Broadening access to STEM via gender inclusive teaching.

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ICHEP 2018
The framework – CERN’s Teacher Programmes

~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
The framework – Collision of ideas
The context – Choice of study subjects

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

Boys

- 12.0%
- 5.8%
- 4.7%
- 2.1%

Girls

- 5.2%
- 17.0%
- 0.4%
- 0.8%

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
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
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

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

**Interviews with female scientists at CERN**

**Information on initiatives** – local and global

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

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

\textit{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

https://www.facebook.com/groups/2014703878781663
Join the Community of Practice

Get information:
cern.ch/diversity
teachers.cern.ch

Contact us:
hr-diversity-info@cern.ch
jeff.wiener@cern.ch

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