Summary Report on Policy for Rewarding Responsible Research and Innovation through academic curricula in Higher Education

Deliverable 5.1

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1.0 Introduction

This paper\(^1\) set out to examine how and where people working in higher education might, at a policy level, be encouraged to implement Responsible Research and Innovation (RRI) in their curricula. It finds that whilst RRI has not been developed as a concept for higher education curricula, there is the potential to build connections. These potential connections are explored in the context of Science Shops.

Responsible Research and Innovation is a cross-cutting theme in Horizon 2020 and key policy area for European Research. It is still a relatively new concept, albeit stemming from a much longer standing policy drive towards the integration of different voices in the research process. The Enhancing Responsible Research and Innovation through Curricula in Higher Education (EnRRICH) project has been funded by the European Commission to examine the potential for linking the concept of RRI from higher education research into higher education curricula. We are doing this in a range of different ways, from developing learning competencies for RRI, to gathering and sharing models of good practice of RRI in higher education curricula, developing a Community of Practice and supporting and trailng new methods. Further information is available from [www.enrrich.eu](http://www.enrrich.eu)

This paper begins to set out how RRI might be relevant to policymakers with an interest in higher education curricula development. In the first section the concept of RRI is defined, then there is a brief discussion of the purposes of Higher Education and of gaps identified by higher educational policymakers, which RRI might address. Some examples of related policy are also given in Table 2. The fourth section explores Science Shops\(^2\) as one mechanism for bringing together higher education research and teaching with serving the needs of civil society organisations (CSOs) and identifies synergies, whilst the conclusion offers questions for consideration.

2.0 Responsible Research and Innovation

On behalf of EnRRICH, Tassone and Eppink (2016) have developed a working definition of RRI in higher education curricula:

‘Fostering RRI in higher education curricula is about equipping learners to care for the future by means of responsive stewardship of scientific and innovation practices that address the grand challenges of our time in a collaborative, ethical, sustainable and socially desirable way’ (Tassone and Eppink, 2016:9)

This definition brings together key concerns and synergies between education and RRI as identified in the discussion below. Shared areas of concern include engagement with wider society in a collaborative and socially desirable way, a focus

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\(^2\) Science Shops and similar entities respond to the research needs of Civil Society Organisations (CSOs) by offering independent, participatory research support. Science Shops are often, but not always, linked to or based in universities, where research is done by students as part of their curriculum. The EnRRICH consortium is made up of established and new Science Shops throughout Europe and has been funded to examine the potential for RRI to be enhanced in academic curricula using Science Shop methods of participatory research with CSOs.
on caring for the future and sustainability and the importance of equipping learners and building skills. The definition is a working one with the possibility of further articulation as the project progresses – indeed the very concept of RRI is still an emerging area and that there are multiple ways of conceptualizing and implementing it and this is a subject of continued discussion more generally.

Responsible Research and Innovation (RRI) is the latest iteration of the European Union’s determination to bridge the gap between the scientific community and society at large. This approach encourages research, which is co-created amongst different stakeholders from the outset and can therefore work more effectively towards solving the Grand Societal Challenges.

‘Responsible Research and Innovation (RRI) implies that societal actors (researchers, citizens, policy makers, business, third sector organisations, etc.) 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 society’ (European Commission, 2016a)

In order to support the development of the concept, the RRI Tools project was funded under the Seventh Framework Programme with a goal of empowering all actors to contribute to the Responsible Research and Innovation initiative (see www.rri-tools.eu). RRI requires new and innovative ways of thinking about research, not just by researchers themselves, but also by wider society.

Wider society stakeholders might include policymakers (including funding agencies, regulators, and executive); business/industry representatives; CSOs; researchers and innovators; and the education community (Smallman et al, 2015). In terms of both the EnRRICH project and Science Shops more generally, the focus is here on the CSO sector in particular.

In this understanding, research is very likely to require interdisciplinary approaches. Figure 1 overleaf shows the RRI keys and Process Requirements which are listed below.

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3 The European Union has identified seven societal challenges which are at the heart of their Horizon 2020 research funding programme. For more information see https://ec.europa.eu/programmes/horizon2020/en/h2020-section/societal-challenges#Article
The European Commission initially identified five key issues relevant to the implementation of RRI – Public Engagement, Science Education, Ethics, Open Access, Gender Equality, with a further key of Governance being added at a later stage. The RRI tools project has re-conceptualised these keys as policy agendas and has also identified four research process requirements for RRI: Diversity and Inclusion; Openness and Transparency; Anticipation and Reflexivity; and Responsiveness and Adaptive change (Klassen et al, 2014; 2015). Klassen et al also propose three outcomes of RRI. Most relevant here are learning outcomes – which suggest that RRI should lead to empowered responsible actors across the whole range of our socio-technical systems. Other outcomes include research and innovation outcomes and solutions to societal challenges.

These policy agendas and processes are guidelines to help implement and evaluate RRI in research processes and outcomes and should not be treated as a tick box exercise but rather as a different way of thinking about research (Klassen et al, 2014; 2015). This conceptualization of RRI implies the need to ensure that all actors in the broad research and innovation ecosystem are skilled to participate in research processes - both researchers and future professionals of all types.

This suggestion that future professionals of all types need to develop skills for RRI has implications for European higher education policy, particularly in the field of curricula development. How these implications connect to the purposes of higher education and European Higher Education Policy is explored in the next section.
3.0 Purposes of Higher Education

The Council for Europe identified four main purposes of European higher education: preparing students for the labour market; preparing students for life as active citizens in a democratic society; personal development of students; and development and maintenance of a broad, advanced knowledge base (Bergen, 2005). All four purposes are interlinked although the first three especially focus on the student and the fourth is more directly linked to society. This approach argues that the needs of students and society should be central in higher educational programmes, and was used by the Bologna Working Group in 2005 in designing what became known as the Bologna process of reform in Higher Education (Bologna Working Group on Qualifications Framework 2005). The European Higher Education Area (EHEA) points to generic expected outcomes of European study programs, within each of the main three cycles - Bachelor, Master and Doctorate. Within each cycle, some generic qualification descriptors are outlined (Bologna Working Group on Qualifications Frameworks, 2005). These are known as the Dublin Descriptors and their relationship to RRI and Science Shops will be discussed further in section 4.0.

Whilst the Purposes of Higher Education predate the concept of RRI by a considerable amount of time, it is possible to identify key concepts, which can connect. According to Tassone and Eppink (2016) RRI speaks to the four purposes of higher education, as illustrated in the table below.

**Figure 2: Purposes of European Higher Education through the lens of RRI (Tassone and Eppink, 2016)**

<table>
<thead>
<tr>
<th>Higher Education Purpose</th>
<th>How RRI links</th>
</tr>
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<tbody>
<tr>
<td>Preparing students for the labour market</td>
<td><strong>RRI can contribute to this process by fostering students</strong> problem solving, research and innovation capacities, related to addressing societal challenges in a responsible way</td>
</tr>
<tr>
<td>Preparing students for life as active citizens in a democratic society</td>
<td><strong>RRI can contribute to this process by preparing students to be inclusive, to develop social values, a sense of care and stewardship, and to be active citizens</strong></td>
</tr>
<tr>
<td>Encouraging personal development for students</td>
<td><strong>RRI can contribute to this process by encouraging reflexivity about personal attitudes, assumptions and commitments and by fostering experimentation with new ways of doing and being.</strong></td>
</tr>
<tr>
<td>Maintenance of a broad, advanced knowledge base</td>
<td><strong>RRI can contribute to this process by bridging science and society and by equipping students to develop the capacities for advancing knowledge and innovation in society</strong></td>
</tr>
</tbody>
</table>

For further discussion on the development of learning competencies to support RRI see Tassone and Eppink (2016). However most noteworthy here is that it is clear that RRI approaches and educational policy agendas can be connected via the core competencies and learning outcomes they aim for in future citizens and knowledge workers, as will be discussed in the next section.
3.1 European Policy Context for Curricula Development in Higher Education

The European Union’s education strategy Supporting Growth and Jobs – an agenda for the modernisation of Europe’s higher education systems (known as ET2020) argues that European higher education is not fulfilling its potential to contribute to European society and to Europe’s prosperity (European Commission, 2011:2). It notes that there is an increasing requirement for knowledge workers and that researcher training should be better aligned with the needs of knowledge-intensive labour markets. However curricula are often slow to respond to changing needs in the wider economy (European Commission, 2011:7). Policy issues identified for member states include the need to ‘stimulate the development of entrepreneurial, creative and innovation skills ... and promote innovation in higher education through more interactive learning environments and strengthened knowledge transfer infrastructure’. It also asks Higher Education Institutions (HEIs) to ‘encourage partnership and cooperation with business as a core activity.’ The European Commission (2011:8) also suggests the need to ‘promote the systemic involvement of HEIs in the development of integrated local and regional development plans.’

ET2020 identifies the ‘knowledge triangle’ as a way of linking higher education, research and business in pursuit of excellence and regional development. However it argues that ‘the capacity of HEIs to integrate research results and innovative practice into the educational offer, and to exploit the potential for marketable products and services, remains weak’ (European Commission, 2011:7). To address this gap, the EU High-Level group on the Modernisation of Higher Education recommends that ‘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’ (2013:66). The shared goal is anchoring education in the knowledge triangle (European Commission, 2011:10). Modernisation implies synergies between teaching, research and innovation, linking HEIs and local communities and regions, and innovative approaches to improve the relevance of curricula, including innovative and active pedagogies, based on participatory and project based methods (Official Journal of the European Union 2015).

More recently, the role of education as a key component in ‘fostering inclusion and equality, cultivating mutual respect and embedding fundamental values in an open and democratic society’ was highlighted in response to incidences of violent extremism at the start of 2015 (Official Journal of the European Union, 2015:2). The Council of Europe (2016) is currently developing a Reference Framework of Competences for Democratic Culture, which can be used in higher education throughout Europe as well as in national curricula and teaching, and may offer some useful suggestions for the integration of democratic values and active citizenship.

3.2 National level and institutional level policy

A scan of education policies at institutional and national level by consortium members indicated a focus on employability, skills and economic development (O’Mahony et al, 2015). RRI was not referred to anywhere. Some examples of policy which has the potential to reward RRI practices are given in figure 3 below,
particularly those connected to community based learning, community based research and responding to the needs of society. Further research is needed to examine implementation and evaluation of these policies in terms of for example university ranking systems or promotion or progression routes.

**Figure 3: Policies to support RRI approaches in Higher Education**

### National policies
- Germany has developed a Memorandum for Social Responsibility in HEIs with an emphasis on community based learning.
- The engagement by staff of students in community based research projects relates to many of the key elements of the Higher Education Academy’s framework for embedding employability in Higher Education in the UK (Cole and Tibbey, 2013)
- Ireland’s mission based performance compacts set out individual indicators of success for all the HEIs, and requires the identification of targets for “Enhanced engagement with enterprise and the community and embedded knowledge exchange” (Higher Education Authority, 2013:19).

### Institutional and professional quality review processes
- The Quality Code Flanders specifies that the involvement of external stakeholders helps demonstrate the quality of a programme and requires that the programme’s curriculum is relevant to society (NVAO, 2015).
- The University of Vechta has developed its own competency framework relating to Teaching and Learning, and it identifies active citizenship/public engagement as a key outcome of university education (Universität Vechta, 2014).
- The Quality and Qualifications Ireland (QQI) office recommends involvement in community campus partnerships and community engaged research as a way to promote greater collaboration between education and training providers and the wider community (Quality and Qualifications Ireland, 2014).
- The Quality Assurance descriptors for many student programmes and skill statements often reference professional responsibility, integrity and ethics. In some cases these also emphasise social responsibility, e.g. UK Quality Code for Higher Education Part A (Higher Education Academy, 2016).
- Engineers Ireland (2014:21) cite high ethical standards, the responsibilities of the engineering profession towards people and the environment and ‘the ability to communicate effectively on specialised engineering activities with society at large as two of their 7 criteria
- In Wageningen University (WU), Vrije Universiteit Brussel (VUB) and Queen’s University Belfast (QUB) a requirement to consider the needs of society is specifically mentioned in staff promotion criteria (information supplied by EnRRICH partners).

### International Prize
- The MacJannet Prize for Global Citizenship was established by the Talloires network and recognises exceptional student community engagement activities amongst its members.

Note: all examples are from O’Mahony et al, 2015
4.0 Bringing RRI into higher education curricula through Science Shops

A Science Shop provides independent, participatory research support in response to concerns experienced by civil society (Living Knowledge, 2016). Fokkink and Mulder (2004) provide an outline of how Science Shops (and similar entities, which may have different names) work and how they can help to modernise academic curricula. To summarise their description, Science Shops combine research and teaching with engagement with society. Science Shops work in the main inside HEIs. They focus on working with Civil Society Organisations (CSOs), discussing their research needs and reframing them as academic research projects, which may then be directed towards disciplinary research areas. Students, under supervision of an academic, then perform the research, almost always as part of their academic curricula. The research output is normally a report (or other product) which is shared with the CSO partner. As part of carrying out a Science Shop project, students learn to use disciplinary knowledge and more generic transferable professional skills such as engagement with stakeholders, communication with non-specialists; reflection on the use of scientific knowledge in societal problem setting; and research in context, from definition to implementation of results, working in a multi-disciplinary context (Fokkink and Mulder, 2004).

This focus on the CSO sector is at the heart of Science Shops. The rationale is that CSOs are often underserved by university research agendas. As Steinhaus and McKenna (2014) note, ‘research funding policy to support applied research is often related to income generation rather than research with and for society’ and this can have a negative impact on the participation of CSO organisations. Von Sydow (2013) argues that ‘civil society...is an essential pillar of democracy.’ Both of these arguments build a good case for integrating CSO research into academic curricula.

According to the Engage 2020 project (2014), Science Shop projects can contribute in all three cycles of the Bologna Process. At undergraduate/bachelor level projects help with descriptors on gathering and interpreting relevant data, communicating information, ideas, problems and solutions and skills needed to study further with a high level of autonomy. At masters level they can contribute to problem solving abilities [applied] in new or unfamiliar environments within broader (or multidisciplinary) contexts, the ability to integrate knowledge and handle complexity, formulate judgements with incomplete data, communicating conclusions and the underpinning knowledge and rationale (restricted scope) to non-specialist audiences, and the ability to study in a manner that may be largely self-directed or autonomous. At PhD level, a graduate should be able to do critical analysis, evaluation and synthesis of new and complex ideas, and to communicate with society in general (dialogue) about their areas of expertise (broad scope), all of which are enhanced and supported by participation in Science Shop projects.

The types of skills identified by Fokkink and Mulder (2005) directly link to some of the priorities identified in European educational policy – in particular the issues of aligning skills with the needs of society, strengthening knowledge exchange and transfer, and the integration of research into the educational offer link to the knowledge triangle referred to in European educational policy. The need to foster
inclusion and democratic values which is a key purpose of Higher Education, links to educational priorities post-Paris attacks and to the Science Shop focus on CSOs.

Figure 4: Areas of common interest between RRI and higher educational policies

The Science with and for Society programme which is funded through the Directorate-General for Research and Innovation in the European Commission also names Science Shops as ‘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, thereby 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’ (European Commission, 2016b).

Blockages to embedding RRI in education have been identified by the RRI tools project. In particular a lack of relationships to enable RRI, a lack of time to implement it, and the difficulties in changing systems and attitudes are cited (Smallman et al, 2015:10). Science Shops can address the first two of these blockages by adding a time resource and bringing their pre-existing relationships with CSOs to bear on HEI curricula.

Science Shops offer one mechanism for implementing RRI in higher education in a way that addresses all of these agendas. Science Shops are an example of RRI in practice. In this context, the EnRRIICH project is using Science Shop methodologies to improve the capacity of students and staff in higher education to develop knowledge, skills and attitudes to support the embedding of RRI in curricula.
6.0 Conclusions and next steps

This report suggests how Science Shops can bring RRI into academic curricula and can respond to the concerns of educational policymakers. Bringing RRI to the attention of policymakers for higher education curricula is a priority in the next stages of the EnRRICH project. Discussions will take place with higher education policymakers in Italy, Spain, Hungary, Ireland, the UK and Germany to examine their views on RRI in higher education curricula. Policy papers will be produced towards the end of 2017 as a result of these discussions. It is the intention of the EnRRICH consortium to continue these discussions over the remaining 18 months of the project.

In moving the debate forward we therefore pose the following questions:

• Does RRI have a place in academic curricula?
• Is there a potential benefit to integrating RRI in academic curricula from the point of view of your organization and its strategic objectives?
• Are there other policy areas which might link to or enhance this discussion?
• What is the best way to go about starting this global discussion?

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References


