The Art of Science Learning

Protocol

EW5- Guess who: Gender inequality and girl's barriers in STEM

THE BIG VAN THEORY

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Faced Topic: Gender inequity; girls' barriers in STEM

Duration: 50 - 65 minutes

General Objective

1. To find out whether students feel that certain STEM jobs are gender stereotyped and why they think that is.

Description

1. **Who has a job like that? (5-10 minutes)**
   - Organise students into groups of 3-4.
   - Give each group a STEM job from the following list and some post-it notes (different colours per group):
     - Inventor
     - Vet
     - Chemist
     - Astronomer
     - Geologist
   - Give the groups 5 minutes to write down 5 things on different post-it notes that characterise the people that do that job.
   - Photograph the post-its of each group around the associated job.

2. **Word presentation and discussion (35 minutes)**
   - Groups present their words and discuss why they were chosen.
   - Post-it notes are collected by the facilitator.
   - The facilitator will take each word in turn and get the whole group to vote on each word as to whether it is best suited to a man, a woman or neither (gender neutral) and discuss why they think that. The facilitator are stick the post-it notes on the board under "Male", "Neutral" and "Female".

- Note down these words along with their gender association and the reason why.
- Look at the final outcome. Discuss any jobs with lots of "male" words or "female" words. The coloured post-it notes will help remember which jobs those words were associated with
- Discuss any interesting points with the students such as:
    - Links between intellectual jobs being associated with male or female?
    - Links between physical jobs being associated with male or female?

3. Videos (15 minutes)

- Show videos after the activity to generate discussion on where these stereotypes come from
    - Always #likeAGirl:
    - A Man's a boss, a woman's bossy:
- Allow students to re-assess their words based on the discussion.
- Photograph the new word locations.

Possible variation:

- Split the students into groups of boys and girls and get them to all write 5 words to describe the people working in the same job.
- The activity would then continue as before, however, the different coloured notes would now highlight whether boys and girls use different describing language and whether they view the jobs in different ways.

Materials Needed: Post-it notes in different colours, pens/pencils, board to put post-its on

Data collection protocol for EW5: see figure 1

Basic information about the group & workshop	
Workshop name	
Facilitator/s	
Date & time	
Teacher attending (if any)	
Number of participant students	Total:
	Boys:
	Girls:
Students' age	
Name of the school	
FG Name	

Activity	Students' responses	Facilitators' observations
Take a picture of the groups of post-it around each job		
Write down the words typically male or female and try to identify with the students why are they gendered-biased		
Word 1:	¿Male related or Female related? ¿Why?	
Word 2:	¿Male related or Female related? ¿Why?	
Word 3:	¿Male related or Female related? ¿Why?	
Word 4:	¿Male related or Female related? ¿Why?	

Figure 1: Data collection protocol for EW5

Guidelines emerged from EW5

After delivering EW3 in the PERFORM project, the following guidelines emerged. These can be followed to generate a performance play that deals with the gender roles in science.

Guidelines addressing Topic 5: GENDER ISSUES IN SCIENCE
To give women scientists as role models. ✓ Give special mention to female physicists, engineers and computational scientists.
To give special attention to girls in engineering: ✓ To strength girls self-confidence to pursue engineer/maths studies. ✓ To highlight the social projection of the engineering
To highlight that STEM-Jobs are not gendered: ✓ The features that define STEM jobs (curious, motivated, hard-working…) are gendered neutral. ✓ Boys can be Astronomer/Veterinary ✓ Girls can be Inventor/Engineer

How to apply EW5 guidelines

To address gender issues is very important that both men and women participate in the PERSEIA as performers. Moreover, to break related stereotypes, women should perform with a principal role in the PERSEIA.

Sometimes, to overcome our fears and dare to do things we need external role models. We look at other people who have done amazing things and try to follow their example. In that sense, girls may have a hard time choosing careers in science and technology, since the fantastic female models that exist are not given the relevance they deserve. Therefore, it is crucial that PERSEIAs include female scientific models and highlight their contribution to science and technology.

In TBVT PERSEIA great discoveries made by women are highlighted. They talk about female scientists and, in addition, some jokes are made to help students remember their names:

A couple of years ago two scientists, Jennifer Doudna and Emmanuelle Charpentier, I call them Emma and Jenny, put together a technique that is already revolutionizing the world: CRISPR / Cas9

For example, Hedy Lamarr ... don't you know Hedy Lamarr? She is "La Marr" (in Spanish "la mar = very") famous. Thanks to her today we have ... Wi-Fi! What would we do without Wi-Fi? Talk to each others? Come on! Thanks Hedy, you've been la-marr useful to humanity.

Also, during TBVT PERSEIA the female performer talks about their own experiences related to STEM careers and jobs, showing that STEM careers are not gendered by highlighting as a feasible role model their own personal experience:

Male performer.- It is true that with a scientific, technological or math career you can get to work on unimaginable things
Female performer.- When I was 14 I always wanted to be a pilot, and design and

build aircrafts

Male performer.- Then you have to study a lot of physics, mathematics and engineering

Female performer.- I already liked design video games 15 years ago.

Male performer.- *A*nd without math, calculation or programming do not go beyond the Tetris

Female performer.- At 16 I was inclined to play sports because I love to play football

Male performer.- Biology, chemistry, nutrition, even mathematics to calculate game statistics...

Female performer.- And in the end I became a Genetic Engineer. Studying a lot of biology, chemistry and physics.

[Woman talking] When I was a teenager I decided to become a genetic engineer. Jurassic Park dictated my future! To do so, I had to study very hard not only biology, but also physics and maths.

It is also important, if you are thinking to use volunteers from the audience that follows the guideline from SMS: take always the same number of female and male volunteers.

A second action implemented by TBVT is to use a YouTube video that highlight the role of important women in mathematics during the humanity history. The video shown by TBVT can be seen here.

According to the assessment of the PERSEIA, we noticed that just mention the name of some women scientists during the show may be a good starting point to change students' perceptions on gender issues, but is not enough. We do believe more effort need to be put on show current scientists as role models and real barriers for girls in STEM.

With the objective of highlight that STEM jobs are not gendered, TRACES performers represented a dialogue between a father and her daughter in their

PERSEIA. They represented a sketch in which both of them are doing the 3 more positive STEM-jobs selected by students in the EWs: business woman/man, pilot and architect. As good clowns, they amplify and caricature the main positive features of these jobs. And at the end of this dialogue, the father explains to his daughter that she will need mathematics and sciences together, if she wants to choose one of these 3 jobs. As the daughter and the father play these different jobs, it really shows that a man or a woman can make these jobs.