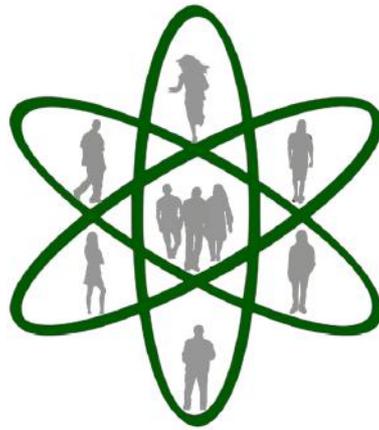


RRIL - Presentation of the Course:

Introduction to Responsible & Sustainable Innovation

Karsten Krüger (Coord.)



***RRIL - Presentation of the course:
Introduction to Responsible & Sustainable Innovation***

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Presentation of RRIL - Responsible Research and Innovation Learning

Responsible Research & Innovation is a genius concept developed by the European Commission for the governance of research and innovation processes with a view on the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products. It aims to shape, maintain, develop, coordinate and align existing and novel research and innovation-related processes, actors and responsibilities with a view to ensuring desirable and acceptable research outcomes.

In the Horizon 2020 programmes, there were and are some projects focusing on related training needs. But there is no substantial attempt observable to develop continuous higher education programmes supporting the implementation of this concept and the respective reorganisation processes in universities, research centres, research and innovation oriented enterprises and public authorities like cities or regional governments. This project pretends to fulfil this gap through the co-creation of higher education modules between different research and innovation actors.

RRIL especially focus on public engagement, gender equality and ethics (in the knowledge fields Energy and Economy) testing the learning modules in innovative environments based on interactive real-problem approaches. The modules developed are offered to research and innovation actors supporting the implementation of RRI principles in the organisations capacitating the learners to develop jointly innovative solution for societal problems.

RRIL is based on co-creation and open innovation processes giving a prominent role to the learners. The co-creation is conceived as multidisciplinary and transversal among different kinds of actors as HEI, research centres, NGO's and cities paving the way for knowledge exchange between them. It consists in informed learning among practitioners considering learners as a knowledgeable and critical partners in designing and implementation of the learning means. Under this perspective, the potential learners – programme coordinators and tutors - are considered peers working collaboratively on the project outputs.

RRIL - consortium

Universitat Rovira i Virgili (Coordinator).

Tampere University

Kozminski University

NOTUS applied social research.

Fundació Tarragona Smart Mediterranean City.

INGOS - Institute of Innovative Economy .

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Preface

Responsible research and innovation (RRI), as an integrated concept, is being promoted by the European Union since 2010 and forms part of the Horizon 2020 in the area of science with and for society. Although the issue of responsibility in research and innovation has been discussed for some time before especially in North America, Great Britain, and the Netherlands, it is a concept genuinely developed by the European Commission at the end of the 2000's for the governance of the science and technology complex from the political level. So far it forms part of the answer of the European Commission to the changes in the configuration of the democratic processes to steer societal processes, in which the private actors gained relevance. However, recently the RRI as guiding vision lost relevance in favour to other concepts as the Sustainability Goals of the UN, which, however, covers the core principles of RRI. For this reason, we decided to anchor RRI in sustainability and enrich it towards Responsible & Sustainable Innovation (ReSI).

RRI is formed by five strategic dimension: public engagement, gender equality, science education, open science and ethics, to which the transversal dimension of governance is added to develop harmonious governance models and institutional strategies. The project developed learning courses for three of these dimensions: public engagement, gender equality and ethics, to which we add an introductory course to ReSI.

The goal of the learning programme is to support the integration of these core aspects of RRI and sustainability in science-based innovation processes. The main target groups are academics involved in science-based innovation processes or students as future academics or agents of innovation e.g. in business, NGOs, local and regional authorities.

The integration of the programme in the learning offers of higher education will support the promotion of responsibility in innovation processes in universities. The participating Higher education institutes will do so in the next academic years. The use of the creative Commons licences Attribution-NonCommercial-ShareAlike allows other higher education institutions to integrate the whole programme (or parts of them) in their learning offers. Although the courses are designed as a holistic programme, they can be used separately.

In this document, we present briefly the programme and then in some more detail the course Introduction to Responsible & Sustainable Innovation.

The learning program

Fiche				
Title	Responsible and Sustainable Innovation: Learning Programme			
Leading Organisations	University Rovira i Virgili, Kozminski University; Tampere University			
Target group	Master Students, PhD students, others as agents of change of municipalities, NGOs, Business etc.			
N° of students	20			
Language	English, also accessible in Spanish			
Requirements of participation	Medium Level of English/ Medium Level of Spanish			
Credits points	9 ECTS			
N° of lecturing hours	60 hours			
Mode	F2F	blended	Online	MOOC
		X	X	X
Learning Methods	Lecture, group work, workshop or others			
Evaluation	Quizzes Open questions Group discussions Case studies as group work using problem based approaches Design and realisation of interviews with experts			

Objective

The program aims at helping practitioners to understand and analyse the dynamics of science-based innovation processes and the integration of principles of responsible and sustainable innovation focusing on public engagement, gender equality and innovation ethics. The practitioner will learn the reasons of the development of Responsible Research & Innovation (RRI) and its further development to Responsible & Sustainable Innovation (ReSI). The program aims at helping the students to understand the dynamics of public engagement, the relevance of gender equality for the research processes and the tools for applying innovation ethics in science-based innovation processes. It provides the students with insight so that they can (a) reflect on their research and innovation already in early career stage; (b) anticipate intended and unintended consequences of their activities; (c) apply criteria of open science making transparent the intention of the research and innovation, the actors involved and their particular interest; and (d) involve the main stakeholders including the citizens in the deliberation processes from the beginning to the end of the science-based innovation process.

Structure

Course: Introduction to Responsible & Sustainable Innovation (ReSI)

Introduction.

Lecture1: Changes in Innovation Systems.

- Lecture 2: Multi-actor configuration and open innovation.
- Lecture 3: Answer to innovation dilemmas: Responsible Research & Innovation.
- Lecture 4: Responsible Research and Innovation.
- Lecture 5: Towards Responsible & Sustainable Innovation.
- Lecture 6: ReSI in practice.

Course: *Public Engagement in Responsible Research and Innovation*

- Introduction.
- Lecture 7: Public Engagement in Responsible Research and Innovation.
- Lecture 8: Innovation and Innovation Models.
- Lecture 9: Conceptualising Dimensions of Public Engagement.
- Lecture 10: Commercialisation of Research and Innovation and Public Engagement.
- Group Exercise and Learning Diary: Developing sustainable public engagement strategy.

Course: *Gendered Responsible & Sustainable Innovation (ReSI)*

- Introduction.
- Lecture 11: Gender Bias in Economic Research.
- Lecture 12: Gender Economics and Sustainability.
- Lecture 13: Gendered ReSI (including gender bias in energy and technology innovation).
- Lecture 14: Gender ReSi in Cities (with reference to energy use and mobility).
- Lecture 15: Gender Mainstreaming and Doughnut strategy.
- Group Exercise and Learning Diary: Gendered Responsible & Sustainable Innovation.

Course: *Ethics in Responsible and Sustainable Innovation*

- Introduction.
- Lecture 16: Tools to ensure societal relevance and ethical acceptability of RRI outcomes.
- Lecture 17: Corporate Social Responsibility.
- Lecture 18: Smart City & Responsible Technology.
- Lecture 19: Just Energy Transition.
- Group Exercise and Learning Diary: Ethics and General programme

Content

The first course introduces in **Responsible & Sustainable Innovation**, which anchored the concept of Responsible Research and Innovation (RRI) in Sustainability and the Sustainable Development Goals. The students will learn about

- the transformations of the innovation system towards quadruple helix configuration.
- the dilemmas, which academics must face, and how the concept of Responsible Research and Innovation have academics orientations to face these dilemmas.
- the need to anchored RRI in Sustainability and the Sustainable Development Goals. proposing the concept of Responsible & Sustainable Innovation (ReSI).

Based on this concept, the courses of public engagement, gender equality and innovation ethics has been developed. All three modules take as thematic reference points: economy, energy (including mobility) and urban development. The last topic indicates that the program insists in

the cooperation with municipal public administrations and policy makers considering cities as crucial to achieve the Sustainable Development Goals.

[<https://lor.instructure.com/resources/0c1fa583b6cb443e9b37d75403e56fbc>]

The course of **public engagement** aims at helping students to understand and analyse the dynamics of public engagement in the context of responsible research and innovation and its central elements. The students will be able to critically assess the strengths and weaknesses or advantage and disadvantages of public engagement in enhancing responsible research and innovation. The course insists in the relevance of public engagement for the implementation of the gender perspective and principles of innovation ethics already at the beginning of the innovation process. Students will work on a particular country/region innovation process case and analyse the major challenges and opportunities of public engagement of universities in transforming an innovation process to meaningfully respond to social, economic and political problems and come up with strategic and feasible solutions.

[<https://lor.instructure.com/resources/f17d06173ec14c61bccf80117e771fd8?shared>]

The course of **gender equality** aims to enable participants to integrate the dimension of gender equality and social vulnerability in science based innovation projects based on quadruple helix configuration, especially with the participation of municipal public administration and policy makers. Through the example of economy and technology (energy and artificial intelligence), it will arise the awareness of gender bias in science and innovation processes. The module insists in the interrelation with public engagement and innovation ethics to achieve the implementation of the gender perspective in science based innovation processes. It will reinforce the competences of the participants (defined in terms of knowledge, capacities, responsibility and autonomy) to integrate the gender and social vulnerability perspective in innovation projects and to evaluate and monitor their impact on gender equality and social vulnerability.

[<https://lor.instructure.com/resources/0aa23b741bac4f6a855057d12c8e17c1>]

The course of **innovation ethics** aims to enable students to introduce the ethical perspective in science based innovation processes, particularly in the fields of economy and energy with the focus on sustainability. It provides an overview of various tools, approaches, and methodologies such as the precautionary principle, International Standard ISO 26000, Value Sensitive Design, and participative technology assessment. It will arise the capability of the students to use in their projects, campaigns, or any other endeavours these and other tools reinforcing the ethic dimension of the innovation activities in close relation to public engagement and gender equality. It is based on the premise that to ensure social relevance and acceptability of any innovation, its impact should be evaluated at the early stages of the research process, including its possible unintended and unexpected consequences. Monitoring the innovation process could be enabled by sharing authorship and responsibility of the results with relevant social groups (citizens, policymakers, entrepreneurs, educators, etc.) who should be involved in all stages of the process while respecting the principles of gender balance.

[<https://lor.instructure.com/resources/eec37eb0a22d49a1bd5139b105f4194b?shared>]

The programme and its four courses used video presentation to introduce to the topic and subtopics, web texts, video with experts (generally from external sources), individual exercises (e.g., quizzes and open questions), participants' learning journals, and group works (e.g., simulation of project development, interviews with experts among others) using holistic approaches combining public engagement, gender and ethic. Each course includes group exercises for its specific topic, so that they can be used separately, but maintaining the holistic approach.

For more details of the content of the program, please consult the RRIL learning programme presentation at [RRIL project website](#) or the [project lab at research gate](#) or the [online learning programme](#).

Course: Introduction to Responsible & Sustainable Innovation

Fiche				
Title	Introduction to ReSI			
Leading Organisation	Universitat Rovira i Virgili			
Target group	Master Students, PhD students, others as agents of change of municipalities, NGOs, Business etc.			
Nº of students	20			
Language	English, also accessible in Spanish.			
Requirements of participation	Medium Level of English or Medium Level of English/Spanish			
Credits points	1 ECTS			
Nº of lecturing hours	3 hours			
Mode	F2F	blended	Online	MOOC
		X	X	X
Learning Methods	Lecture, group work, workshop or others			
Evaluation	Group presentation Videos Case studies			
Link to the course	https://lor.instructure.com/resources/0c1fa583b6cb443e9b37d75403e56fbc			

Objective

The introductory course aims at helping students to understand a) the dynamics of change in innovation systems and science based innovation processes towards open and user innovation, b) the implication for the researchers, c) how the European Commissions tries to steer the public funded innovation processes through the approach of Responsible Research and Innovation, d) that RRI requires a coherent anchor to steer research processes, which provides the three pillar model of sustainability and the Sustainable Development Goals (SDGs) of the Agenda 2030 of the United Nations (UN). The course provides the students with insight about the main dimension of RRI: reflection, anticipation, openness and inclusive deliberation, which are of main relevance to understand the outline of public engagement, gender equality and innovation ethics presented in the following courses.

Structure

Course: Introduction to Responsible & Sustainable Innovation (ReSI)

Lecture1: Changes in Innovation Systems.

Lecture 2: Multi-actor configuration and open innovation.

Lecture 3: Answer to innovation dilemmas: Responsible Research & Innovation.

Lecture 4: Responsible Research and Innovation.

Lecture 5: Towards Responsible & Sustainable Innovation.

Lecture 6: ReSI in practice.

Content

Following the principles of 'Responsible Research and Innovation (RRI)', this module introduces students to the concept of RRI enriched by the Sustainable Development Goals. For this reason, we are talking about Responsible & Sustainable Innovation (ReSI). The students will learn about

- the transformations of the innovation system and processes.
- the dilemmas, which academics must face, and how the concept of Responsible Research and Innovation have academics orientations to face these dilemmas.
- the need to anchored RRI in Sustainability and the Sustainable Development Goals, proposing the concept of Responsible & Sustainable Innovation (ReSI).

The course introduce to the concept of Responsible and Sustainable Innovation through:

1. Changes in the innovation systems

This session explains fundamental changes in territorial anchored innovation system, for which the approaches of triple and quadruple helix are representative. It underpins one main problem of investment in innovation is the opposition of part of the society against the proposed innovation mentioning as example the atomic energy, genetically modified food among others

2. Multi-actor configuration

This lecture goes more in detail to the changes in the innovation processes, which is characterised by the involvement of a wide range of actors with different interest. It use the approaches of open and user innovation are examples for increasing participation of the public in innovation processes. Similar in public innovation processes citizens' participation has gained relevance.

3. Answers to innovation dilemmas

The lecture assumes that the changes in the innovation systems and processes create serious dilemmas especially for researchers at public universities and research centres. It underpins, as an example, the changes in the founding of public research, in which the competitive factor is more and more relevant and in which the share of private funding has increases. One answer to these dilemmas is Responsible Research and Innovation.

4. Answers to innovation dilemmas

Responsible Research and Innovation (RRI) introduces guiding principles in public funded research processes. This lecture explains the definition of what RRI means and its basic principles as: Reflection, inclusive deliberation, anticipation and openness.

5. Towards Responsible & Sustainable Innovation

The lecture criticized that RRI proposed valid principles for public research processes, but that a anchor to guide the action is missed. It identified the topic of Sustainability and Sustainable Development Goals as the most adequate anchor in time of climate change and ecological degradation. For this reason, it is proposed to talk about Responsible & Sustainable Innovation (ReSI).

6. ReSI in practice

The implementation of RRI has been designed generally as institutional top-down process and has not reached the level of research groups and individual researchers. This lecture insists that implementation of RRI and ReSI must be focus on these levels so that their principles will be applied to concrete science-based innovation processes.

Competencies

The introductory course pretends to transmit knowledge about the basics of RRI and ReSI. The aim is not that the learners acquire a complete set of competencies as defined by the EQF 2018. It is limited to the acquisition of knowledge as the basis to develop the competencies defined in the other three courses.

Knowledge

EQF – Learning outcomes linked to knowledge

Level 6 (Graduate):

advanced knowledge of the field of work or study, involving a critical understanding of theories and principles.

Level 7 (Postgraduate: Bologna Master or other higher education postgraduate programmes (Formal and informal):

highly specialised knowledge, some of which is at the forefront of knowledge in the field of work or study, as the basis for original thinking and/or research.

critical awareness of knowledge issues in a field and at the interface between different fields.

The objectives are to:

- understand the dynamics of modern innovation systems.
- understand the dynamics of modern technological and social innovation processes in private and public spheres.
- understand the main principles and domains of Responsible Research and Innovation.
- understand the relevance of sustainability and sustainable development goals as anchors for RRI.
- understand the relevance of principles of responsible & sustainable innovation for the fair transition towards a Sustainable Europe and World.

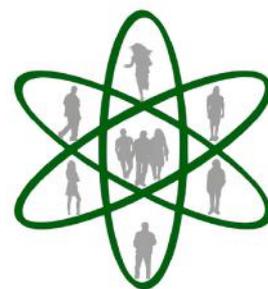
Assessment and learning products

Assessment

Standardised quizzes for each lecture

Learning products

none



Responsible Research & Innovation (RRI) is a genius concept developed by the European Commission for the governance of research and innovation processes with a view on the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products. It aims to shape, maintain, develop, coordinate and align existing and novel research and innovation-related processes, actors and responsibilities with a view to ensuring desirable and acceptable research outcomes.

RRIL – Responsible Research and Innovation Learning has developed and tested a learning programme on RRI anchoring it in Sustainability and Sustainable Development Goals. talking about Responsible & Sustainable Innovation. For the development of the learning programme, RRIL focus on three core dimension of RRI: public engagement, gender equality and ethics based on interactive real-problem approaches.

It is based on a previous analysis of the degree of the implementation of RRI in the R&I systems of Finland, Poland and Spain (Catalonia) and of the close cooperation with innovation stakeholders, especially from local authorities

This learning programme is composed by four courses: (a) Introduction to Responsible & Sustainable Innovation (ReSI); (b) Public engagement; (c) Gender equality; and (d) Ethics. We present here the second course Introduction to Responsible & Sustainable Innovation. It can be online consulted, download and imported to other learning platforms at:

<https://lor.instructure.com/resources/0c1fa583b6cb443e9b37d75403e56fbc>

The whole learning programme is accessible at

<https://lor.instructure.com/resources/3d459de396ba4ad59e5f6b87a306d5e6>