# Teenage girls as co-creators of science learning engagement

*Guidance for Partners*
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## NOTHING HAS WORKED! THE CHALLENGE

For many years EU has tried to make science education more attractive to girls, and to encourage them to a life in science.
However, science education and science jobs are not attractive to most girls in the EU.
Joint research and policy clearly state that the paramount driver of teenage girls' resistance towards science and a life in science is that they find it impossible to integrate the images of science into the development of their female identities along the teenage years.
This is true even if the teenage girls might be doing better in science subjects than the boys in secondary school.

The research also concludes that the young people's basic images of science are created precisely along the teenage years, in secondary school and between the age of 12 and 16.

**Which are the typical attempts that have not worked?**

- "modernizing" classroom-based science education in school, through various pedagogical methods", including forms of "girlification"
- making science education more "entertaining"

- using female role-models in science education and in science career guidance and promotion
- adding out-of-school visits to science museums, science fairs and similar
- using new technology in classroom teaching
- in a few cases trying to gamify science learning in secondary school
- inviting female students to discuss their resistance towards science and what it will take to counter this resistance
- national and European campaigns to attract female students to attend higher education science studies

Even if such initiatives might have a positive effect on the girls (and on the boys), and how they "live with" science in secondary school, none of the attempts have proved sufficiently powerful to fundamentally change the preferences of the girls and the girls' images of science.

*The clear conclusion is that there is nothing wrong with the girls, but a lot wrong with science education in secondary school.*

Therefore, an increasingly evident conclusion is that the girls should not change, science education should.

**Why have these attempts and strategies failed, then?**

BECAUSE THEY DID NOT MANAGE TO CREATE IMAGES OF SCIENCE AMONG THE GIRLS ALLOWING THE UPTAKE OF SCIENCE IN THE FEMALE IDENTITY DEVELOPMENT

This means that strategies to change the girls' mind about science need to change science education and need to be powerful enough to integrate in teenage girls' female identities.

To allow integration into female identities, science education in school needs no less than a "revolution": fundamentally different science learning strategies are needed.

This raises two important questions:

*1. Which are the core values in teenage girls' identity development that new science strategies need to link deeply to? Typical preferences are:*
- engaging in helping people and communities
- engaging in social challenges
- engaging in real-life challenges and making a visible difference
- engaging in challenges that allow the integration of intellect and emotions
- engaging in art, design, music and aesthetics
- engaging in cultural activities
- engaging in activities in which they can articulate their female identities

*2. What should, then, be the characteristics of innovative science education strategies that will be considered attractive by the girls? The most important are:*
- avoiding formal and abstract science education not linking to real people
- offering science activities based on real-life challenges and in the near community
- offering immersion into challenges the girls consider socially and emotionally important
- linking science activity strongly to human life and changing human life to the better
- offering science learning through which they can collaborate with a variety of people and address the people's problems and needs
- offering science activity that allows the girls to gain personal satisfaction
- offering science engagement that allows the girls to feel how female values in science can improve the world and make a difference

Obviously, visits to the science museum or playing science games will not in any way be powerful enough to fundamentally change the girls' science images, and will therefore not be able to integrate positive science images into their identity formation.

## THE PROJECT

### OPPORTUNITY

Now we have a historic opportunity to go much deeper, to take the girls' values seriously and start developing more fundamental changes in science learning.

This opportunity has two factors:

- The EU Commissions' promotion of open science schooling (OSS as the most powerful innovation of science learning, including applying a responsible science approach.

- The urgency for all youth to address climate change at all educational levels.

The combination of: female values, OSS and climate change engagement is the most powerful opportunity to make science and a life in science attractive to girls.

### FEMALE VALUES IN SCIENCE EDUCATION and REAL LIFE

In traditional classroom science teaching, female values and life preferences are never discussed nor visible.

By opening up the doors to real-life science and climate change:
-girls are encouraged to develop critical views on science and to interact with community players and resources engaged in science and climate change
-female values can be heard and integrated when working with real-life science challenges
-girls will at the same time be able to create images of responsible science: climate change prevention offers opportunities to create images of science presenting them as extremely useful to life and to protect new generations from imminent disasters
-the girls will be able to discover how science and climate change affect citizens and create their own images of value-based science
-girls will create their own story-telling from the missions to create their voices