**Supporting RRI: Developing RRI Guidelines for PhD Candidates**

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| --- | --- |
| **Audience** | **PhD students** |
| **Year of study** | **Beginning of PhD research project** |
| **Number of ECTS credits** | **1.0 ECTS credit (workload of 25 to 30 hours)** |

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Please remember that the resources at hand **can (and should) be adapted** to your specific needs and context. The HEIRRI resources have been **designed to be flexible**, so we encourage you to think about including **local cases**, adjusting the **timings** of the course to your needs, and also adapting some contents to your specific **field or discipline**.

**SYLLABUS**

|  |  |
| --- | --- |
| **Element** | **Description** |
| **Title** | Supporting RRI: Developing RRI Guidelines for PhD Candidates |
| **Cycle** | EHEA: Third cycle  EQF level: 8  Degree level: PhD |
| **Year of study** | This training programme does not have a determined year of study. At best, however, students should attend this course at the beginning of their PhD training and before they start their research projects. |
| **Number of ECTS credits** | 1.0 ECTS credit (workload of 25 to 30 hours) |
| **Learning outcomes (LO)** | On completion of this course students will be able to  1. identify possibilities to promote Responsible Research and Innovation (RRI) given their own position in research and innovation (R&I) processes and institutional structures;  2. develop and formulate RRI guidelines for PhD candidates within their field;  3. and to deliberate on how to implement RRI into their own research projects. |
| **Mode of delivery** | This short PhD course is a discussion-based workshop of five to six hours in-class time. Applying a flipped classroom principle, students have to prepare basic RRI literature to be used in class. Attendance and active participation in the workshop are necessary for the students’ assessment. |
| **Prerequisites and co-requisites** | Students need to have reached the required qualification to enrol into a PhD programme. |
| **Course content** | Building on basic RRI literature and in-class discussions, students will develop responsibility guidelines for their academic setting (and potentially for their respective discipline), which are viable for the students’ further PhD research. |
| **Recommended or required reading and other learning resources/tools** | * *European Commission (2012). Responsible Research and Innovation: Europe’s ability to respond to societal challenges. Retrieved 16 February 2017, from http://ec.europa.eu/research/science-society/document\_library/pdf\_06/responsible-research-and-innovation-leaflet\_en.pdf* * *Owen, R., Macnaghten, P., & Stilgoe, J. (2012). Responsible research and innovation: From science in society to science for society, with society. Science and Public Policy, 39(6), 751–760. DOI:10.1093/scipol/scs093* * *Stilgoe, J., Owen, R., & Macnaghten, P. (2013). Developing a framework for responsible innovation. Research Policy, 42(9), 1568-1580. DOI: 10.1016/j.respol.2013.05.008* * *Wickson, F., & Carew, A. L. (2014). Quality criteria and indicators for responsible research and innovation: Learning from transdisciplinarity. Journal of Responsible Innovation, 1(3), 254–273. DOI:10.1080/23299460.2014.963004* |
| |  |  | | --- | --- | | **Planned learning activities and teaching methods** |  | | This course combines a set of learning activities and teaching methods: Employing a flipped classroom model, students have to prepare questions on RRI literature that will then be discussed in class. The workshop itself is mostly discussion-based, and work takes place in small to medium-sized groups or in the plenary. The concrete work on the guidelines is more productively done in small groups, while the suggestions and results are discussed in the plenary to reach agreement among all participants. Short presentations by each of the small groups are necessary to share the content of the work done. Concluding their experiences in the workshop, students have to reflect on and adapt the developed guidelines for their own research projects or planned research. |
| |  |  | | --- | --- | | **Assessment methods and criteria** |  | | The assessment of the students’ performance will be based on the quality of   * the preparation of RRI-related texts; * the active participation in the group work and in plenary discussions; * and a short reflection essay on the feasibility of the developed RRI guidelines for PhD researchers for the respective student’s own research project. |

**PhD PROGRAMME STRUCTURE**

**“Supporting RRI: Developing RRI Guidelines for PhD Candidates”**

|  |  |  |
| --- | --- | --- |
| **Part 1** | **Activity** | **Duration** |
|  | Introductory round | 20’ |
| RRI discussion | 1h’ |
| Introduction to RRI | 40’ |
| Case studies | 1h30’ |
| **Part 2** | **Activity** | **Duration** |
|  | World Café | 2h |
| **Part 3** | **Activity** | Duration |
|  | RRI Guidelines | 1h |

*This programme is thought as a one-day workshop; however, it can be adapted. More face-to face time can be incorporated increasing some activities’ time, such as the case studies, activities related to students’ research project, or incorporating the adaptation possibility added at the end of this programme.*

*Furthermore, we recommend performing this PhD programme in the first PhD year during the students’ research project definition. It can also be included as part of a foundational course on philosophy and methods of science: modes of doing science, sites of discovery and epistemological assumptions applying each method, for example or other PhD courses.*

**PREPARATION OF BASIC RRI LITERATURE**

In preparation for the workshop, students have to read basic RRI texts. This reading material will serve as the basis for subsequent discussions in class.

It is suggested that students prepare the following guiding questions for the first in-class discussion. The questions can be adapted, modified, or replaced by others you consider suitable:

* How do you explain “Responsible Research and Innovation” based on the texts?
* Which arguments are presented to emphasise the importance of RRI?
* Thinking about your own discipline and academic setting, where can RRI be employed and contribute to more responsible research processes and outcomes?
* Can you see hindering factors for implementing aspects of RRI into you discipline?

The suggested reading material is the following:

* Stilgoe, J., Owen, R., & Macnaghten, P. (2013). Developing a framework for responsible innovation. *Research Policy, 42*(9), 1568-1580. DOI: 10.1016/j.respol.2013.05.008
* Wickson, F., & Carew, A. L. (2014). Quality criteria and indicators for responsible research and innovation: Learning from transdisciplinarity. *Journal of Responsible Innovation, 1*(3), 254–273. DOI:10.1080/23299460.2014.963004
* European Commission (2012). *Responsible Research and Innovation: Europe’s ability to respond to societal challenges*. Retrieved 16 February 2017, from http://ec.europa.eu/research/science-society/document\_library/pdf\_06/responsible-research-and-innovation-leaflet\_en.pdf

Depending on the audience and interests, other literature can be employed as well. You can find a list of recommended literature and a collection of introductory videos on RRI in the HEIRRI training materials on the HEIRRI website (http://heirri.eu) and in the HEIRRI section of the RRI Tools website (https://www.rri-tools.eu)

**PART 1. INTRODUCING RRI**

**Activity 1. Introductory round**

**Goal:**

*The aim of this activity is for the participants to be able to introduce themselves and explain why they are attending the course clearly and concisely in a short period of time and be understood.*

**Learning outcomes:**

After this activity, the participants should be able to:

* To get to know fellow participants

**Description of the activity**

This session should start with a short briefing on behalf of the teacher on what the workshop entails. This should be followed by a general introduction, with each participant stating:

* + Who they are
  + What their field of study is
  + Why they chose to participate in the workshop.

The introductory round can also be done with the speed dating technique. For this activity, the teacher has to arrange the tables of the classroom so that the PhD students can change quickly. The teacher has to assign half of the students to remain seated, the other half should move over one chair for each round.

So, first the students who are seated in the fixed place have 1 minute to introduce themselves and explain who they are, what is their field of study and why they have decided to participate in the workshop to the other students (the ones who change seats), which are acting as listeners and have 1 minute of question time. After that, they change the roles: the students who have acted as listeners, now introduce themselves and explain why they are attending to the workshop. The students who remained seated in the fix location act as listeners and have one minute to question. Each student should repeat this process with the other students. The main idea is that with each “date”, based on the questions received from the listeners, the students should be able to improve on their delivery and contact with the other students.

**Duration of the activity:** 20’-30’

**Activity 2. RRI discussion**

**Goal**

*The aim of this activity is to provide the students with a general view of RRI.*

**Learning outcomes**

After this activity, the students should be able to:

* Analyse and discuss the main characteristics of different concepts of RRI and their implications for research practices
* Determine key aspects of RRI from the papers provided
* Construct an RRI definition integrating their own ideas and different perspectives from the reading material
* Create a holistic vision of RRI
* Identify possibilities to promote RRI given their own position in research and innovation (R&I) processes and institutional structures.

**Materials**

* RRI texts
* Multiple coloured post-its.

**Description of the activity**

This part of the workshop is devoted to an overall discussion of the thoughts and answers on the RRI introductory texts students prepared based on the guiding questions provided. It is recommended to leave sufficient time to discuss each of the questions and other issues that might have come up. During this discussion, students should identify different **aspects** of RRI.

* Generation of ideas:  Each participant should write a minimum of five ideas, concepts or experiences related to RRI, each one on a different post-it. All the post-its must then be stuck on the wall.

In a further step, students will group the different identified ideas, concepts and experiences of responsible research in:

1. Gender equality
2. Sustainability
3. Ethics
4. Inclusive Science[[1]](#footnote-1)\*

The post-its should be organized into these different this four aspects on the wall. Participants should form smaller groups to work on the different four aspects. Ideally there should be one group per key aspect.

* Post-it revision: Groups must then revise the post-its, make sure that everyone understands them and clarify concepts or ideas if needed.
* Analysis and selection of ideas: The group has to discuss the concepts, ideas and experiences that are stuck on the wall and came from the generation of ideas. Then, participants have to categorize and select the best ideas, discarding the impracticable ones.
* Sharing: Each group has to share with the rest of the class the main ideas that have flourished in their group discussion.

**Duration of the activity:** 1h

**Teachers’ role: How can the teacher facilitate the activity?**

To guide this activity some of these tips are useful:

* When the teacher explains the dynamic, it is important to emphasize that every idea or proposal is acceptable; judgment and criticism should be avoided.
* It is also important to highlight that in this kind of dynamic quantity is more important than quality. The brainstorming or generation of ideas technique states that quantity, a big number of ideas, helps to find quality.
* One of the participants of each group can play the role of guiding his/her group and the activity.
* The teacher can walk around the room and ask the participants which ideas or proposals have emerged and promote the discussion.

**Activity 3. Introduction to RRI**

For the introduction to RRI, **See PowerPoint presentation: Introduction to RRI – short version**.

**Goal:**

*The aim of this activity is to provide the students with a general view of RRI to consolidate what has been discussed in class.*

**Learning outcomes:**

After this activity, the students should be able to:

* Identify the main aspects of RRI
* Comprehend the general meaning of responsibility in research and innovation.

**Materials:**

* PowerPoint presentation: **Introduction to RRI – short version**

**Description of the activity:**

The teacher will give the students a brief presentation on RRI.

**Duration of the activity:** 20 minutes

**Activity 4. Case studies**

**Goal**

*The aim is for the students to be able to learn about a specific RRI aspect in depth and to share their views on this aspect.*

**Learning outcomes**

After this activity, the participants should be able to:

* Understand a specific aspect of RRI in depth
* Share views and opinions on a specific aspect of RRI
* Acquire some expertise in a specific aspect of RRI
* Analyse RRI exemplary cases based on the RRI Key Issues formulated by the European Commission (EC)
* Identify good practices that integrate RRI EC Key Issues into research

**Materials**

* Exemplary cases. **See HEIRRI CASES.**
* Issue cards
* Conversation cards

**Description of the activity**

In small groups, participants will work on a series of case studies. These cases are classified according to the four key aspects of RRI mentioned above (Gender Equality, Sustainability, Ethics and Inclusive Science). The HEIRRI project has identified these different aspects that have been defined from the 6 key issues proposed by European Commission just for methodological and pedagogical purposes of the activities.

The students will also be provided with a pack of multidisciplinary cases examples (**HEIRRI CASES GUIDE)**, which can be found in the Annex of this document. Each case explains a research project and how some RRI perspectives were included.

The exemplary cases are the following:

RRI cases

Architecture/Urbanism

**Gender Equality**

* HOUSING AND NEIGHBOURHOOD DESIGNS

Public Health

Biomedical Research

**Gender Equality**

* HIV MICROBICIDES

Biomedical Research

Public Health

**Gender Equality**

* MALVECBLOK

Public Health

**Sustainability**

**Inclusive Science**

**Gender Equality**

* *CASAS MATERNAS*

Sociology

**Sustainability**

Ecology

**Inclusive Science**

* IMRR

Environmental Sciences

**Inclusive Science**

**Sustainability**

* KLIMA ALLTAG

Marine Biology Research

**Inclusive Science**

**Sustainability**

* PIER

Public Health

Environmental Sciences

**Sustainability**

**Inclusive Science**

* MOSQUITO ALERT

Waste Management

**Inclusive Science**

**Sustainability**

* MARLISCO

Biomedical Research

**Ethics**

* TRREE PROJECT: ADOLESCENTS IN HIV RESEARCH
* PPI PARKINSON’S

**Ethics**

Biomedical Research

**Inclusive Science**

**Sustainability**

Botany

Sociology

**Ethics**

**Inclusive Science**

* THE BUCHU PLANT

Education

**Inclusive Science**

**Ethics**

* UCL CHANGEMAKERS

Technology

**Inclusive Science**

* AMBIACT

Biomedical Research

Science Education

**Inclusive Science**

* DNA LABS
* SUSTAINABILITY IN PRISONS

Environmental Sciences

**Sustainability**

**Inclusive Science**

Sociology

Education

History

**Inclusive Science**

Sociology

* CROSSCULT

**Card-based Engagement Exercise**

This learning activity is roughly based on a card-based public engagement method developed for debating emerging technologies. Cards have frequently been used as stimuli for debate and as research tools in qualitative research as well as in public engagement with science and technology.[[2]](#footnote-2)

Students will work in groups with the given cases in form of a card-based engagement exercise.

For the discussion or debate, the students should use exploratory talk.

According to Mercer[[3]](#footnote-3), “*Exploratory talk* is when partners engage critically but constructively with each other’s ideas. Statements and suggestions are offered by all the participants for joint consideration. These may be challenged and counter-challenged, but these challenges are justified and alternative hypotheses are offered. All the students should actively participate and opinions are sought and considered before decisions are jointly made.”2 The author also says that “Exploratory talk is a form of dialogue in which the participants’ main aim isn’t to protect their own interests and keep their identities separate, but in which they try to achieve a combined comprehension in a rational manner.”2

In this way, *exploratory talk* is based on the intention to establish priorities, reach agreements and reduce discrepancies without losing critical discourse. It allows for “inter-thinking” to build and share knowledge.[[4]](#footnote-4)

In small groups, students will choose a first case from the pack of cases the teacher has provided them with. Also, each group of students will have a pack of **Issue cards**, which can be found in the Annex, and a pack of **Conversation cards**, also in the Annex.

Each group of students has to analyse all the Issue cards relevant to their key aspect, which pose specific questions or topics related to RRI, then discuss and analyse the case they have selected with the chosen Issue cards. These cards are meant to orient the students and guide them towards understanding what the integration of responsibility in a research project means. Furthermore, the students have to use the Conversation cards to generate a good debate based on exploratory talk.

In the exploratory talk participants in the debate can be guided via linguistic labels, in the form of a deck of cards, to be used during the discussion. These cards help internalize the information, abilities and knowledge necessary in a debate. The cards also help the participants respect others’ opinions, express agreement or disagreement, present new ideas or arguments, ask questions or ask for more information. They allow the students to use conversational strategies that will permit them to intervene and regulate a debate successfully.3 The students can hold up one of these cards whenever they want a turn to speak during the debate. The students can analyse more than one case if there is enough time.

After the students have performed the card-based exercise, each group has to briefly present the cases they have analysed and then explain:

1. *How this case/project has incorporated responsibility?*
2. *What we could improve in this case?*

**Duration of the activity:**

The students will have 1 hour and 30 minutes for this activity. The first hour should be allowed for reading the case, the cards and perform the discussion and the debate, and the last 30 minutes for the establishment of the case conclusions of each group.

**Teachers’ role: How can the teacher facilitate the activity?**

In this learning activity, the teacher will have a rather passive role and will function as a moderator if necessary. The teacher should provide the students with the pack of cases. If she/he wants, the teacher can also choose which cases are to be studied in this session. The cases can be limited to the field of study of the participants or be multidisciplinary.

Once the cases have been handed out, the teacher can guide the participants and help them understand each case if needed. The teacher should also provide the students with the Issue cards. Again, during this phase the teacher can act as a moderator and help and orient each group of students during the discussion to reach final conclusions.

To guide this activity some of these tips are useful:

* While the teacher explains the activity, it is important to communicate and control the timing of the activity.
* The teacher can guide the presentation of each group conclusion and highlight the most important aspects that have emerged in this part.

The teacher should make sure there is a good use of the Conversation cards.

A good debate is based on the following principles2,3.

* There should be a common interest and objective, implicating all the participants
* There should be room for the individual participation of all members, and it is important that all the members of the group participate. It is necessary to respect everyone’s turn to speak.
* Relevant information should be shared to promote mutual understanding. There should be a common language, so as to allow “inter-thinking”.
* Personal opinions should be well reasoned and argued, so as to provide sufficient information for the conversational partners to debate them.
* Interventions and contributions should circulate, they should be recovered, resumed, incorporated into the conversation, to be compared, assessed etc.
* The objective should be to come to shared conclusions, by adding up voices, not excluding them. Agreements should be sought to progress.
* There should be results that indicate progress, advancement and detailing of knowledge compared to the starting point of the discussion.
* All students should participate (the teacher ensures it) and it does not happen that one or a few students monopolise the discussion or impose their opinions.

**PART 2. PUT RRI INTO PHD RESEARCH PRACTICE**

**Goal**

*The aim of this activity is for participants to incorporate RRI ideas in their research throughout an adaptation of a Public Engagement exercise.*

**Learning outcomes**

After this activity, the participants should be able to:

* Share views and opinions on a specific aspect of RRI
* Explain a specific aspect of RRI in depth
* Acquire a holistic view of RRI
* Incorporate RRI ideas in their research project

**Materials**

* Tables and chairs in a café format
* Cardboard or paper
* Coloured pens

**Description of the activity**

In the second part of the workshop, students will perform an adaptation of the World Café dynamic to introduce different RRI aspects to their research project. In the first part of the activity, they work in the small groups formed at the end of Part 1. They will deliberate on how to put RRI into practice, in a general level, in their research domains and draft first suggestions for guidelines. Moreover, they should come up with specific ideas on how to incorporate aspects of RRI into the own research settings. By doing so, they should draw on their own experiences within their HEIs or research institutions. They should reflect on how much freedom they have to change the direction and implementation of their project, how they could change the environment or the project they are working on, and how research processes could be opened up in order to incorporate aspects of RRI.

After this collective reflection, students should consider the different aspects of RRI discussed in Part 1 (Gender Equality, Sustainability, Ethics and Inclusive Science). Each small group will work on one of these aspects, and then they have to systematically collect and arrange their insights of the previous discussion on a flip charts, a whiteboards, or another appropriate mean. Students do not have to agree with every aspect of their discussion; if they employ different perspectives, they can also make these visible on the flip chart or whiteboard and put the competing visions up for discussion in the subsequent part of the workshop.

Thus, at the end of this part, there will be four groups, each one in a different table and with a different key issue (Gender Equality, Sustainability, Ethics, Inclusive Science), with a draft of a guideline on how to incorporate the specific key issue they had work on in a research project. The students of each table had become “experts” on the specific aspect they had been working on.

**Duration of this part of the activity:** 30 minutes

The goal of the second part of this activity is that each student can acquire a holistic view of RRI gathering information of each key aspect.

Small Group Rounds: The process begins with the first of four fifteen minute rounds of conversation for the small group seated around a table. Each round of conversation at each table has to include:

* + Explaining the specific table key issue and the guideline designed in the previous part.
  + Discussing how to incorporate this key aspect on the new table members research project.

To perform this activity, it is necessary that always an “expert” of the specific key aspect always stays at the table as the “table host”. So, each member, except the table host, of the key aspect groups will go to a different table with a different key aspect. Each “table host” for each key aspect will explain to the rest of the participants, who have come to their table, what they have learnt about their specific aspect and how to integrate this aspect into research and innovation processes. The “table hosts” can change every round, so as to give them the chance to move around the room as well, and also to allow each member of the group to explain their key aspect to others.

At the end of the fifteen minutes, each member of the table moves to another one to learn more about other key aspects. One person stays as the “table host” for the next round.

Possible questions for each table to promote the discussion can be:

* How would you define the table key aspect? Give some examples.
* How can you integrate the table key aspect into your project?
* How may your research project benefit from incorporating this key aspect?
* What are the possible challenges of incorporating this key aspect into your practice?

**Duration of this part of the activity:** 1 hour

In the last part of this activity, the groups will share their discussion with the whole class.

* Harvest: After the small groups (and/or in between rounds, as needed), individuals are invited to share insights or other results from their conversations with the rest of the large group. Doing this, a resume of each key issue can be done and also some ideas and examples of incorporating RRI in different research projects can be shared with all the participants of the course.

**Duration of this part of the activity:** 30 minutes

**Teachers’ role: How can the teacher facilitate the activity?**

The teacher will have to organize the dynamic and control the timing and organisation of each activity, also take part in it as the moderator in the harvest and outline the conclusions of the activity. If the teacher needs more information about the World Café, see:

* Engage 2020 Action catalogue <http://actioncatalogue.eu/>
* The World Café Community Foundation <http://www.theworldcafe.com/>

**PART 3: RRI GUIDELINES FOR PHD STUDENTS**

**Goal:**

*The aim of this activity is for students to create guidelines for the incorporation of RRI aspects into research and innovation processes. Students should become able to identify which criteria can be used to evaluate the integration of RRI into their research. To this end, students will design an evaluation instrument for their research.*

**Learning outcomes:**

After this activity, students should be able to:

* Identify indicators for RRI key aspects
* Reflect on the incorporation of RRI key aspects into a research project
* Develop and formulate RRI guidelines for PhD candidates within their field
* Incorporate the feedback into their future projects

**Materials**

* RRI indicators guide.

**Description of the activity**

The guidelines will be structured upon these four key aspects of RRI:

1. Gender equality
2. Sustainability
3. Ethics
4. Inclusive Science

Each group will formulate a guideline on the key aspect they have been studying. They should define evaluation criteria for each key aspect, and indicators for each of the criteria they come up with. This means that each group can focus on one specific aspect, allowing for a more in-depth reflection.

Each group will have 20’ to describe their evaluation criteria and indicators. After this presentation round, the evaluation criteria and indicators will be shared with all groups. Group members should shortly present their ideas for the guidelines. These ideas are then further discussed. An agreement should be reached (20’) on the most important and viable guidelines. It is not necessary to consent on every detail of the guidelines. If diverging views and experiences lead to different strategies and recommendations, this should be made clear and incorporated into the guidelines.

Once the groups have completed their guidelines for each aspect, they should present their ideas to the rest of the participants (20’). The guidelines created can then be collected and brought together, so as to create a complete guideline including all the key aspects of RRI.

**Duration of the activity:** 1h-1h 30’

**Teachers’ role: How can the teacher facilitate the activity?**

The role of the teacher during the sharing of ideas is essential. The teacher should facilitate the debate on the definition of guidelines, and his/her contributions should encourage reflection - trying not to bias the students’ thought-processes.

To assist the discussion on the indicators of RRI, the teacher can seek inspiration on the report from the Expert Group on Policy Indicators for Responsible Research and Innovation “**Indicators for promoting and monitoring Responsible Research and Innovation”. [[5]](#footnote-5)**

To help participants define their evaluation criteria and indicators, the teacher can hand out the **Guidelines to define evaluation criteria and indicators,** added at the Annex.

Once the guidelines are complete, the teacher should collect them and create a single document for participants including all RRI key aspects considered.

**Reflection essay**

After the workshop, students have to write a reflection essay integrating the provided RRI literature, the in-class discussions, and the developed guidelines. In this essay, they have to explain how they plan to use the guidelines they have been working on the workshop for incorporating RRI in their own research and/or PhD theses.

Depending on the state of their PhD, participants will relate differently to this task. Those just starting their PhD can draw up a plan of how to use the guidelines in the process of finding a research question and in the process of research design. If students already have a concept or are in the phase of conducting their research, they can revaluate it according to the guidelines and see if they can make changes according to what they have learnt on RRI. Participants who are at the end of their PhD can write an essay about how they would continue their project in a more responsible way.

With this final reflection essay, students show that they have achieved Learning Outcome 3 (LO3), “to deliberate on how to implement RRI into their own research projects”.

***Adaptation Possibility 1: Follow-up workshop(s) (+0.5 or +1.0 credits)***

*In case the PhD programmes and curricula of the participants allow more time for the workshop, this course can be extended by implementing a follow-up workshop. This workshop should be scheduled at least a couple of weeks or more after the initial workshop, e.g. at the end of the semester, the beginning or end of the following semester, or a year later. In this workshop, the experiences concerning the guidelines, how and if they have been implemented in the students’ research, if there have been any hindrances in using them, and similar points should be discussed. For doing so, students should prepare a brief presentation on their experiences and present them to the group. The students’ progress as well as their individual experiences will be discussed in the plenary.*

*A follow-up workshop of that kind can be conducted twice (the second to be held as well at least a couple of weeks after the first follow-up workshop). 0.5 ECTS credits can be awarded for each follow-up workshop.*

*The discussion can also be continued online instead of the in-class follow-up workshops, using a forum or equivalent on an online learning platform. For doing so, a forum on an appropriate (e-learning) platform needs to be set up in advance of the activity. Students can exchange their experiences and pose questions to be discussed and elaborated on by all of the participants and the teacher. For the assessment, each student has to post a short recap of their development.*

**SURVEYS AFTER IMPLEMENTATION**

The HEIRRI project has developed surveys for post-project application of HEIRRI training programmes and materials. These surveys follow the design used for pilot evaluation, with a few additional open-ended questions, based on adaptations, difficulties encountered and opinions on the future of RRI in education.

Please respond to the relevant surveys after using the teaching resource at hand:

1. Survey for **students**: <https://www.surveymonkey.com/r/3PBQYZN>

2. Survey for **teachers**: <https://www.surveymonkey.com/r/3P37NG7>

For public engagement events:

3. Survey for the **public** (museum events): <https://www.surveymonkey.com/r/36L8Z6R>

4. Survey for **facilitators** (museum events): <https://www.surveymonkey.com/r/3P6WY2V>

Please remember that the resources at hand can (and should) be a**dapted to your specific needs and context**. The HEIRRI resources have been designed to be flexible, so we encourage you to think about including **local cases**, adjusting the **timings** of the course to your needs, and also adapting some contents to your specific **field or discipline**.

**ANNEXES**

* ANNEX 1. HEIRRI Cases
* ANNEX 2. Issue Cards
* ANNEX 3. Conversation Cards
* ANNEX 4. Guidelines to define evaluation criteria and indicators

**ANNEX 1. HEIRRI CASES**

**TABLE OF CONTENT**

* INTRODUTION TO RRI CASES
* GENDER EQUALITY
  + HOUSING AND NEIGHBOURHOOD DESIGNS
  + HIV MICROBICIDES
  + MALVECBLOK
  + *CASAS MATERNAS*
* SUSTAINABILITY
  + IMRR
  + KLIMA ALLTAG
  + PIER
  + MOSQUITO ALERT
  + MARLISCO
* ETHICS
  + TRREE PROJECT: ADOLESCENTS IN HIV RESEARCH
  + PPI PARKINSON’S
  + THE BUCHU PLANT
  + UCL CHANGEMAKERS
* INCLUSIVE SCIENCE
  + AMBIACT
  + DNA LABS
  + IMRR
  + KLIMA ALLTAG
  + PIER
  + MOSQUITO ALERT
  + MARLISCO
  + PPI PARKINSON’S
  + SUSTAINABILITY IN PRISONS
  + CROSSCULT

**INTRODUCTION TO RRI CASES**

The cases proposed below are used in different Higher Education programmes. These case examples can be useful to promote a reflection on responsibility in R&I issues related to: Gender, Sustainability, Ethics and Inclusive Science. Some of these cases can be used for different aspects (see the previous list). The HEIRRI project has identified and defined these different aspects (Gender, Sustainability, Ethics, Inclusive Science) from the 6 key issues proposed by European Commission just for methodological and pedagogical purposes.

The cases consist of:

-A brief description of the case

-The bibliography of the case

-The learning objectives of the case

-The reflection questions of the case

**How can these cases be used in class?**

To start the activity, the teacher will give the students/participants the brief description of the case. If the teacher considers that the students need more information to generate a good debate/discussion, each case is provided with useful links and bibliography to add more information.

The instructor will have also the learning objectives, what the students/participants are expected to learn during the activity, and some reflection questions. After the students/participants have read the description of the case, the teacher can use the reflection questions that we propose here to generate a robust discussion. These reflection questions are specific for each case and for each issue (Gender, Sustainability, Ethics and Inclusive Science). Furthermore, with the reflecting questions posed by the teacher, the students can analyse the controversies of each aspect to construct a deeper discussion and consolidate knowledge on each one. The instructor can also add more reflection questions if needed or to enrich the debate.

After the discussion, the teacher can end the activity with the conclusions formulated by all the students’ contributions.

**GENDER EQUALITY**

**“Housing and Neighbourhood design: analysing gender”**

*RRI Key issues: gender*

The website Gendered Innovations presents a case study called “Housing and Neighbourhood design: analysing gender”[[6]](#footnote-6) with the aim of providing an example of how urban design may incorporate a gender perspective.

In the website, it is said that “gender roles and divisions of labour result in different needs with respect to built environments”, which sometimes reinforce gender roles or can’t provide equal services to women and men[[7]](#footnote-7). These differences can be visible at many levels, from single buildings to whole neighbourhoods, cities or even regions, and can also be seen within cities through its means of transport, public facilities, housing, open spaces, and so on. This case in Gendered Innovations states that “urban design typically lacked a gender perspective, and was ‘blind’ to differences between groups”. It should be taken into account that the entity UN Women[[8]](#footnote-8) states that, around the world, women carry out at least two and a half times more unpaid household and care work than men[[9]](#footnote-9).

In Vienna, Gendered Innovation writes, the gender analysis integrated in its urban planning has contributed to the city’s quality of life, and as an example of this planning, the project “Frauen-Werk-Stadt I” is described. This initiative designed a whole area of the city[[10]](#footnote-10) that didn’t separate housing from commercial spaces, nor from childcare facilities, medical centres or police stations. This way, according to Gendered Innovations, overall car use was reduced, as well as the stress experienced by those people combining career and house/family care, since “Frauen-Werk-Stadt I” was designed in a way where daily needs could be met within the vicinity of the apartments.

**Learning objectives**

* To identify the gender issues involved in this project
* To describe which gender policies should be implemented: equal opportunities for women and men in this research
* To discuss which gender issues should be taken into account in the research content
* To analyse how the gender issues have been addressed and which stakeholders have been involved in the process

**Reflection questions**

* Do you think the case presented is a good example of research done responsibly? Why?
* Does the case presented reflect on gender roles and tasks typically attributed to men/women?
* Do you think this case presents gender equality in a simplistic way? How could it be improved?
* Can you think of arguments against gender equality in urban planning? Could it reinforce gender stereotypes? Could it neglect other collectives?
* Do you think the urban planners did a public consultation, or rather they based their designs on stereotypes and preconceptions?
* Does this case include enough different perspectives? How could they be complemented or improved?

**“HIV MICROBICIDES: Rethinking Research Priorities and Outcomes”**

*RRI Key issues: gender*

As stated in the Gendered Innovations site of the case on “*HIV microbicides: Rethinking Research Priorities and Outcomes*”[[11]](#footnote-11), in the last years, both the European Union and the U.S. have invested to increase the number of women scientists and engineers[[12]](#footnote-12),[[13]](#footnote-13). However, from Gendered Innovations it is considered that women's participation is low in the STEM fields (i.e., science, technology, engineering, and mathematics), and they conclude that “increasing the number of women requires more than programs focused on removing subtle gender bias from hiring and promotion practices, stopping tenure clocks, leadership training, and the like; such interventions are necessary but not sufficient”. They also state that, in order to increase the numbers of women in STEM fields, research should be re-conceptualised so that it includes “methods of sex and gender analysis in creative and forward-looking ways”. They say that since the image of engineers and the offering of engineering education “focus narrowly on mathematics and science”, many girls and young women “are dissuades from pursuing engineering careers“[[14]](#footnote-14), and argue that engineering would be more appealing to women “if engineering images and education fore-grounded the social aspects of engineering alongside the technical.[[15]](#footnote-15),[[16]](#footnote-16) "

To prove this point, Gendered Innovations mentions the case of a mechanical engineering lab at the University of California that shifted its research focus from applied physics to biomedical engineering and changed its research goals from “understanding the physics of a problem to developing models that could be used to evaluate devices or treatments for medical conditions”. Over the period of a decade, the lab researchers were a majority of women.

**Context** **information**

More than 36 million people worldwide live with HIV[[17]](#footnote-17). Gendered Innovations writes that most of the infections and related deaths happen in sub-Saharan Africa, where the prevalence of HIV infection among women aged 15-24 is about 8 times higher than that of men of the same age-group.[[18]](#footnote-18) The only woman-controlled HIV prevention option, the site states, is the female condom; however, it is detectable, requires partner consent, and is less available and more expensive than the male version.[[19]](#footnote-19)

According to Gendered Innovations, the lab from the University of California was able to develop a woman-controlled HIV protection because they understood in this context why HIV has a higher incidence in them. The result of the research is a vaginal gel that provides an HIV microbicide.

As a conclusion, the site writes that research priorities “have a profound effect on who will perform research”, as exemplified with the case of HIV microbicides at the mechanical engineering lab from the University of California: in that instance, “research priorities related to improving women's and men's health increased the representation of women in the lab”. The Gendered Innovations site concludes that “it is possible that changing research priorities in engineering could increase the representation of women in the field overall”.

**Learning objectives**

* To identify the gender issues involved in this project
* To describe which gender policies should be implemented: equal opportunities for women and men in this research
* To discuss which gender issues should be taken into account in the research content
* To analyse why the gender balance changed and what effect it had on the project

**Reflection questions**

* Do you think the case presented is a good example of research done responsibly? Why?
* Does this case reflect on gender roles and stereotypes?
* Does this case present gender equality in a biased way?
* Can you think of arguments against gender equality in research? Could there be problems related to imposed quotas or to positive discrimination (aka affirmative action)?
* What ethical problems could arise from the research presented?
* Are there other ways of increasing the number of women in engineering? Are these ways based on gender stereotypes?
* Does this case include enough different perspectives? How could they be complemented or improved?

**“MALVECBLOK Project”**

*RRI Key issues: gender*

As the World Health Organisation (WHO) reports, there were 212 million malaria cases worldwide in 2015, most of which occurred in the WHO African Region (90%)[[20]](#footnote-20),[[21]](#footnote-21). Malaria is caused by the parasite Plasmodium and is transmitted to humans by the mosquito *Anopheles gambiae* s.s. The strategies currently used to control mosquito populations are insecticides and mosquito nets, but the appearance of resistance and the lack of new insecticides hold up its control[[22]](#footnote-22).

The European project MALVECBLOK[[23]](#footnote-23), composed of three European countries and two African teams, wanted to get an integrated view of mosquito immunity and reproduction and to establish the mosquito interaction with the parasite in order to provide a new vision for malaria control.

The project aimed to consider, when studying the reproduction of the malaria mosquitos, the different gender roles in society (for example, that men and women interact differently with water, where the mosquito reproduces). These differences can be relevant because vulnerability to the disease and access to treatment tend to vary between men and women. According to the “Gender and Health” report (Module 2, Field 1) of the “Gender in EU funded research” website[[24]](#footnote-24), “a careful gendered analysis of how the outcomes can be used to actually improve disease control will be necessary. The success of any disease control programme depends on a gender-sensitive approach”.

**Learning objectives**

* To identify the gender issues involved in this project.
* To describe which gender policies should be implemented: equal opportunities for women and men in this research.
* To discuss which gender issues should be taken into account in the research content.

**Reflection questions**

* Do you think the case presented is a good example of responsible research? Why?
* Does this case reflect on gender stereotypes and roles?
* Can you think of arguments against including a gender perspective in research? Is it necessary for all sorts of research projects?
* Could including a gender perspective in research favour bias in its findings?
* How is gender portrayed in the research project presented? Which cultural and social issues are involved in it?

***Casas Maternas* in the Rural Highlands of Guatemala: A Mixed-Methods Case Study of the Introduction and Utilization of Birthing Facilities by an Indigenous Population**

*RRI Key issues: sustainability, inclusive science and gender*

In Guatemala, the NGO “Curamericas” established birthing facilities (or “*casas maternas*”) in an isolated region of the country with the aim to help reduce the high maternal mortality rate of indigenous women living there, who traditionally gave birth at home. This was achieved by providing “local access to community-based, culturally appropriate maternal services for routine deliveries”, according to the website of the [Communication Initiative Network](http://www.comminit.com/global/content/casas-maternas-rural-highlands-guatemala-mixed-methods-case-study-introduction-and-utili).

This website explains that the maternal mortality rate in Guatemala for indigenous women is twice as high as non-indigenous women. These days, after the construction of birthing facilities, “birth attendants are encouraged to bring patients for delivery at *Casas Maternas*, where trained staff are present and access to referral care is facilitated”. A study was conducted with 275 women surveyed and, together with *casas maternas*, volunteers visited homes to encourage the use of the facilities. The website says that various actors were identified as stakeholders, including the women delivering, midwifes and partners.

The [article](http://www.ghspjournal.org/content/ghsp/4/1/114.full.pdf) published in “Global Health: Science and Practice” states that Curamerica’s initiative strengthens maternity care and “has potential to increase health facility utilization in isolated mountainous areas inhabited by an indigenous population where access to government services is limited and where maternal mortality is high”.

According to the [World Health Organisation](http://www.who.int/mediacentre/factsheets/fs348/en/), “maternal mortality is higher in women living in rural areas and among poorer communities”. “Skilled care before, during and after childbirth can save the lives of women and new-born babies”.

**Bibliography:**

* <http://www.ghspjournal.org/content/4/1/114.full>
* <http://www.comminit.com/global/content/casas-maternas-rural-highlands-guatemala-mixed-methods-case-study-introduction-and-utili>
* <http://curamericasguatemala.blogspot.com.au/>
* <http://www.who.int/mediacentre/factsheets/fs348/en/>

**Learning objectives**

* To identify the stakeholders involved and assess the benefits of their inclusion.
* To reflect on the role of inclusion of marginalized communities and its possible impacts.
* To discuss the methods used to involve society in this kind of projects.

**Reflection questions**

* How do you think community engagement impacts a society?
* What are the possible social impacts of this project? And in the demography?
* What aspects of RRI can you see in this case? How are these aspects achieved and worked on?
* Do you think this project is “responsible”? In what way?
* What is the role of stakeholder engagement? How does it contribute to this project?

**SUSTAINABILITY**

**IMRR – “Integrated and sustainable water management of Red-Thai Binh Rivers System in changing climate”**

*RRI Key issues: sustainability and inclusive science*

The Red-Thai Binh Rivers basin is the largest in Vietnam, supplying for a total population of 26 million people[[25]](#footnote-25). This region is growing economically and in population numbers very fast. In this context, and with the aim to develop “strategies for the sustainable management of the Red-Thai Binh rivers system”, the IMRR project[[26]](#footnote-26),[[27]](#footnote-27) has been launched. This project intends to meet “Vietnamese society's long-term needs for water resources while maintaining essential ecological services and improving the economic benefits from hydropower production and agriculture”, so the initiative claims to “combine coordinated decision-making and stakeholder participation, supported by advanced modelling and optimization tools, and capacity building in local institutions”85.

Previously, according to the project’s information, there had been water shortages (and many problems derived from it) due to the “lack of coordination and inefficient operation of the reservoirs” 85. That is why the IMRR states that it wants to promote a participatory approach to include relevant stakeholders from different fields and ensure that Vietnamese institutions are given the tools and capacities to manage the Red River basin.

The IMRR project is funded by the Italian Ministry of Foreign Affairs (cooperation program).

**Learning objectives**

* To identify the stakeholders involved in the project
* To discuss the outcomes and possible use of the project for stakeholders
* To analyse the methodology used to obtain the results
* To understand the importance of public engagement in science and innovation practices
* To assess the sustainability of the project and possible environmental impacts

**Reflection questions**

* Do you think the case presented is a good example of research done responsibly? Why?
* Do you think that the data presented by the IMRR project could be biased?
* What is the role and possible importance of public engagement? How did public engagement contribute to this project? Can you think of negative environmental impacts of this project? And political impacts?
* Why do you think the Italian government funds such a project applied in Vietnam? Could this have negative impacts for the Vietnamese authority?

**The “KlimaAlltag” project**

*RRI Key issues: sustainability and inclusive science*

According to the “KlimaAlltag” project[[28]](#footnote-28), organised by the Institute for Social-Ecological Research (ISOE) in Frankfurt am Main, CO2 emissions come substantially from daily requirements of private households, these being the third source of CO2 (15%) only after the energy industry (25%) and transports (23%), and followed closely by the food industry (14%)[[29]](#footnote-29).

On this line, researchers from the “KlimaAlltag” project studied from 2010 to 2013 how daily behaviours varied in different social strata and tried to promote lifestyles and choices more environmentally sensitive. “KlimaAlltag” main focuses were on “mobility, nutrition, home living and household energy consumption”[[30]](#footnote-30).

The “KlimaAlltag” research did field tests and empirical surveys to households’ members, who also received climate-consultant advice for the following half year. According to the project leader, Immanuel Stieß, “more than half of those surveyed were basically ready to make changes in their behaviour”, and he adds that actions like “choosing green energy, buying seasonal and regional food, and using buses and trains more often” could decrease CO2 emissions by 10-15%.

“KlimaAlltag” explains in its leaflet[[31]](#footnote-31) that “the course and results of the field study were carried out and evaluated under scientific supervision”, and that they checked whether municipal climate protection measure would be possible and effective through a survey of 1000 people.

**Learning objectives**

* To identify the stakeholders involved in the project at all levels
* To understand the importance of public engagement in science and innovation practices
* To discuss the reason and methods used to involve society in this kind of projects
* To discuss the initial objectives and effectiveness of this program
* To assess the sustainability of the project and possible environmental impacts

**Reflection questions**

* Do you think the case presented is a good example of research done responsibly? Why?
* Do you think that the data presented by the “KlimaAlltag” organisers could be biased?
* Is the data presented applicable only in Europe or is a trend around the world?
* What is the role and possible importance of public engagement? How did public engagement contribute to this project?
* What stakeholders were involved in the research? Why have they been selected?
* Can you think of possible negative environmental impacts of this project? Have they been taken into consideration?
* How could the inclusion of more perspectives improve the overall project?

**The PIER project: “Public Involvement with Exhibition on Responsible Research and Innovation”**

*RRI Key issues: sustainability and inclusive science*

The PIER project[[32]](#footnote-32) was a European project of the 7th Framework Programme, which, according to the CORDIS website[[33]](#footnote-33), aimed to engage the public in Responsible Research and Innovation in society. As it is said in their report, the project developed an exhibition on the topic of Marine Research in the Mediterranean Sea. The exhibition was designed through several participatory activities to involve stakeholders, researchers, politicians, and the wider public. The PIER project wanted to enhance the importance of responsibility in research and to highlight the implications research can have on local development and on the quality of life of the citizens.91

As is described in their report, the involvement of the public and the experts started in the early stages of the project, with the realisation of workshops and focus groups. Citizen participation helped researchers decide the main topics of the exhibition, which were: fishery and aquaculture, biodiversity, energy from the sea, preventing disasters, new materials from the sea and safe maritime transportations.

The report mentions that the public was involved in questions related to responsible aspects of the Marine research: “how much personal behaviours can affect marine ecosystems, in terms of food selection, of waste disposal, on tourism activities, but also what people can do to improve the health of the Ocean, how people can have their say on research and policies related to the seas, how personal engagement can be strengthened, and how to get access to reliable scientific information and facts.”92

The project developed an exhibition with a participatory programme to engage the larger public in their achievements, for which it included different communication and participation channels like hands-on exhibits, prototypes, videos and multimedia products.

**Learning objectives**

* To understand the role of public engagement in science and innovation practices.
* To reflect on the role of science education in society and its possible impacts.
* To discuss the methods used to involve society in this kind of projects.
* To assess the possible environmental impacts of the project.

**Reflection questions**

* Do you think the case presented is a good example of research done responsibly? Why?
* What aspects of RRI can you see in this case? How are these aspects achieved and worked on?
* What is the role and possible importance of public engagement? How does public engagement contribute to this project?
* What is the role and possible importance of science education in this project?
* How can you promote reflection on R&I and its impacts in science education projects?
* Can you think of arguments against public engagement in science? What about science education?
* How can you promote reflection on R&I in the exhibition?
* What are the possible environmental impacts of this project?

**“MOSQUITO ALERT”**

*RRI Key issues: sustainability and inclusive science*

According to the European Centre for Disease Prevention and Control[[34]](#footnote-34), the tiger mosquito (Aedes albopictus) is an **invasive species and a** vector of diseases originating in Southeast Asia. Its habitat is mainly in urban areas where it breeds in small vessels or containers of stagnant water. According to the Mosquito Alert website[[35]](#footnote-35), this mosquito was detected in Spain for the first time in 2004, near Barcelona, and now it is present all around the Mediterranean coast.

The **Yellow fever mosquito** (Aedes aegypti) is a species of African origin found in Africa and tropical and subtropical countries, and it is also a vector of diseases. This mosquito has also adapted to urban areas, but currently there are no populations of Aedes aegyptiin Spain. However, as it is stated in the Mosquito Alert website, the increase of the global mean temperature could favour the eventual appearance of this mosquito in Spain.

The diseases transmitted by these mosquitoes are caused by viruses (like the Dengue virus, the Chikungunya virus or the Zika virus) and can result in fever and joint and muscle pain, among other symptoms, and can lead to hospitalization[[36]](#footnote-36).

The Mosquito Alert project wants to fight the invasive species of the tiger mosquito and the yellow fever mosquito. The project claims that: “To prevent transmission of these diseases it is crucial to control the presence of these species, minimize them in areas where they reside and control its expansion. To do this, the cooperation of citizens, along with the work of scientists, governments and managers of vectors and vector-borne diseases is essential.”93

Mosquito Alert describes itself as a **citizen science platform** that aims to unite citizens, **scientists**and**managers** in the fight against mosquito-borne diseases. “With the Mosquito Alert app anyone can report a possible finding of a tiger mosquito and its breeding sites by sending a photo. A team of experts is in charge of reviewing and classifying the photos before making them public on a map. With this information, scientists are studying the distribution of these mosquitoes.”

**Learning objectives**

* The students should be able to:
* Understand the role of public engagement in science and innovation practices
* Analyse the methodology used to involve society and obtain the results
* Discuss the outcomes and possible use for stakeholders
* Identify the potential future impacts, social and environmental, of the project

**Reflection questions**

* Do you think the case presented is a good example of research done responsibly? Why?
* What aspects of RRI can you see in this case? How are these aspects achieved and worked on?
* What is the role and possible importance of public engagement? How does public engagement contribute to this project?
* What is the role and possible importance of citizen science?
* Can you think of arguments against public engagement in science? Could there be problems related to the development of the project and results?
* Is there a wide range of stakeholders involved? How does this affect the project?
* What are the possible social and environmental impacts of the Mosquito Alert project?
* Do you think it’s positive to involve citizens in mosquito detection? What are the possible outcomes of these involvement?

**“The MARLISCO project”**

*RRI Key issues: sustainability and inclusive science*

**The MARLISCO project (from “MARine LItter in European Seas: Social AwarenesS and CO-Responsibility”)[[37]](#footnote-37), is a European initiative of the Seventh Framework Programme that went from June 2012 to the end of May 2015. In its website[[38]](#footnote-38) it is said that the project’s objective was to “raise public awareness, facilitate dialogue and promote co-responsibility among the different actors towards a joint vision for the sustainable management of marine litter across all European seas”.**

**The project’s context was, according to their website, that marine litter was an emerging thread to the environment and human health, a problem that has arisen from our** production systems, consumption patterns, and waste management.

MARLISCO’s website97,[[39]](#footnote-39) states that it wanted to raise awareness about social behaviours and their consequences, to promote co-responsibility among relevant stakeholders, and to achieve collective solutions for the litter impact, among other goals. MARLISCO’s activities took place in the four European seas (North-East Atlantic, Baltic, Mediterranean and Black Sea), and included **a “study**of the sources and trends regarding marine litter in each regional sea”, a best-practices collection from consortium countries, an attitude survey of different actors about marine litter, a European video contest, national debates and tailor-made activities in each partner country.

**Learning objectives**

* To identify the stakeholders involved in the project at all levels
* To understand the importance of public engagement in science and innovation practices
* To discuss the methods used to involve society in this kind of projects
* To analyse the initial objectives and effectiveness of this program
* To assess the sustainability of the project and possible environmental impacts

**Reflection questions**

* Do you think the case presented is a good example of research done responsibly? Why?
* Do you think that the data presented at the MARLISCO website could be biased?
* Do you think this project could be applied to the rest of the world, or is it only relatable to the production, consumption and waste-management patterns of Europe?
* What is the role and possible importance of public engagement? How did public engagement contribute to this project?
* What is the role and possible importance of science education? Is this project a good example?
* What are the stakeholders involved in MARLISCO? Why have they been selected?
* What are the possible environmental impacts? Can you think of possible negative impacts?
* Can you think of ways of improving the project by including more perspectives? Which ones?
* Can you think of ways the MARLISCO project promotes reflection on the impacts (ethical, legal, environmental, social) of marine litter?

**ETHICS**

**“Adolescents in HIV research”**

*RRI Key issues: ethics*

According to the TRREE project[[40]](#footnote-40), HIV is still a huge burden of disease in many settings. Optimal HIV prevention will possibly require a combination of interventions which should be tailored to specific sub-groups.[[41]](#footnote-41) At the moment, there is considerable prevention research agenda and HIV prevention trials are being conducted worldwide.[[42]](#footnote-42)

Up until now, the majority of HIV prevention trials have involved adult participants. Adolescents around the world are considered to be the epicentre of the epidemic, or close to.101 They demonstrate a range of behaviours that increase their risk of acquiring an HIV infection, for example an early sexual debut, overlapping sexual partnerships and inconsistent condom use.4  Because of this high risk, adolescents are one the principal populations for intervening to reduce risk of HIV acquisition.[[43]](#footnote-43) This means that they are important targets for up and coming biomedical approaches for HIV prevention.103 The TRREE project states that “It is imperative that adolescents are able to access safe and effective interventions to address their pressing health problems, including risk of HIV acquisition.”

According to Rudy et al100, changes that occur during adolescence can make it difficult to extrapolate data obtained in adult trials. In this manner, adolescents should be involved in trials to collect specific data about this group and to improve understanding of adolescent responses to biomedical prevention technologies. Some characteristics of adolescence, such as poorer impulse control, can make their participation in trials complicated, especially when it comes to issues such as retention and reporting all of which can impact on the scientific validity of trial results. 100,[[44]](#footnote-44)

The challenge of adolescent populations is to ensure they are adequately represented and protected. Adolescent involvement in research trials for HIV prevention therefore requires attention to ethical challenges so adolescent trials meet high-level legal and ethical standards.

**Learning objectives**

* To discuss the ethical guidelines that should govern such trials
* To assess who should be involved in the design and outcomes of these trials
* To reflect on the ethics of involving adolescents in clinical trials and the possible risks involved, and how they should be prevented

**Reflection questions**

* Do you think the case presented is a good example of research done responsibly? Why?
* What aspects of RRI can you see in this case? How are these aspects achieved and worked on?
* Which cultural and social issues are involved in the execution of this project involving adolescents in HIV research?
* What ethical impacts should be anticipated in involving adolescents in clinical trials?
* What is the role of ethics in this project?
* Are there potentially harmful impacts of the project? How can they be prevented?

**“PPI PARKINSON’S”**

*RRI Key issues: ethics and inclusive science*

Parkinson's disease (PD) is a chronic and progressive movement disorder, meaning that symptoms continue and worsen over time. The cause is unknown, and although there is presently no cure, there are treatment options such as medication and surgery to manage its symptoms. As the World Health Organisation (WHO) states, about 1 in 500 people suffer from Parkinson's disease[[45]](#footnote-45), which means there are an estimated 127,000 people in the UK with the condition. Most people with Parkinson's start to develop symptoms when they're over 50, although around 1 in 20 people with the condition first experience symptoms when they're under 40.104

Parkinson’s UK is a charity that aims to contribute to better care, treatments and quality of life for people with Parkinson’s disease. They want to fund research that is relevant and beneficial to people affected by the condition. Therefore, they encourage researchers to work with patients and carers in designing, delivering and sharing their research. In this exercise, we will discuss some of the activity of this charity as a possible example of a good RRI practice. Specifically, we are interested in a pilot project run by Parkinson’s UK to facilitate involvement.[[46]](#footnote-46)

The main idea of the pilot project was the following: They sent an email to current grant-holders and co-applicants with an invitation to take part in the pilot, as well as advertising it in the Parkinson’s UK researcher e-newsletter. Eight research teams came forward, including a wide range of research projects and researchers. Fifty-two people affected by Parkinson’s were involved at five locations across the UK. These volunteers met with one or two researchers from one of the pilot projects. This allowed the researchers and volunteers to ask each other questions. The researchers were then encouraged to follow-up with the volunteers to seek further input.

According to Parkinson’s UK, there were three main ways in which the volunteers’ contributions made a difference to the research:

* Improving the written information about the research project.
* Improving the practical arrangements to make the research more feasible and acceptable for participants.
* Commenting on the ethical issues raised by the research.[[47]](#footnote-47)

**Learning objectives**

* To analyse the methodology used to obtain the results and involve society in the project
* To discuss the outcomes and possible use for stakeholders
* To identify the potential future impacts of the project
* To understand the role of public engagement in science and innovation practices
* To assess the ethical principles involved in this pilot project

**Reflection questions**

* Do you think the case presented is a good example of research done responsibly? Why?
* What aspects of RRI can you see in this case? How are these aspects achieved and worked on?
* What is the role and possible importance of public engagement? How does public engagement contribute to this project?
* (Which stakeholders are taking part in the public engagement activities and why have they been selected?)
* Can you think of arguments against public engagement in science? Could there be problems related to the involvement of patients in the setting of research agendas?
* Could different methods and techniques for engaging specific stakeholder groups in dialogue have been taken into consideration? Why?
* Are sufficient perspectives and participants included? How could one enrich the perspectives?
* What ethical impacts should be anticipated in this project?
* What is the role of ethics in this project?

**Responsible, Inclusive Innovation: a documentary on the Buchu Plant**

*RRI Key issues: sustainability, inclusive science and ethics*

The [ProGReSS project](http://www.progressproject.eu/) (PROmoting Global REsponsible research and Social and Scientific innovation) wanted to establish a global network on RRI “involving academia, SMEs, international organisations, policy advisors, research funders, NGOs and industry”. The project sought to connect “existing international networks of RRI with relevant societal actors”, to “compare science funding strategies and innovation policies in Europe, the US, China, Japan, India, Australia and South Africa”, to “advocate a European normative model for RRI globally”, and to foster “the convergence of regional innovation systems at the global level”.

The project developed the [documentary “Responsible, Inclusive Innovation - The Buchu Plant](https://www.youtube.com/watch?v=Nk_Tl7dK5O0)”. The film talks about the San people of Southern Africa, a marginalised community with deep knowledge on medicinal plants. The narrative focuses on the Buchu plant and its many uses. The film includes interviews with San people talking about the plant, its history, spirituality, and role in the San community. Other interviews include a pharmaceutical representative, a researcher, a professor from Cape Town University, and a San Legal representative. According to ProGReSS, the film was made to “show how traditional knowledge holders can collaborate with responsible entrepreneurs and scientists to drive inclusive innovation”.

The United Nation’s General Assembly “Report of the Special Rapporteur on the situation of human rights and fundamental freedoms of indigenous people[[48]](#footnote-48)”, focused on the indigenous peoples in Botswana (including the San), states that initiatives to address “marginalisation in political spheres and a history of underdevelopment” are important but “still suffer from a variety of shortcomings and need to be designed and implemented in a manner that recognizes and respects cultural diversity and (…) identities”.

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**Learning objectives**

* To reflect on the role of inclusion of marginalized communities and its possible impacts.
* To discuss the methods used to involve society in this kind of projects.
* To identify the stakeholders involved and assess the benefits of their inclusion.

**Reflection questions**

* What aspects of RRI can you see in this case? How are these aspects achieved and worked on?
* Do you think this project is “responsible”? In what way?
* What is the role of stakeholder engagement? How does it contribute to this project?
* Do you think this film is a good vehicle to promote reflection on R&I?
* Do you think this film helps the marginalised community? In what way?
* What are the possible environmental impacts of this project? And social impacts?

**UCL CHANGEMAKERS: Fostering Multiple Abilities through Sensory Object Engagements**

*RRI Key issues: inclusive science*

[UCL ChangeMakers](http://www.ucl.ac.uk/changemakers) promotes collaboration and innovation to improve the learning experience at UCL (University College London). This programme encourages students to work together with university staff, undertaking projects to benefit the UCL community, by providing funding and support. This method benefits both the students, by allowing them to become more engaged, responsible and pro-active; and the university, which gains the expertise and enthusiasm of the students to contribute to making UCL better.

**Fostering Multiple Abilities through Sensory Object Engagements** was a student-initiated project that took place during 2015-2016. The project parted from the question “What are the potential learning benefits of museum objects for students with specific learning disabilities?” with the aim of improving teaching techniques, especially those oriented towards students with learning disabilities. The idea was that education is very often text heavy, and this can sometimes be an obstacle for those who are visual learners or have more specific learning needs.

The hypothesis was discussed in various group sessions, and the students then held an open workshop, held at an Art Museum at UCL. The workshop was called “making teaching more accessible and learning more engaging”. According to the report, the workshop showed that “Using objects encourages students to think more laterally and actually apply the knowledge they have, forming stronger memories of the material. Using museum objects in seminars also engages student’s natural curiosity – encouraging students to speak up in class and share their ideas.” The participants were asked to offer feedback on the objects provided so the students could “proceed further with integrating tactile and kinaesthetic learning and if, where and how it would be viable to adopt this as a regular practice in teaching.”

The project showed that using museum objects in teaching could significantly improve learning experiences, making them much more enjoyable and accessible to all students, not just those with learning disabilities. The participants expressed that the objects might be especially useful in science and history classes, for example to show how science and technology have evolved over time. The props were seen to help conversation flow and intellectual discussion.

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**Learning objectives**

* To identify the stakeholders involved and assess the benefits of their inclusion.
* To discuss the outcomes and possible use of the project for stakeholders.
* To assess the possible social and educational impacts.
* To discuss the methods used to involve society in this kind of projects.

**Reflection questions**

* What are the possible social impacts of this project?
* Do you think this project helps the student community? In what way?
* What aspects of RRI can you see in this case? How are these aspects achieved and worked on?
* Do you think this project is “responsible”? In what way?
* What is the role of stakeholder engagement? How does it contribute to this project?

**INCLUSIVE SCIENCE**

**“AMBIACT”**

*RRI Key issues: inclusive science*

According to the case study on Responsible Research and Innovation about Information and Communications Technology for Ageing People, the Ambiact is a smart meter designed to be placed in any power outlet, with an appliance to be plugged in to the Ambiact itself[[49]](#footnote-49). If the appliance is not used for a certain amount of time (generally, for more than 24 hours), the Ambiact will automatically generate an emergency call. This devise would provide elderly people who live alone with improved home safety and quality of life.[[50]](#footnote-50)

The Ambiact project claims that interviews were conducted during the whole product development in order to design the device according the people’s needs. The interviewees included social alarm customers and alarm operators. At the same time, the project also conducted two 13-months field trials involving approximately 100 people, where men and women were equally represented and where people with disabilities were also included. Results from these interactions were made publicly available and were used by the project in lectures, scientific talks and public presentations.[[51]](#footnote-51),[[52]](#footnote-52)

With its results, Ambiact concluded in its report that “the impact achieved by the project was the development of an innovative and patented product which is accepted by both the customer (e.g. care providers) and the end-user. It is currently sold by a start-up company, the Oldntec GmbH, to social alarm operators in Germany”.

**Learning objectives**

* Analyse the methodology used to obtain the results and to involve society in the project
* Discuss the outcomes and possible use for stakeholders
* Identify the potential future impacts of the product development
* Understand the importance of public engagement in science and innovation practices

**Reflection questions**

* Do you think the case presented is a good example of research done responsibly? Why?
* What aspects of RRI can you see in this case? How are these aspects achieved and worked on?
* Can you think of possible negative impacts of this product? If so, which ones?
* Do you think people could feel that Ambiact violates their privacy?
* What is the role and possible importance of public engagement? How does public engagement contribute to this project?
* Which stakeholders are taking part in the public engagement activities and why have they been selected?
* Can you think of arguments against public engagement in science?
* Could different methods and techniques for engaging specific stakeholder groups in dialogue have been taken into consideration? Why?
* Are sufficient perspectives and participants included? How could one enrich the perspectives?

**“Mobile Education DNA Labs”**

*RRI Key issues: inclusive science*

The Article titled “Genomics Education in Practice: Evaluation of a Mobile Lab Design The DNA-Labs” explains that the gap between scientific research and school science is ever wider, and due to the rapid progresses in many fields, school education finds it difficult to keep up with all the new advances.[[53]](#footnote-53)

The initiative “DNA labs on the road” started in 2006 in the Netherlands as an extracurricular development activity to fill this gap between school science and scientific research, and to empower the students, the future citizens, to deal with these personal and societal science decisions. According to the DNA labs project[[54]](#footnote-54), the workshops organised offer students the opportunity to experience scientific research through experiments with equipment that usually is not available in schools, while at the same time, they place scientific research in a relevant societal context.111

In these DNA labs, teacher and student manuals were developed for each activity and given in advance of the introductory lessons, which were taught by teachers at the schools before the “lab” itself. The practical part of the lab was taught by visiting university students, who were previously trained by the institutions involved. The labs were offered free of charge to all secondary schools in the Netherlands. From the start of the project, the article reveals, the five mobile labs reached 54.000 students in 342 different schools.111

The DNA Labs were evaluated on their quality, learning outcomes and effect on the attitude of the students towards genomics applications through questionnaires and some personal interviews (also with teachers).111

**Learning objectives**

* The students should be able to:
* Understand the role of public engagement in science and innovation practices
* Evaluate the role of science education in schools, in science and innovation practices
* Identify the future impacts of this project
* Discuss the methods used to involve society in this project.

**Reflection questions**

* Do you think the case presented is a good example of research done responsibly? Why?
* What aspects of RRI can you see in this case? How are these aspects achieved and worked on?
* What is the role and possible importance of public engagement? How does public engagement contribute to this project?
* Do you think this project could be applicable around Europe? And around the world? If so, how?
* Do you think this project is a good tool to promote scientific careers among youngsters? Why?
* What is the role and possible importance of science education in this project?
* Which stakeholders are taking part in the education activities and why have they been selected?
* How can you promote reflection on R&I and its impacts in science education projects?
* Can you think of arguments against public engagement in science? What about science education?

**Sustainability in Prisons Project (SPP)**

*RRI Key issues: sustainability and inclusive science*

The [Sustainability in Prison Project](http://sustainabilityinprisons.org/) (SPP) is an initiative from the Evergreen State College (Washington) and Washington State Department of Corrections. Their mission is, according to their website, “to bring science, environmental education, and nature into prisons”. They “conduct ecological research and conserve biodiversity by forging collaborations with scientists, inmates, prison staff, students, and community partners”, while at the same time, “help reduce the environmental, economic, and human costs of prisons by inspiring and informing sustainable practices”. Ultimately, the SPP wants to help incarcerated people rebuild their lives.

Currently, the SPP has several programmes involving different actors, such as the “Beekeeping & Pollinator Landscapes” programme, the “Environmental Engagement Workshop Series”, the “Taylor’s Checkerspot Butterfly Rearing” and the “Western Pond Turtle Rehabilitation” programmes. They claim that all their programmes have five components: 1) Partnerships and collaborations with multiple benefits, 2) Bringing nature “inside”, 3) Engagement and education, 4) Safe and sustainable operations, and 5) Evaluation, dissemination and tracking.

As stated in their website, the SPP is funded by different conservation organizations and state and federal agencies, such as the Washington State Department of Corrections, the Centre for Natural Lands Management, or the Institute for Applied Ecology. The SPP publishes a biannual newsletter and has a Facebook page.

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* <https://www.facebook.com/sustainabilityinprisons/>

**Learning objectives**

* To identify the stakeholders involved and assess the benefits of their inclusion
* To discuss the outcomes and possible use of the project for stakeholders
* To assess the sustainability of the project and possible environmental impacts

**Reflection questions**

* In what ways do you think the SPP is “Responsible”? Do you think it is also “Irresponsible” in other ways?
* Do you think the SPP is a good example of research done responsibly? Why?
* What is the role of public engagement in this project? Who is it involving and why?
* Can you think of negative environmental impacts of this project? And political impacts?
* Who is this initiative addressed to?

**CROSSCULT: Where History meets IT**

*RRI Key issues: inclusive science*

**“Nothing in History occurs just because one person causes one event. Everything has to be understood in a wider context. “**

[CrossCult](http://www.crosscult.eu/) is a project that has received funding from the European Union's [Horizon 2020](https://ec.europa.eu/programmes/horizon2020/) research and innovation programme. The aim of CrossCult is to “better understand and reinterpret history and culture”, as they describe in their website. The project describes itself as “empowering reuse of digital cultural heritage in context-aware crosscuts of European history”, to provoke a change in the way citizens of Europe view history.

The idea is that history is a complex web of interrelated events and facts, not a collection of unconnected happenings, which is how it is often taught. The project plans to change people’s views on what they have learnt by providing them with “pieces of cultural heritage, other citizens' viewpoints and physical venues”. In this manner, CrossCult aims to promote reflection amongst citizens, helping them to reinterpret history in a wider and more global way.

CrossCult considers that the way history is taught in school and universities is lacking in certain aspects such as “cross-border cultural aspects and global views”. According to their website, the experiences they have designed aim to: raise consciousness, give an overview of historical events from multiple perspectives, approach history via alternative sources (archaeological remains, iconography, epigraphy, numismatics, architecture, art, etc.) and transmit the fact that there can be many contrasting viewpoints in history.

The project uses technology and mobile apps as a tool to reach citizens across Europe. The project states in their website that the idea is to “connect people to digital and physical historical artefacts and in different places across Europe”. The end products will be a semantic knowledge base that “interrelates an unrestricted set of (existing and future) digital cultural heritage resources and venues across different repositories, on the grounds of common properties or crosscutting, transversal concepts”, and also to “design business models and plans for the exploitation of the project results in collaboration with a new network of researchers, scholars, ICT professionals and specialists of digital heritage.”

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* [**http://www.crosscult.eu**](http://www.crosscult.eu)

**Learning objectives**

* To identify the stakeholders involved and assess the benefits of their inclusion
* To assess the possible social and political impacts
* To analyse the methods used to involve society in this kind of projects
* To discuss the outcomes and possible use of the project for stakeholders

**Reflection questions**

* What are the possible social impacts of this project?
* What aspects of RRI can you see in this case? How are these aspects achieved and worked on?
* Do you think this project is “responsible”? In what way?
* What is the role of stakeholder engagement? How does it contribute to this project?

**ANNEX 2. ISSUE CARDS**

**ISSUE CARD 1**

**Responsibility**

Which factors of responsibility, as pointed out in the concepts of RRI, can you detect in this case? How are these aspects achieved and worked on?

**ISSUE CARD 2**

**Responsibility**

Do you think this case presented is a good example of research done responsibly? Why?

**ISSUE CARD 3**

**Responsibility**

Can you detect any implications (e.g. ethical) in this case? How would you describe these implications? Why are they implications and for whom?

**ISSUE CARD 4**

**Responsibility**

Who should be held responsible for applications resulting from the described process?

**ISSUE CARD 5**

**Responsibility**

Who should be responsible if the described process goes wrong?

**ISSUE CARD 6**

**Responsibility**

Who should be held responsible for applications resulting from the described process?

**ISSUE CARD 8**

**Responsibility**

What other impacts can we anticipate?

**ISSUE CARD 7**

**Responsibility**

How will the risk and benefits be distributed?

**ISSUE CARD 9**

**Inclusive Science**

Which (other) stakeholders could be involved in the described process/case?

**ISSUE CARD 11**

**Inclusive Science**

Which societal actors could be directly affected by the described case? How could they be affected?

**ISSUE CARD 10**

**Inclusive Science**

How can a broader public be involved in the described process/case?

**ISSUE CARD 12**

**Inclusive Science**

Which societal domains could be directly affected by the described case? How could they be affected? How could the described process/case be made more responsible?

**ISSUE CARD 15**

**Inclusive Science**

What stakeholders were involved in the research? Why have they been selected?

**ISSUE CARD 14**

**Inclusive Science**

What is the role and possible importance of public engagement? How did public engagement contribute to this project?

**ISSUE CARD 13**

**Inclusive Science**

Does this case include enough different perspectives? How could the inclusion of more perspectives improve the overall project?

**ISSUE CARD 19**

**Inclusive Science**

What is the role and possible importance of citizen science?

**ISSUE CARD 16**

**Inclusive Science**

What is the role and possible importance of science education in this project?

**ISSUE CARD 20**

**Inclusive Science**

What are the possible outcomes of involving citizens in research?

**ISSUE CARD 21**

**Inclusive Science**

Could different methods and techniques for engaging specific stakeholder groups in dialogue have been taken into consideration? Why?

**ISSUE CARD 17**

**Inclusive Science**

How can you promote reflection on R&I and its impacts in science education projects?

**ISSUE CARD 22**

**Gender Equality**

Does the case presented reflect on gender roles and tasks/ stereotypes typically attributed to men/women?

**ISSUE CARD 23**

**Gender Equality**

Do you think this case presents gender equality in a simplistic way? How could it be improved?

**ISSUE CARD 24**

**Gender Equality**

Can you think of arguments against gender equality in this specific case?

**ISSUE CARD 18**

**Inclusive Science**

Can you think of arguments against public engagement in science? What about science education?

**ISSUE CARD 25**

**Gender Equality**

Could this case reinforce gender stereotypes? Could it neglect other collectives?

**ISSUE CARD 26**

**Gender Equality**

Is it necessary for all sorts of research projects to include gender equality? Could including a gender perspective in research favour bias in its findings?

**ISSUE CARD 27**

**Gender Equality**

How is gender portrayed in the research project presented? Which cultural and social issues are involved in it?

**Sustainability**

**Sustainability**

**ISSUE CARD 29**

**ISSUE CARD 30**

**ISSUE CARD 31**

**Ethics**

Do you think that the data presented by the case could be biased?

**ISSUE CARD 32**

**Ethics**

What is the role of ethics in this project?

**ISSUE CARD 33**

**Ethics**

What ethical impacts should be anticipated in this project?

**ISSUE CARD 28**

**Sustainability**

What are the possible environmental impacts of this project? Can you think of possible positive/negative impacts?

Can you think of ways this project promotes reflection on the impacts (ethical, legal, environmental, social) of it?

Do you think this project could be applied to the rest of the world, or is it only relatable to the production, consumption and waste-management patterns of Europe?

**ISSUE CARD 34**

**Ethics**

Can you think of the political impacts of this project?

**ISSUE CARD 35**

**Ethics**

What ethical issues could arise from the research presented? What about privacy data?

**ISSUE CARD 36**

**Ethics**

What ethical impacts should be anticipated in this project?

**ANNEX 3. CONVERSATION CARDS**

I agree

I disagree

I would like to present a new idea

I want to add information

I want to ask a question

I want to answer

I want a clarification

I want further information

**ANNEX 4. GUIDELINES TO DEFINE EVALUATION CRITERIA AND INDICATORS**

|  |  |
| --- | --- |
| 1. **Gender Equality** | |
| **Criteria** | **Indicators** |
| **Example: Gender Equality in the research group** | * Percentage of women that are principal investigators on a project * Percentage of women that do a PhD versus percentage of women in PI positions |
| **Strategies to ensure that women are not discriminated during recruitment processes** | * No data about gender in CV |
|  |  |
| 1. **Sustainability** | |
| **Criteria** | **Indicators** |
| **Example: Waste management** | * Quantity of waste * Monitoring of management in waste plants * Availability of recycling bins in the facilities * Campaigns to raise awareness of the importance of recycling |
|  |  |
| 1. **Inclusive Science** | |
| **Criteria** | **Indicators** |
| **Example:**  **Competence building** | * Training of scientists / engineers |
| **Strategies to foster inclusion in the research environment** | * Accessible space for people using wheel-chairs |
|  |  |
| 1. **Ethics** | |
| **Criteria** | **Indicators** |
| **Example: Research integrity** | * Compliance of international research integrity standards * Integrated ethics committee in research centre |
|  |  |

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