

Deliverable Report

**Grant Agreement Number 612367**



Including Responsible Research and innovation in cutting Edge Science and Inquiry-based Science education to improve Teacher's Ability of Bridging Learning Environments

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## Executive Summary

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As described in the IRRESISTIBLE Description of Work, the main instrument for assessing the modules' impact on students will be a pre-post-questionnaire on students' attitudes to Responsible Research and Innovation (RRI). In addition, the project decided to measure teachers' attitudes to RRI as a part of the evaluation of teacher professional development within the Communities of Learners (see Deliverable D5.1; Framework paper of teacher professional development programme evaluation).

This instrument for both of these purposes is here attached as Deliverable D5.3. The background and the development process of this instrument were discussed in Deliverable D5.2; Framework paper for module evaluation.

## Questionnaire to Measure Attitudes to Research and Innovation in Today's Society

The RRI Questionnaire was first developed for teachers and then slightly adapted for secondary school students by clarifying and simplifying some expressions. The questionnaire measures the respondents' attitudes and awareness of RRI dimensions in scientific research and innovation. During the first round of the project, the questionnaire was administered to teachers in the Communities of Learners (CoL), to teachers who were not in the CoL (control group) and to students who learned the modules that were developed in the project. The purpose of this stage was to validate the questionnaire. During the second round of the project, the questionnaire will be used in a pre/post manner to measure the influence of the IRRESISTIBLE project on teachers' and students' attitudes to RRI.

The background and the development process of this instrument was discussed in D5.2 (Framework paper for module evaluation), and the results will be presented as a part of module evaluation in D5.6.

### Part One

**Instructions:** Please determine the degree to which you agree with the 24 following statements (1- do not agree at all ; 5 - agree a great deal)

1. Scientists should give lectures about their work in science classrooms.
2. Scientists should publish their research findings only for other scientists.  
(NEGATIVE statement)
3. It is fine if a male researcher prefers to hire male students over female students, even though both have the same qualifications. (NEGATIVE statement)
4. Scientists should present their research to the general public in popular lectures.
5. To decide what topics to research, scientists should consult with community representatives, such as people who work for nature conservation, human rights, and consumer rights.
6. Scientists should focus only on doing research and should not invest time on promoting learning in schools. (NEGATIVE statement)
7. People who create products do not need to think about the possible risks of these products. (NEGATIVE statement)
8. Scientists should report their findings to the government, even if they are not required to do so.
9. Industrialists who develop technology products, such as new cell phones and

- computer applications, should be invited to give lectures on their work in schools.
10. Government, businesses and non-profit organizations (or NGOs) do not share the same values, so they cannot work together. (NEGATIVE statement)
  11. Scientists should try to balance the number of men and women in their research teams.
  12. The scientific and business communities cannot work together because they are motivated by different interests. (NEGATIVE statement)
  13. Scientists should spend part of their research budget to present their research online, in a free and open way.
  14. The government needs to regulate scientific research institutions.
  15. Having high ethical standards can help ensure high quality results in science and technology.
  16. Organizations which fund scientific research should consult with scientists to decide which research topics to fund.
  17. If it is clear that doing research has negative implications or risks, scientists have the duty to stop conducting this research.
  18. When scientists are required to report about the details of their research, this negates their academic freedom. (NEGATIVE statement)
  19. The science curriculum in schools should include topics like how science solves society's problems.
  20. A scientist who needs people to "work around the clock" should not hire women with young children. (NEGATIVE statement)
  21. Women and men should have equal rights and responsibilities in scientific research.
  22. One of the roles of government is to prevent harmful or unethical practices in research and innovation.
  23. Scientists have an obligation to make their research findings available to everyone.
  24. The government should not determine which topics of research are more important than others. (NEGATIVE statement)

## Part Two

All of the following questions should be for the Teachers Questionnaire.

\* Only questions #27 and #30 should be included in the Students Questionnaire

25. The following groups can each take different degrees of responsibility for the

consequences of research and innovation on society and the environment. In an ideal world, what degree of responsibility should each of these groups take? (1= to a very small degree ; 5 = to a great degree)

	1	2	3	4	5
The Government (policy planners)					
Academic Institutions					
Scientists					
Educators					
Environmental Organizations					
Musicians					
Non-profit organizations (or NGOs)					
Consumers					
Businesses					
The Printed and Electronic Media					

26. The following groups can each take different degrees of responsibility for the consequences of research and innovation on society and the environment. In an ideal world, what degree of responsibility should each of these groups take? (1= to a very small degree ; 5 = to a great degree)

	1	2	3	4	5
The Government (policy planners)					
Academic Institutions					
Scientists					

Educators					
Environmental Organizations					
Musicians					
Non-profit organizations (or NGOs)					
Consumers					
Businesses					
The Printed and Electronic Media					

27. How

often have you participated in discussions in science classrooms that deal with ethical issues of science and society? (for example: "Should we pursue new nuclear technologies?" or "What are the risks and benefits of nanotechnology applications?") (1= never ; 5 = often)

28. How often have you participated in classes or workshops that deal with ethical issues of science and society? (1= never ; 5 = often)

29. How often have you taught ethical issues relating to science and society? (1= never ; 5 = often)

30. Which ethical issues in science and society do you think are relevant in regard to developing new technologies for solar cells?

### RRI dimensions (categories in the questionnaire)

i. Statements relating to the dimension of ENGAGEMENT ("Choose together"):

5 ; 12(Negative) ; 24 (Negative) ; 16

ii. Statements relating to the dimension of GENDER EQUALITY ("Unlock the full potential"):

3(Negative) ; 11 ; 20(Negative) ; 21

iii. Statements relating to the dimension of SCIENCE EDUCATION ("Creative learning

of fresh ideas"):

1 ; 19 ; 6(Negative) ; 9

iv. Statements relating to the dimension of OPEN ACCESS ("Share results to advance"):

23 ; 2(Negative) ; 4 ; 13

v. Statements relating to the dimension of ETHICS ("Do the right thing and do it right"):

10(Negative) ; 7(Negative) ; 15 ; 17

vi. Statements relating to the dimension of GOVERNANCE ("Design science for and with society"):

9 ; 14 ; 18(Negative) ; 22