Protocol

EW3- Life recreation: Ethical issues in scientific research

THE BIG VAN THEORY

European Commission | Horizon 2020 European Union funding for Research & Innovation

This project has received funding from the European's Union H2020 research and innovation programme under grant agreement No. 665826

Contents

Protocol

Title: Recreate life

Faced Topic: Ethics in scientific research

General Objective: Make the students realize, verbalize and discuss about their own ethical feelings on science and innovations.

Duration: 1 hour

Description of the EW

1- Intro - 5 min

2- The facilitators draw a line on the blackboard. On the left extremity they write “impossible”, on the right extremity they write “doable”. There are 10 marks on the line: from 0 (impossible) to 10 (doable).

3- Students are splitted into 3 groups of 5 people (number of groups will depend on number of students participating in the activity)

4- Each group is given 4 cards with an innovation (see materials). The students discuss if they think that today, with modern technology and research, this innovation is more likely to be “impossible” or “doable”.

5- A representative of first group physically put the first card somewhere on the line drawn in sec. 2. The group explains to all the class the reasons why they put the card in that specific location in the line. The final position of the card in the line **must be** a collective consensus with all the students of the class. 5 min for each card.

6- Point 5 is repeated by all the groups until all the cards are located.

7- On the extremities of the line, the facilitators replace the word “impossible” by “unacceptable” and the “doable” by “desirable”. Now the 10 marks go from 0 (unacceptable) to 10 (desirable).

8- The facilitators ask the students if they think that some of the cards must now be moved. If they think so, the cards are moved, but once again, the final position must be a collective consensus. 15-20 minutes

9- Facilitators help the students to define “ethics” with their own words. 5 minutes

10- Debriefing. - 5 min

Material Needed:

- Set of A4 cards with some of the possible innovations from above :
    - Chose the sex of your child.
    - Bringing back to life someone who has been under cryogenic process.
    - Recreating an extinct species.
    - Merging a rabbit with a chicken.
    - Create a child who will always be top of the class.
    - Create human beings never have heart disease.
    - Transplant a pig heart in a human being.
    - Know at birth how you will die.
    - Create a living organism from inert matter.
    - Cloning a human being.
    - Make bacteria that can produce energy.
    - ...

Of course other relevant ideas may be added to this list.

- Magnets or adhesive gum to stick the cards on the blackboard.
- A marker to draw the line and write the scale.

Data collection protocol for EW3: 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
POINT 6	Take a Picture of the Bloackboard when all the cards will be located.	
POINT 8	Explain which cards have been moved by the students and the reasons thay they given	
Card Number X	Name of the invention: Moved from X to Z Reasons given by students to move	
Card Number X	Name of the invention: Moved from X to Z Reasons given by students to move	
ADD as "Card Number X" sections as you need		
POINT 9	Take a picture of the Bloackboard when all the cards will be RE-located. Take notes about the definition of ethics that rise from the students.	

Figure 1: Data collection protocol for EW3.

Guidelines emerged from EW3

After delivering EW2 in the PERFORM project, the following guidelines emerged. These can be followed to generate a performance play that deals with ethical issues in science.

Guidelines addressing Topic 3: ETHICS IN SCIENCE AND IN THE RESEARCH PROCESS
To highlight that scientists do not play to be God, as all new discoveries are under ethical control: ✓ GMO, Artificial Intelligence/Robots, medical advances (cloning, genetically modifications in humans)
To highlight that research is not only conducted to generate useful knowledge from the human being interest point of view. Ethical standards promote research on basic science as: ✓ Improve the environmental quality ✓ Generate basic knowledge to improve nature understanding ✓ Ensure animal rights

How to apply EW3 guidelines

When talking about ethics, a very useful tool is to capture the attention of the audience putting the focus on them, for instance, asking their opinion.

TBVT created a monologue talking about genetic engineering and the use of the new genetic editing tool CRISPR/Cas9. They took advantage of the use of social media during the PERSEIA and created a survey on Twitter asking the students: Would you change your genes?[1] Once the students are engaged with the ethical topic because the focus is on them, it is possible to go deeper and further in this issue. After launching the Twitter survey TBVT says:

> We scientist don't play to be God, copy-paste genes to create new species or just to see "what would happen if". We do follow very strict ethical standards, we want to help humanity, not destroy it! We are supervised by the big-brother, an international committee that prevents experiments outside ethical standards.

SMS use an original way to put the focus on students before addressing ethical standards. The busker performer complains, that they would love to get to know everyone in the room personally, but there is just not time for this, so the best he can do is to shake the hands of 3 pupils in the audience and then get them to shake everybody else's hands! Prior to pupils entering the room, the busker has covered their hands in fine silver glitter, and after some other busk experiments, the performer said:

> Hands up if you have some glitter on you? Wow nearly everybody in the room! What if instead of glitter that had been a really infectious disease, we might have all got really ill! Some diseases can spread that fast!
>
> So if I said that some scientists were trying really hard to help deadly diseases spread even faster (in a laboratory!) would you agree with that? NO, why not? (Busker gathers opinions).

Well said people! But ethically we have to ask why the scientists are doing this research? And for the most part it's so we can better understand how these diseases spread so fast so that we can become better at stopping them.

Scientists are very carefully regulated in their work, no way would they get funding if there was anything suspect about their research into such deadly diseases.

A different approximation to this topic is the case of TRACES PERSEIA. With a heavy load of irony, TRACES represents a mother who goes to the doctor to have a custom-made child. The situation is so exaggerated that it allows students to understand that it is not possible, and the sketch concludes by saying that science does not proceed without control, science follows ethical standards (see figure 7.2).

Scientist.- Intelligent as his mother. Great as ... finally brown. The eyes of his mother, or the young eyes of a while ago. And what temperament! You remember when he was broken ...

Mother.- I am not ready to give birth to a young person whose life would be suspended at the slightest breakdown of battery.

Scientist.- But do not worry, I will operate it at birth, I will put a battery built into the leg.

Mother.- Oh, how brilliant you are, what spirit. But wait, the battery should be charged constantly!

Scientist.- But do not worry, we will install a kinetic energy system that will convert the movements of the walk into electricity!

Mother.- But we will have a connection problem, we would have to square a USB port somewhere on the body.

Scientist.- But no, we can use the induction, so it will suffice that he put his laptop in a pocket and it will recharge itself.

Mother.- But can we do it right away?

Scientist.- Yes, there are still some improvements to be made, but it is a matter of time.

Mother.- But I want you right away ...

Scientist.- But we are not going to give birth to a child so that it has problems of battery when it will be great! It's not ethical. I do not want a child who is suffering! Only when all the technology will be ready, it will be applied.

Figure 7.2: Picture of the fragment of TRACES PERSEIA addressing ethical issues.