Living Knowledge
The International Science Shop Network

EnRRICH
A LIVING KNOWLEDGE PROJECT

How can Europe Create a Generation of Responsible and Engaged Researchers, Innovators and Citizens?

Europe is facing challenging times. The needs of an increasingly complex knowledge society and recent challenges to democratic values have highlighted the importance of higher education in creating graduates with the skills, knowledge and experience to face these challenges.

During the last two years, the Enhancing Responsible Research and Innovation through Curricula in Higher Education (EnRRICH) project has trialed Responsible Research and Innovation (RRI) approaches, encouraging students to leave lectures, libraries and virtual environments, and inspiring them to take risks and try innovative approaches. Co-operation with social actors, and working alongside communities has helped students become researchers who have a better understanding of societal needs. There are also significant benefits to higher education itself, particularly in developing curricula to encourage the integration of teaching and learning with research and engagement. This paper examines cross-cutting issues between higher education teaching policy and RRI. It aims to stimulate discussion amongst European higher education policymakers about the value of embedding RRI in higher education curricula and developing curricula to enable students to respond to societal research needs.

Responsible Research and Innovation

Responsible Research and Innovation (RRI) 'seeks to bring issues related to research and innovation into the open, to anticipate the consequences … and to involve society in discussing how science and technology can help to create the kind of world and the kind of society we want[1]'. According to the European Commission[2] RRI 'allows all societal actors (researchers, citizens, policy makers, business, third sector organizations etc.) to work together during the whole research and innovation process in order to better align both the process and its outcomes with the values, needs and expectations of European society.'[2] As Figure 1 shows, key elements of RRI include public engagement, gender, open access, ethics, science education and governance. Key processes of RRI include anticipation, reflexivity, inclusion and responsiveness, Learning outcomes, research and innovation outcomes are expected, alongside impacting on the Grand Societal Challenges.[3] RRI is a cross-cutting priority in Horizon 2020 research funding. Further information about RRI is available from www.rri-tools.eu.

The EnRRICH project has piloted and trialed RRI in higher education curricula across Europe and has examined links between higher education policy for teaching and learning and RRI, including carrying out interviews with regional and institutional policymakers working in this field.

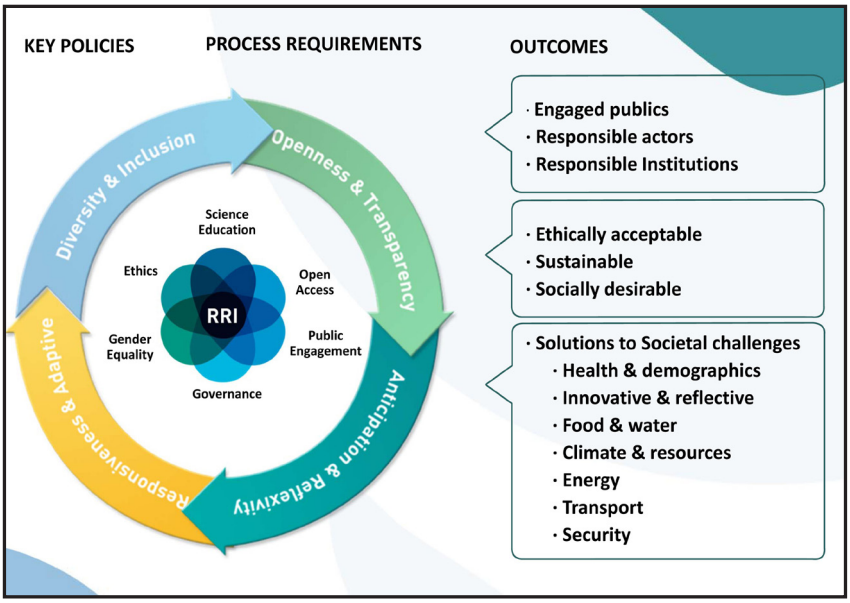

Figure 1: RRI Policies, Process Requirements and Outcomes. www.rri-tools.eu

Policy Brief

Policy Brief

The Challenge for Teaching and Learning in Higher Education at a European Level

The renewed European Union agenda for higher education set out by the European Commission in May 2017 identifies four significant challenges:

- a skills mismatch between what Europe has and what Europe needs;
- persistent and growing social divisions;
- an innovation gap; and
- a lack of integration across different parts of the higher education system.

The agenda highlights that engagement with society is vital and notes that the public funding of universities is increasingly tied to demonstration of positive impact on society. As the EC notes 'well designed higher education programmes and curricula are crucial for effective skills development'[4]. Similarly, it notes that 'research is not exploited enough as input for teaching while undergraduates are often not involved in research. This limits students' opportunities to explore contemporary issues and develop their research skills'[4]. The European Union High-Level Group on the Modernisation of Higher Education states that Higher Education Institutions (HEIs) should introduce and promote cross-, trans- and inter-disciplinary approaches to teaching, learning and assessment, helping students develop their breadth of understanding and entrepreneurial and innovative mindsets. They identified a need for synergy between teaching, research and innovation, linking HEIs and local communities and regions. They recommended improving the relevance of curricula, including innovative and active pedagogies that should consider participatory and project based methods.[5] The role of education in 'fostering inclusion and equality, cultivating mutual respect and embedding fundamental values in an open and democratic society' is also noted, in response to incidences of violent extremism at the start of 2015[6].

How RRI links with teaching and learning

EnRRICH has worked with higher education policymakers to map the links between RRI and policy priorities for higher education teaching and learning. Figure 2 begins to outline the ways in which embedding RRI in teaching and learning can address the key challenges in European higher education teaching and can have impacts for students, for society, and for higher education system itself.

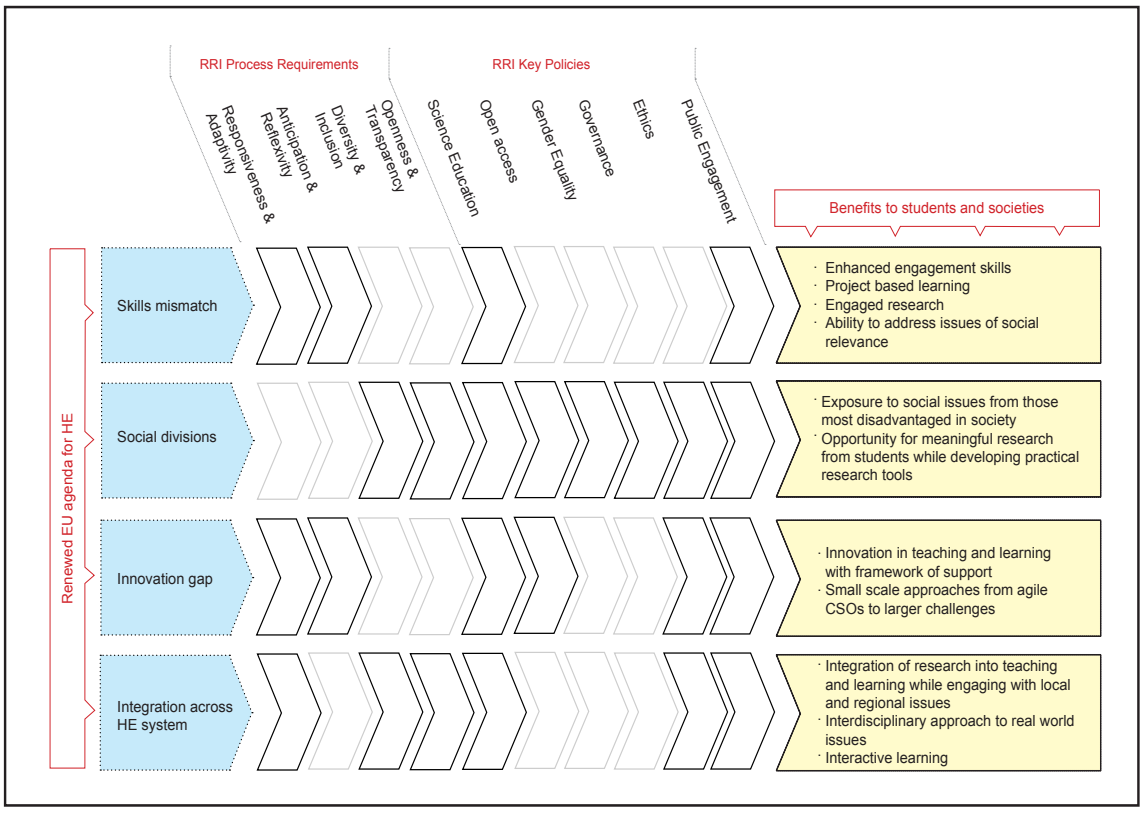

Figure 2: Impacts and benefits of embedding RRI in teaching and learning in European higher education teaching

At a National Level

At a national level the EU agenda is also echoed. Interviews carried out by EnRRICH partners with 20 higher education policymakers across six countries identified the following key priority areas:

- increasing diversity in higher education;
- improving the quality of teaching and learning;
- connecting higher education teaching with 'real world' employment opportunities;
- the reform of higher education curricula;
- helping students to connect global issues with local issues; and
- an improved focus on interdisciplinarity.[7]

Students who had participated in RRI based teaching sessions valued:

- the interactive nature of the sessions and the projects involved;
- the focus on leadership, stewardship and responsibility;
- the opportunity to work on something meaningful and to develop the tools and capacities to do this;
- the social relevance of the issues addressed; and contacts with groups and individuals outside of their HEI.

Over 70% of higher education students felt it would impact them, either in their choice of career or in the way they conducted their work after graduation[8]

Developing RRI in Curricula: Science Shops

Science Shops respond to the research needs of Civil Society Organisations (CSOs) by offering independent, participatory research support. They are usually linked to or based in HEIs, where research is undertaken by students as part of their curriculum, through credit bearing elements of their programme such as a thesis, research course or research project. According to the European Commission 'The Science Shop model of participatory research and innovation has been successful in bringing students, researchers and civil society together towards tackling real issues at the local and regional levels. Aside from positively impacting on the co-creation of solutions to real world problems, the process of engaging with society has strengthened both the research process and its outcomes … contributing to research excellence and acceptability of innovation outcomes. It has also lead to improved teaching and learning methods in academia, which has benefitted both students and their teachers'.[9] For more information about Science Shops see www.livingknowledge.org.

Case Study: Community Based Action Research Module

This module was run by the FOIST Laboratory in Università degli Studi di Sassari, Italy. It brought together students from the MA Social Work and MA Cultural Tourism, using flipped classroom methodologies to help students better understand the needs of community partners and to develop reflexivity about research and research processes. Students who undertook the course worked directly with a CSO from a disadvantaged community, observing their daily work in order to understand their key challenges. They learned about the diversity within one community and about working with people from different backgrounds, and recognised the different contributions that different people can make within their communities.

Example project: A student carried out research and facilitated discussions amongst stakeholders, helping a diverse community to agree on their main needs. A short paper produced highlighted four key priorities and the next steps in addressing them. The CSO has developed 4 working groups based on these priorities and these groups are currently starting to address one priority area each.

Case Study: Making the Most of Masters

This is a programme which is being piloted in Queen's University Belfast, UK, in collaboration with partners from local organisations across Northern Ireland. The Science Shop and The Graduate School came together to offer community based research projects to students on a range of taught Masters programmes, including Mechanical Engineering, Anthropology, Computer Science and Management. Students were able to choose to engaged research instead of an academic dissertation and were given a chance to see the range of research needed in communities and to understand some of the opportunities and challenges of working with external partners on research.

Example project: A student from Mechanical Engineering worked with Mourne Heritage Trust to investigate innovation in machinery which could be used to cut down vegetation in inaccessible parts of a Northern Irish mountain range, reducing the risk of wildfire. The student analysed types of machinery used in other countries to see what might work best, and made recommendation to the organisation which now examines the options.

Next Steps in Embedding RRI in Academic Curricula

Policy Brief

The experience from EnRRICH to date has been largely positive, with policymakers, academic course leaders and students seeing benefits in terms of embedding RRI in higher education. EnRRICH has demonstrated that it is possible to successfully pilot RRI in higher education via the mechanism of Science Shops.

Policymakers interviewed asked both for examples of how RRI could be embedded in curricula, and for evidence of the outcomes where it had been. They suggested the following:

- developing more rounded citizens who understand and value reflexivity, collaboration and cooperation;
- the bringing of diverse voices into higher education curricula to help drive pedagogic change;
- and helping students to think about the relevance of their studies in a broader frame.[10]

According to policy makers interviewed by the EnRRICH project, there are several factors which might create challenges for embedding RRI in academic curricula: Rigidity of the system and pressure on curricula; academic freedom and ownership of curricula (which they viewed as vitally important but a potential block); a lack of student buy-in; inherent tensions in the system between research and teaching; a lack of incentive for RRI at national levels; overall lack of investment in higher education; the fatigue about new concepts at a policy level; and a shortage of relevant assessment models[10].

These concerns also echoed issues that partners encountered whilst setting up the EnRRICH pilots in their own institutions. EnRRICH will begin to address some of these challenges at both operational and strategic levels, however it is clear this work needs to continue beyond the lifetime of the project. Whilst individual partners and institutions will continue to take this work forward, there is also a role for a continuation of discussions at a strategic level. To that end the EnRRICH consortium would like you to consider the following:

- How to further develop and resource models to support the integration of RRI in curricula at both strategic and operational levels
- Continuing to build evidence to encourage staff and student buy-in and to incentivise RRI at national and international policy levels
- Further examination of ways to improve the flexibility of curricula
- How incentive systems for academic staff can encourage them to integrate RRI in their own teaching and learning practices.

EnRRICH Resources

- The EnRRICH tool which provides a 4 step framework to guide educators to revitalize curricula from an RRI standpoint
- Teaching materials to support the embedding of RRI in higher education curricula
- Promising practices and case studies across a range of academic disciplines to offer real examples of how RRI can enhance teaching at Bachelors, Masters and PhD levels
- A range of newsletters and reports

www.enrrich.eu

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