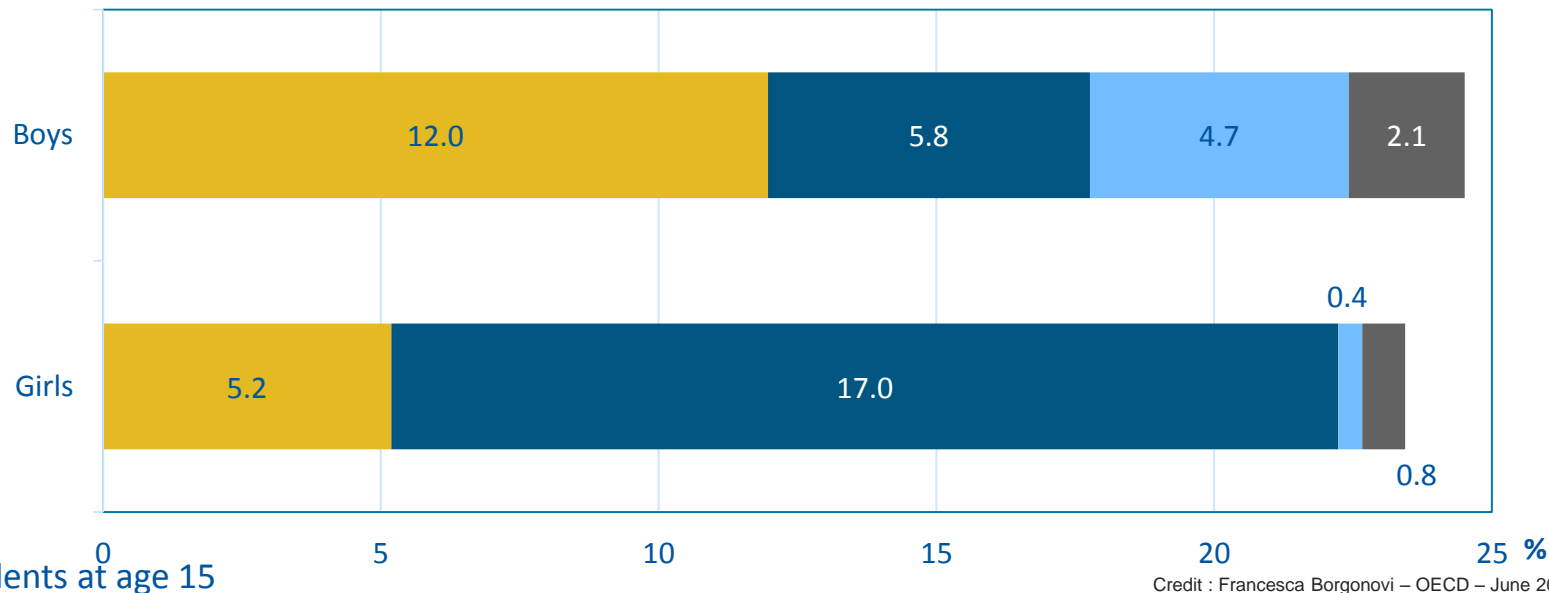


Credit : Beth Bramley – IOP – June 2018

The context – Career expectations

Students who expect to work as...

- ...science and engineering professionals
- ...health professionals
- ...information and communication technology (ICT) professionals
- ...science-related technicians or associate professionals



PISA numbers – students at age 15

Credit : Francesca Borgonovi – OECD – June 2018

Our (humble) aim and assumptions

- **Encourage** school kids and in particular girls to take up science subjects
- Contribute to **the reduction of the gender gap in the field** by
 - ▶ Raising awareness on gender equality in STEM / in physics
 - ▶ Helping teachers re-think their teaching methods
 - ▶ Learning from each other
 - ▶ Disseminating tools for an inclusive classroom
- Assuming that teachers are not trained to teach to a **diverse audience**
- Using the **amplification power** of the Teachers community

Teachers' expectations

Develop new projects
and teaching material
that engage ALL my
students

Make a
change in
my country

Engage girls who
excel, but who
not consider a
career in physics

Reflect on my
teaching
method and
gain
competencies



How?

Objective 1 : to equip teachers with tools to understand the issue of gender balance / gender equality in their science classroom, through:



Data – STEM, Physics, CERN

Sharing experience –
Teachers' observations from their classroom

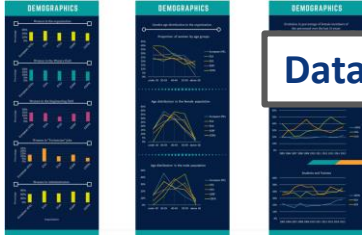
Introduction of concepts – Application to the classroom

Information on initiatives – local and global

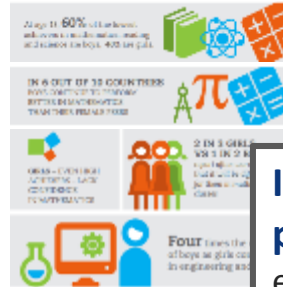
Input from research and practices – meet experts / explore research papers

Interviews with female scientists at CERN

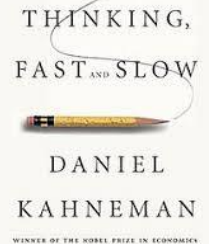
Content developed in collaboration Dr Isabelle Collet - Senior lecturer in Education and Associate Researcher at the Institute of Gender Studies - University of Geneva



Gender Equality Network in the European Research Area



OECD PISA study on gender equality in education.



How?

Objective 2 : to establish concrete and realistic actions teachers will be able to implement in their classroom

Examples of actions implemented by previous participants:

- Open activities – science fair to teach the scientific method (BE)
- “Buddy system” for higher grades (UK)
- Introduction of reflection time and open enquiry activities (UK)
- Implementation of an alternative way to prepare students for evaluation (ZA)
- Workshop for teachers (CO)



Objective 3 : to disseminate the lessons learnt and tools developed

- ⇒ **Output of 2016 work group : a leaflet with country-specific approaches, learnings from the interviews and advice on how to support a gender inclusive environment in the physics classroom**
- ⇒ **Output of 2017 work group : a collaborative website**
<http://www.inclusivephysics.org/tips-for-gender-inclusive-teaching/>

What teachers take home...

- **Reflection time:** studies have shown that giving students the opportunity to reflect on the learning process and outcome (e.g. a learning journal), increases the pleasure of learning for both genders significantly.
- **Collaboration, rather than competition:** by nurturing an environment that is based on collaboration (e.g. through group work) rather than competition, girls' interest in the subject can be sparked. Research has shown that girls are less engaged if the learning environment is competitive.
- **Avoiding stereotypes:** we all have biases and as a teacher it is especially crucial to be aware of the remarks and examples being used to avoid common stereotypes, e.g. girls being generally better suited for social sciences and languages.
- **Open enquiry activities:** opportunities for debates, e.g. on the ethical implications of science for society, allows the students to experience science in alternative ways.
- **Avoid painting science pink :** adapting classroom examples to a stereotypical image of girls does not work to get more girls into science.
- **Role models:** pointing out positive female role models in science and engineering and at all career levels can counteract the stereotypical image of a mature male scientist.

What teachers take home...

“It really made me realise some of my own unconscious behaviours, to which I will definitely pay more attention to in the future.

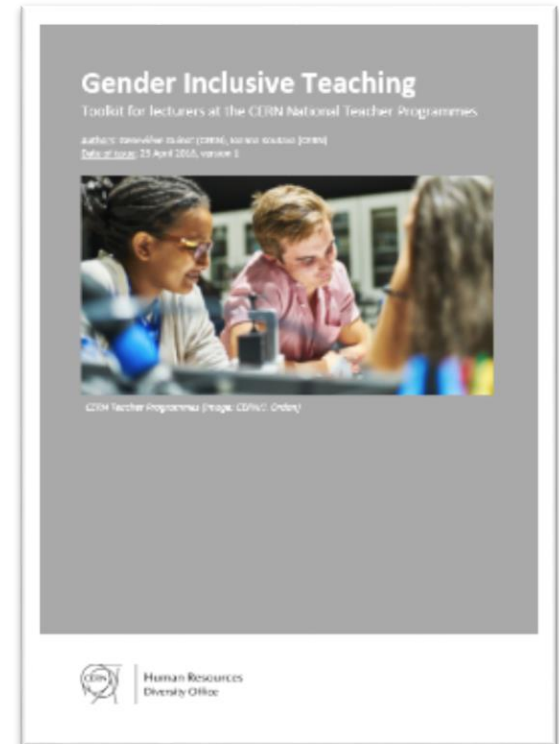
One of the things I will take home is, that an environment of collaboration and open discussion, rather than competition, can do wonders and can engage not only more girls, but also my more introverted male students.”

(Itumeleng Molefi, Physics Teacher in South Africa, 2016 HST programme participant)



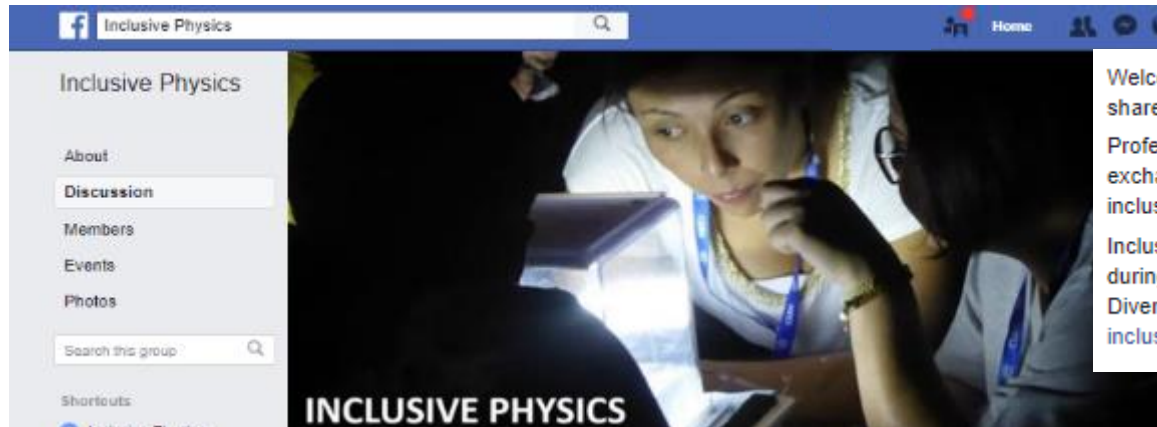
Taking it a step further

- Introducing Gender Inclusive Teaching at National Teacher Programmes
 - ↳ Multiply the message
- Engaging CERN people to deliver the module
 - ↳ Develop an organizational gender competency



Taking it a step further

- Create a Community of Practice
 - ↳ Share knowledge and information



Welcome to Inclusive Physics, this is a collaborative network for teachers to share resources and exchange on the topic of Gender Inclusive Teaching.

Professionals with an interest in science teaching can use this group to exchange ideas, best practices and materials with the aim of creating inclusive classrooms.

Inclusive Physics was an idea conceived by a group of six science teachers during their 3 weeks' stay at CERN, under the guidance of the CERN Diversity Office. To find out more, visit <http://diversity.web.cern.ch/gender-inclusive-teaching-2017>

<https://www.facebook.com/groups/2014703878781663>

Join the Community of Practice

Get information:

cern.ch/diversity

teachers.cern.ch

Contact us:

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People @ CERN ⇨ take part in the Gender inclusive teaching campaign

