Responsible Research and Innovation

A quick start guide for science engagement organisations

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About the RRI Tools project

RRI encompasses six fields relating to research and innovation: public engagement, science education, gender equality, ethics, open access to scientific results, and governance of research and innovation. The RRI Tools project aims to foster Responsible Research and Innovation (RRI) in Europe, breeding a harmonious and efficient relationship between science and European society. To achieve this, it has developed an innovative Toolkit comprising practical digital resources and actions aimed at awareness-raising, training, dissemination and implemention of RRI. The Toolkit – an online repository of RRI-related resources – was designed by and for all stakeholders in the research and innovation space. The tools provided in the RRI Toolkit are based in collective reflection and built on existing best-practices.

RRI is
a compass, not an objective

Making science engaging is vital work, but fraught with challenges. How do you stay relevant in your local community? How do you ensure activities are designed in a way that places the needs and preferences of multiple target audiences at their centre? How do you find new collaborators and effectively expand your network? If you work for a science engagement organisation and need some support or just a little direction, this quick start guide to Responsible Research and Innovation (RRI) will help.

Reading the inspiring real-life examples in this guide will help you to understand what RRI looks like in practice, and how the approach can help you to develop or improve your own activities.

Like science itself, RRI isn't about a specific process or tool – it's a framework for thinking in a way that anticipates the consequences of research and innovation, brings issues into the open, and involves society in discussing how science and technology can help create a better world for future generations.

While in some ways RRI is new to science engagement organisations, the notion of social responsibility is not. Science engagement organisations already make significant contributions to education and sensitizing public opinion on a variety of innovation-related issues. This is something to build upon when talking about RRI.

A group of practitioners from science engagement organisations have worked collaboratively to put this guide together and explain how their work relates to RRI. Read on to discover many new ideas, as well as some old ones adapted to RRI contexts, and feel free to adapt, borrow (or downright steal!) from any examples in this guide that resonate with your experiences or spark your imagination.

RRI is a mindset, not an activity

2. RESPONSIBLE RESEARCH AND INNOVATION: THE WHY, WHAT AND HOW?

The research and innovation community has major responsibilities within society, but politicians, industry representatives, and citizens can't leave the full burden on scientists' shoulders. RRI addresses the fact that the different strands of society must establish a common direction and collaborate to set research agendas that take us there. Non-scientists hold important knowledge, opinions and ideas for improving science's position in society and RRI encourages all stakeholders to work together to solve societal challenges.

RRI is a framework, which means that positive outcomes are important, but so is the journey; empowering responsible stakeholders and finding sustainable answers to big challenges are the end goals, but ensuring the processes that get you there are genuinely inclusive and transparent are equally critical.

Excitingly, RRI is still developing as a concept. Given the stress it places on widening participation in science, technology, and innovation, you may not be surprised that a broad range of perspectives are needed to help define RRI itself and build tools for this field. That's where you come in.

Science engagement organisations already actively contribute to RRI's many agendas – science education, public engagement, open access, ethics, gender, and policymaking – through collaboration with stakeholders ranging from industry representatives, to school teachers and politicians. However, by understanding the RRI approach, you will be able to consistently push your organisation's efforts even further.

3. A RECIPE FOR SUCCESS: THE RRI 'INGREDIENTS'

Diversity and inclusion

A wide range of stakeholders is required to generate diverse perspectives and expertise. Responsible Research and Innovation needs to be inclusive to be diverse, and equally, a focus on diversity encourages inclusion.

Openness and transparency

Openness and transparency are important conditions for trust. Communicators need to adapt communication according to the needs of different audiences.

Anticipation and reflection

Anticipation is important in RRI because present research and innovation practices shape the future; it is about envisioning impending change and acting accordingly. In essence, 'reflection' is a form of post-event critical thinking. Reflection must therefore concern all aspects of research and innovation: from daily routines, planning assumptions and personal interactions, all the way up to institutional values and strategies.
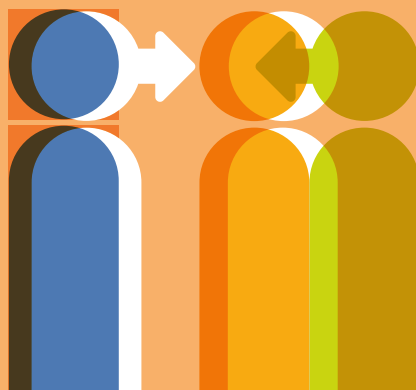
Responsiveness and adaptive change

Responsiveness means being receptive to new knowledge, perspectives, and views – all necessary when adapting to change. Being RRI-oriented also requires the flexibility and openness to adapt existing organisational structures in response to evolving environments, values and insights.
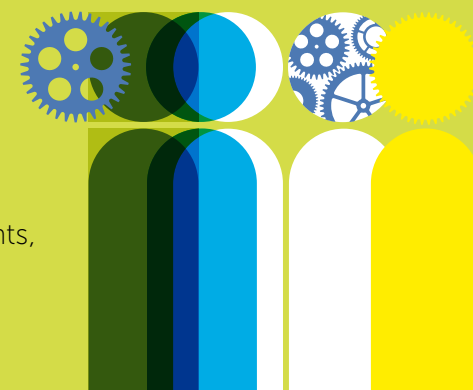
4. WORKING 'IN THE WILD': INSPIRING EXAMPLES OF RRI

Science engagement organisations are, by nature, socially responsible. Many of the projects and practices they develop and implement effectively showcase the RRI mindset. This guide is designed to put some of the inspiring examples in the spotlight. Nine practices were selected by a group of practitioners from science centres and museums – Ecsite members, partners in the RRI Tools project and beyond – and the Ecsite project team through a collaborative process from the RRI Tools repository. Each practice covers a different topic and format.

The importance of starting

The 'all-or-nothing' effect is the notion that a single project must address all dimensions of RRI for it to count as RRI; hence, if a project doesn't produce all RRI results, there is no point in developing it, or even trying to implement the framework at all. However, a project doesn't need to aim at all RRI dimensions at once, as the RRI Tools project successfully identified.[1] It's more important to consider your context and address the tasks that are of biggest priority to serving you and your public. Neither is RRI just measured by results; it is also a set of values that should underlie the development of projects, such as inclusiveness, participatory principles and reflexivity.

Limited public awareness of RRI can be a problem. People might not even be convinced of the value of RRI. This can be a problem especially if you assume that they already know about the framework. To overcome this obstacle, it's best to avoid over-conceptualization, academic jargon, and preaching about responsibility and risk, which can all be intellectually patronizing.

Another obstacle can be an audience's own perceived lack of legitimacy: "What's the point of participating, if I'm not an expert?" This can be overcome by demonstrating how their participation is consequential. Try to make your project not just interactive but iterative too. Be ready to change the design, course and aims of your project by taking into account the inputs of the engaged publics with specific experiences and knowledges. Discuss these changes with them. And repeat.

These obstacles probably rest on a rather monolithic view of the public. Be aware of the range of constituencies that you are engaging with, their disparate interests, types of knowledges and experiences. Detailed mapping of your stakeholders is crucial, and why not work with social scientists? And remember to make use of your soft skills, personal networks and expertise as a member of society.

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[1]   Deliverable 1.4 A catalogue of good RRI practices, p.7

4.1 BENDING GENDER ASSUMPTIONS

The **Criteria for Gender Inclusion** document showcases a set of 15 reflective questions that address gender inclusion at four different levels (individual, interactional, institutional and societal) which can help to adapt activities and exhibitions within your organisation so they become more gender inclusive.

For example, the following questions may be used to assess the gender inclusiveness of planned and/or implemented science education activities at the individual level:

What previous experience does the learner have with the type of institution? How does the learner's sense of self or identity relate to the activity? or **What scientific interests do learners have?**

By asking these questions at the planning stage, you acknowledge that individual learners may have previously experienced gender exclusion. For example, research shows that during museum visits, parents explain science to boys more often than girls, which may affect a learner's willingness to participate in the education activity.[1]

Each question is followed by an explanation and example in an effort to facilitate the reflection process within a team or at a personal level. No special gadgets or devices are needed, just the time to apply the set of questions, discuss, reflect and make the adaptive changes.

[1]   Crowley, K., Callanan, M. A., Tenenbaum, H. R., & Allen, E. (2001). Parents explain more often to boys than to girls during shared scientific thinking. Psychological Science, 12(3), 258-261.
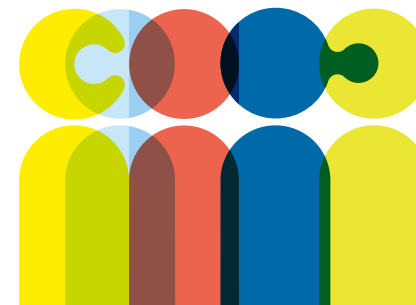
KEY RRI TAKEAWAYS

Diversity & Inclusion
Developing practices that break stereotypes helps create more inclusive and inspiring environments.

Openness & Transparency
The questions ensure an open space for discussing, reflecting and accepting the possibility of changing the way we are creating and transmitting our messages.

Anticipation & Reflection
These questions provoke critical thinking, inviting contributors to challenge their own assumptions. Responding to the questions anticipates subconscious bias and potentially excluding practices.

Responsiveness & Adaptive Change
Applying these criteria provides a concrete opportunity to adapt and improve flaws that might appear in the scope of generating non-gender-biased material or activities, putting responsibility into practice.

Stakeholders Meeting in Brussels, Hypatia Project

4.2 HOW DO YOU TURN A SCIENCE CAFÉ UPSIDE DOWN?

Science cafés can be engaging, enlightening and fun. They enable dialogue between civil society and experts representing different areas of research in a relaxed atmosphere: the public asks a question, an expert answers it, the conversation rolls on and the coffee or beers flow.

The Copernicus Science Centre is testing the concept to see how the outcomes can be improved: the result is the 'Reversed Science Café' format. The Reversed Science Café includes all of the features described above but with an important difference: in this café, it is the experts asking the public questions.

By challenging traditional roles, the Reversed Science Café places participants in the role of the experts too. In addition, it presents an opportunity to gain new inputs and ideas for the focus or scope of a research project. It's a great opportunity for researchers to improve their work, having shared time with the public.
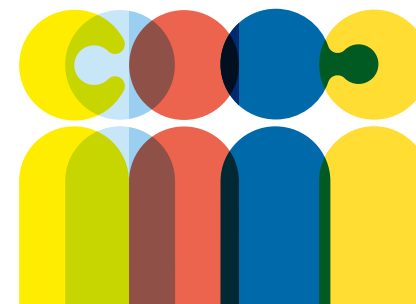
Contact the developers:
Ecsite – European Network of Science Centres and Museums (Belgium) www.ecsite.eu, info@ecsite.eu
Copernicus Science Centre (Poland), Wiktor Gajewski, Science and Art Events Director
wiktor.gajewski@kopernik.org.pl
RRI Toolkit: Sparks. Rethinking Innovation. Together.

KEY RRI TAKEAWAYS

Diversity & Inclusion

This particular form reinforces the idea that "everyone is an expert": non-scientists hold important knowledge, opinions and ideas. This is an opportunity to provoke encounters between scientists and the public in a way that stimulates new ideas on both sides.

Openness & Transparency

The Reversed Science Café provides a direct and open way to address current and publicly important scientific questions and concerns. There are no filters between the public and scientific representatives and it offers an open space for problem solving.

Anticipation & Reflection

The topics addressed by this activity can provoke the public and scientists to reflect on research and the roles different interest groups and stakeholders, including lay public, play in relation to them.

Responsiveness & Adaptive Change

Reverse Science Cafés offer opportunities for new inputs and ideas relating to the scope of research, while placing the role of science more central within society. This format also challenges traditional roles of a scientist and lay public, reinforcing the RRI principle that non-experts hold important knowledge and can provide important feedback that scientists and experts could incorporate in their research, thus bringing science and society closer.

Reverse Science Café in Bonn, Sparks Project

4.3 CANVASSING OPINIONS: A WORKSHOP AND CANVAS FOR RRI STRATEGY DEVELOPMENT

The canvas is a set of questions aimed at supporting managers/strategists to analyse their science/technology centre or a museum, to exchange ideas about this analysis with peers, and to define a preliminary strategy on becoming a forum for dialogue. The canvas offers a "quick-scan" of your organisation. Together with an accompanying workshop, it has been tested at the 2016 Ecsite Annual Conference in Graz and the full paper analysing the outcomes of the workshop are available here.

You can use the canvas and the workshop script in multiple ways: for example, introduce employees, management and even external stakeholders to RRI and the role that science/technology centres and museums can play as forums for dialogue. It can also be used in a more sophisticated way as a tool for collaborative strategy development, or alternatively, for creating roadmaps toward becoming forums for dialogue. The canvas can be used to reflect on a science/technology centre or museum's strengths and weaknesses in regard to becoming a forum for dialogue.

KEY RRI TAKEAWAYS

Diversity & Inclusion
The canvas can help identify new opportunities for science centres and museums and their potential in terms of working with external stakeholders, making the R&I system (more) inclusive.

Openness & Transparency
Collaborative RRI strategy development, using the canvas as a supportive tool, challenges science/technology centres and museums to define their role in RRI. Once this strategy is developed, a science/technology centre or a museum can contribute to making the research and innovation system more open through its activities as a forum for dialogue.

Anticipation & Reflection
As a result of the canvas-based strategy, a science/technology centre or museum's activities and exhibits can be created to anticipate future impacts of emerging science and technology, which offer opportunities for reflection by a range of societal groups.

Responsiveness & Adaptive Change
The canvas helps to stimulate change processes in science/technology centres or museums through reflection on their own practices and adaptation of strategies in line with various notions of RRI. Contributions to responsiveness and adaptive change depend on the outcomes of activities that science centres and museums may organise as forums for dialogue.

1. How open is your science center to becoming a forum fot dialogue, you think?

| Not | – – | – | + | + + | A lot |

2a. In how far does your science center / organisation currently facilitate dialogues?

| Not | – – | – | + | + + | A lot |

2b. What dialogue format(s) is / are most commonly applied?

3. How would you rate the likeliness that you can partner-up with the following parties indeveloping dialogue?

Univesity partners	unlikely	– –	–	+	+ +	likely
Tech industry / R&D	unlikely	– –	–	+	+ +	likely
NGO's	unlikely	– –	–	+	+ +	likely
Arts partners	unlikely	– –	–	+	+ +	likely
Civic organisations	unlikely	– –	–	+	+ +	likely
Local community	unlikely	– –	–	+	+ +	likely

4. Which of the following types of exhibits* do you currently host that could be a base for dialogue?

- ○ Exhibits about emerging potentialy controversial science / technology
- ○ Exhibits that link to global challenges
- ○ Exhibits that support opinion forming on (emerging) S&T
- ○ Exhibits that offers an opportunity for deliberation on S&T
- ○ Exhibits that show a multitude of views of an (emerging) S&T field
- ○ Other, namely …

5. Which of the following skills does your organisation need to develop to become a forum for dialogue?

- ○ Facilitation skills
- ○ Fund raising for RRI-related activities
- ○ Network function
- ○ Translation of dialogue outcomes
- ○ Other, namely …

6. What might inhibit your science center from becoming a forum for dialogue, currently?

- ○ General disinterest among …
- ○ Lack of competence, among …
- ○ Funding
- ○ Other factors, namely …

7. After answering these questions, compare your answers with the answers of your colleagues

What are the similarities? What are the differences? How come you think the same / different? try to figure out.

synenergene
Responsible Research and Innovation in Synthetic Biology

4.4 A PLACE WHERE ART AND SCIENCE COLLIDE

From artists working in labs, to scientists working in art museums, interaction between science and art is expanding all the time. Atelier Arts Sciences is a joint research laboratory shared by CEA – a French research centre – and Hexagon Scène Nationale Arts Sciences – a theatre based in Meylan, France.

Atelier Arts Sciences aims at fostering visibility of art-science research, giving the public an opportunity to engage in ongoing research, and creating new partnerships around art-science projects. The Atelier Arts Sciences staff helps projects to make contact with end-users at the earliest relevant stage of development and finalised prototypes are displayed during Experimenta, a three-day arts, science and technology fair.

The Experimenta programme includes an evening for the project leaders to meet business representatives; a showroom of finalised prototypes from collaborations between artists and scientists; a showroom of new technologies for artists to build new projects upon; a programme of conferences and debates; and the LivingLab approach to prototypes and project ideas, driven by La Casemate Science Centre.

The event is designed to meet the needs of artists as well as researchers, industry and citizens. In doing so, it enhances collaborations and mitigates barriers between communities.
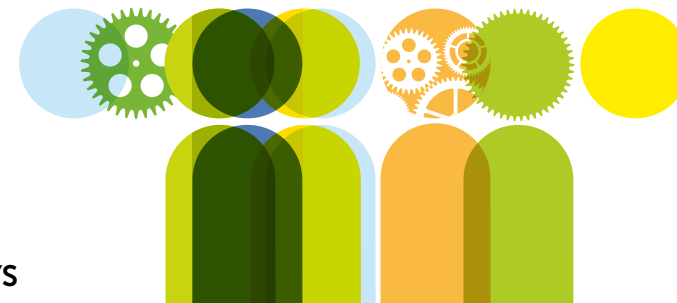
KEY RRI TAKEAWAYS

Diversity & Inclusion	Involving a diverse range of contributors at an early stage helps each project to raise new questions and issues.
Openness & Transparency	Openness is expressed through the broad range of dissemination activities. Information is individually tailored to various target audiences across social networks, websites, leaflets, and targeted mailing.
Anticipation & Reflection	Anticipation and reflection is embedded in each project by only selecting those for which the LivingLab approach makes sense. Project managers actively collect and respond to researcher and citizen feedback.
Responsiveness & Adaptive Change	By presenting to diverse audiences at different stages, each project manager is in a position to respond and adapt his/her project to the constant feedback gained from those exchanges.

Contact the developers:

Experimenta: http://experimenta.fr/?lang=en

Atelier Arts Sciences: www.atelier-arts-sciences.eu/English-47

Kissia Ravanel, CCSTI Grenoble La Casemate (Grenoble, France) kissia.ravanel@lacasemate.fr

RRI Toolkit: CCSTI Grenoble La Casemate is one of the hubs organising local activities in France.

Check the calendar of events here.

Project Espaces Publics, Relais d'Sciences, France

4.5   LOST IN SPACE

In the midst of renovating the old science centre building and redesigning the insides, The Navigation Project at the Danish science centre Experimentarium has the major task of exploring wayfinding and navigation, and optimising visitor experience through dialogue and participatory planning. In order to succeed, the team at Experimentarium reached out to all stakeholders – first and foremost the visitors themselves – in order to create a better flow and navigation throughout the exhibits.

Interviews with the visitors were fruitful, providing knowledge about how they structure a visit. Two modes of experiencing the science centre are dominant according to Experimentarium's research: exploratory and planned.

Interestingly, most guests use both strategies during a visit. Visits are almost always made in groups, a basic feature of which is the need to split up into smaller groups while looking around, before intermittently meeting up again. Some members of the group are more active than others, which means that there is a need for meeting places that are easy to spot, close to activities, and that provide opportunity to sit down and relax. With this information, the team has turned outwards to look at cities for inspiration around successful meeting places.

Just as a city has different neighbourhoods and distinctive buildings – each thematic area should not only have a clear identity, but also be clearly different from the other areas. The key to optimising these identities, it turns out, is to involve designers in order to strengthen the borders of the thematic areas. Distinct borderlines and identities support the visitors in recognising where they are. These distinctions also allow for better map overviews, a key tool requested by visitors.
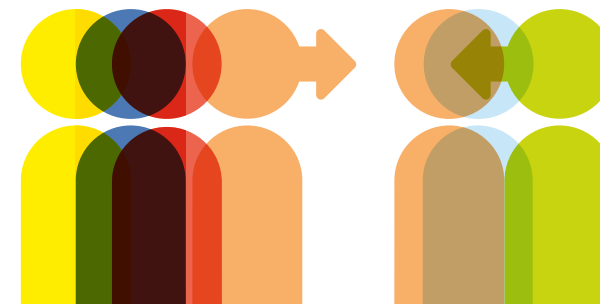
KEY RRI LEARNINGS FROM THE PRACTICE

Diversity & Inclusion	This initiative includes a wide group of contributors, from different personnel at Experimentarium to mixed groups of visitors.
Openness & Transparency	'Identity' and 'clarity' are central, both of which closely relate to 'openness and transparency'. Open involvement of designers and visitors in defining thematic areas is crucial.
Anticipation & Reflectiom	The methods used during meetings with different stakeholders have focused on anticipating future needs, both in the science centres, and of the visitors, as well as reflecting on how these needs can be fulfilled.
Responsiveness & Adaptive Change	The involvement of a broad group of stakeholders was not only a strategy for responding to certain needs; it has also resulted in the will to make adaptive change.

Contact the developers: Science Centre Experimentarium www.experimentarium.dk

Sheena Laursen, Experimentarium (Copenhagen, Denmark) sheenal@experimentarium.dk

RRI Toolkit: Experimentarium is one of the hubs organising local activities in Denmark.

To access other resources made available by Experimentarium, check here.

4.6 'AHA' MOMENTS IN A NEW AGE OF INQUIRY

The Aha-Study format was developed by the Science Centre AHHAA Foundation in Estonia to meet the needs of students and contribute to the implementation of 21st century learning skills through national curricula in STEM education.

The Aha-Study approach focuses on the needs of young learners with an emphasis on teamwork, open questions and collaborative problem solving. It takes into account the 'agile' approach many IT companies now use for project development, which recognises there is more than one way for a project team to develop a product or service by a deadline. This agile approach is about competences and not working in isolation.

The central tenet of Aha-Study sees the science centre building act as an interactive classroom for the whole study day. It connects several subjects related to one of the following key phrases: human anatomy, mind and senses, health and nutrition, electricity, astronomy, geology, backyard, water, forests, and mathematics.

Each group is given different tasks, and they have to organise themselves, taking different roles and making decisions about how best to answer or solve the task: they are responsible for the decisions they make. As there are no fixed answers, groups are encouraged to see the richness of failure or uncertainty, discussing how they can improve on their results. When they need the help of the explainers, they can reach them, but s/he will give them new questions rather than answers!

A typical Aha-Study Day consists of an introduction to the day's topic, laboratory work, inquiry-based group assignments with the exhibits, a science theatre show and a concluding session to reflect and wrap up the day**.**
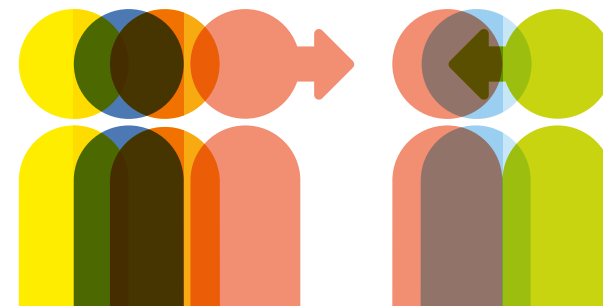
During the science theatre show, students are spectators but only for a while, as the whole play allows them to go through the topic again. Theatre is important because it reinforces different ways of learning: listening, watching and moving are all taken into account as crucial ways to gain knowledge and skills.

The conclusion session is a very honest one: the AHHAA team asks students about their emotional response to sessions, what they missed, what they didn´t like, and if the work was too complicated. They can speak about everything and are encouraged to be critical: the chance for students to express what they didn't enjoy is quite uncommon. This valuable information is often missed but, in this case, it is part of the reflection.

This stage of the day provides an opportunity for honest reflection and builds trust in AHHAA. Teachers and their student groups usually return to the Science Centre and they tend to act differently the second time around: they take the activity more seriously and the relationship is totally different.

AHHAA treat students as experts in learning, as thinking and emotional beings: the students are given the concepts, but they and AHHAA can adapt activities after the original input. For the team working on this format, the best sign that the Aha Study Day works is when teachers and students come back to the Centre and give them feedback: the team has broadened the centre's reach enough to generate new ideas.

An overview of a study day is available here www.youtube.com/watch?v=iRNDMKGT_O8

Contact the developers: Liina Vaher, Science Centre AHHAA (Tartu, Estonia) Liina.Vaher@ahhaa.ee

RRI Toolkit: AHHAA is one of the hubs organizing local activities in Estonia.

Check the calendar of events here.

Following RRI

must lead to mutual benefit

Diversity & Inclusion	This format prepares the students for current trends in innovative working environments, in which job roles are less important than the need to solve tasks in a collaborative way, through peer learning and working. Topics are diverse and this model looks at the students as experts in learning.
Openness & Transparency	Openness and honesty are fostered during the whole study day: everyone is able to share their points of view, through discussions and critical thinking. Emotions are part of the learning process too and they are taken into account as a component that everyone can share. Trusting your team, being transparent in sharing results and explaining how you got them, are all skills that are fostered by this programme.
Anticipation & Reflectiom	This requires students and teachers to anticipate how information about scientific research and innovations might be uncovered. It also offers reflection on those findings and the learning process more generally.
Responsiveness & Adaptive Change	Feedback is the key to development. The format is created and adapted with feedback collected from students and teachers during each study day. This is carefully analysed by the executive team.

Learning format: Aha — Study!?, Ahhaa Science Centre, Estonia

4.7 KEEPING FINGERS ON THE PULSE OF FAMILY HEALTH

The PULSE exhibition at Experimentarium in Denmark aims at improving the health of visitors. Selected as one of the inspiring practices by the RRI Tools project, it serves as an international model that demonstrates how exhibitions can involve visitors, exhibition developers and researchers in the co-creation of an exhibition and activities.

From the very beginning, the PULSE project's concept has been to involve all stakeholders, including users, researchers and designers in developing the concept and framework of the exhibition. The exhibition will also generate a set of methodologies for participatory exhibition design, as well as evidence of the impact such activities have on family health. Despite the serious undertones of PULSE, effective RRI can take on many creative and fun forms, such as a co-created hybrid of science exhibition and lifestyle intervention, where all members of a family or group are involved.

Contact the developers:

Sheena Laursen, Science Centre Experimentarium (Copenhagen, Denmark), sheenal@experimentarium.dk
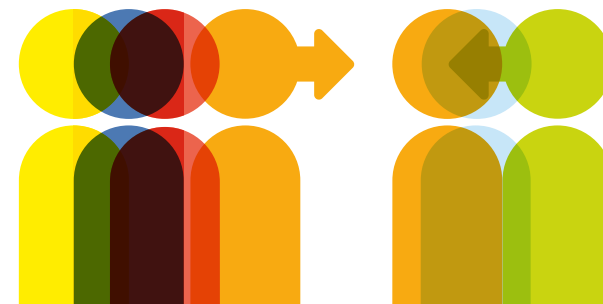
KEY RRI TAKEAWAYS

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Diversity & Inclusion	A main focus area is inclusion and participation of citizens with different ethnic and socio-economic backgrounds; the processes were specifically designed to increase social diversity. The team behind the project also consisted of people from different professional backgrounds, emphasising the interdisciplinarity of the project.
Openness & Transparency	By starting with ethnographic studies, the project gained a thorough knowledge of the differences in target groups and practices. The team subsequently used that knowledge to tailor information and create communication and interaction strategies for different groups.
Anticipation & Reflectiom	Dominant notions of health, responsibility for individual health status and standard notions of how to live a healthy life were challenged to better accommodate different practices of family and social life, and improve communication around health.
Responsiveness & Adaptive Change	The co-creation process involved ongoing dialogue with users. Users' involvement, values and perceptions were all of major importance in the design process and determined whether some of the developers' conceptions were discarded.

PULSE, a co-designed exhibition turning everyday life upside down, Experimentarium, Denmark

4.8 SYNBIO VANILLA FLAVOUR: A WORKSHOP TO ENGAGE

The workshop, developed by MUSE – the Science Museum of Trento, Italy –demonstrates the innovative techniques used to produce vanillin and includes a number of important 'ingredients' to grab citizens' attention and encourage them to participate in the Responsible Research and Innovation process. For example, a lecture can only go so far in capturing the imagination, so after an introduction to vanilla and an overview of vanillin production, the facilitator begins a practical demo. This takes the form of puzzles comprised of pieces that represent four organism genomes (human, fungi and bacteria), and the respective genes and genomes involved in vanillin production. Players identify 'genes of interest' in the four organisms and move the pieces into a fifth puzzle representing yeast genome. The graphical simplification is key because it helps people to understand the otherwise complex genetic engineering procedure involved in vanillin production.

Inviting participants to think critically and apply their new-found knowledge is important to a successful workshop so, aside from the puzzle, three short video clips are shown: one explains industry's views on the benefits of producing synbio-vanillin; the second reports the critical view of an environmetalist organization; in the last one, an academic scientist offers an overview of more fundamental aspects of synthetic biology. Participants then assume the role of a funder, writing a replica cheque to prioritise just one area of synthetic biology research among the environmental, health and food sectors. In this way, the session pushes people to understand more about genetic engineering and how many of the ingredients in their cupboards got there, with feedback loops in place to ensure the workshop continues to engage people effectively.
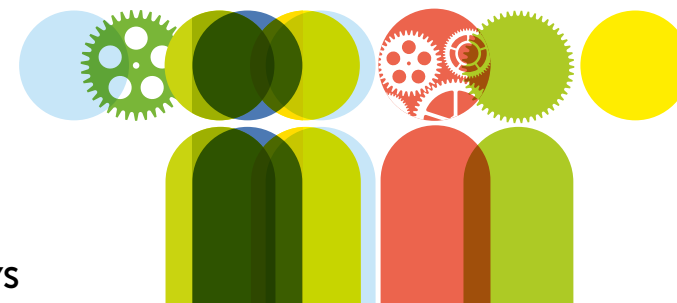
KEY RRI TAKEAWAYS

Diversity & Inclusion	The activity allows visitors to consider the views of different stakeholders in the field of synthetic biology.
Openness & Transparency	The workshop is geared towards stimulating open discussions around the subject of synthetic biology. Also, the workshop openly exposes citizens to diverse points of views of various stakeholders.
Anticipation & Reflectiom	The workshop invites visitors of the museum to reflect on the implications of new technology for various interest groups and stakeholders in the field of synthetic biology, but also for society as a whole.
Responsiveness & Adaptive Change	Citizens are introduced to the funding processes through role play. This activity creates a forum for citizens to voice opinions on the future of this field in a playful manner.

4.9 WHEN A SCIENCE CENTRE INCORPORATES RRI PROCESSES INTO ITS DNA

Whenever someone approaches Relais d'Sciences – Le Dôme with a project, the team first considers if all the necessary ingredients are there: research, openness, accessibility and knowledge sharing. Lately, the team added economical value as another criterion; it's not a 'must have', but raises interesting questions. Whether activities appeal to sports addicts with a footballer-bot workshop or to handwriting lovers, they allow communities with different competencies (developers, engineers, designers, business/industry, researchers) to engage and meet and mix with different audiences.

The Dome stretches the definition of the term 'science centre', but the team is confident in their work and the fact that people can figure out its role for themselves by seeing what the Dome is capable of. For instance, there is the Hope & Bike project, which started with a meeting between the Dome's FabLab and the Maison du Vélo bicycle group. With other partners, they built an open-source device that transforms egular bikes into fancy Electrically Assisted Cycles (EACs). Now the team has dedicated workshops where people train each other to make the device. In doing so, they share engineering and computing knowledge. The project made sense for the region socially, economically and, because of its innovative value, the team was able to build the Dome and buy the necessary equipment to get started. Now that a range of external groups have experienced the gains made from working with the project, they are able to sell their expertise by organizing and facilitating workshops, but the team maintains a strict policy that such efforts need to have an identified purpose with tangible outcomes.
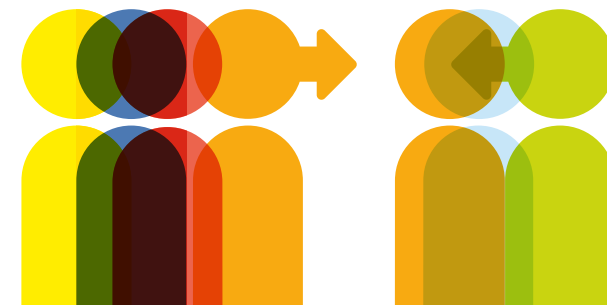
KEY RRI TAKEAWAYS

Diversity & Inclusion

For each project that the Dome's team decide to support, they question the type of community it addresses, and if this community is relevant to the Dome's project: i.e. are those people already sensitised or would they normally not feel concerned by what's going on there? A "yes" to the second option will give the project a better chance of benefitting from greater investment from the team. The idea is to solicit a community from their center of interest to foster their reflexivity.

Openness & Transparency

Both aspects are taken into account for any project brought to the Dome. Whatever decisions are made regarding "openness & transparency", they are the result of a discussion between all partners prior to even starting a project. Through this discussion, partners (even business and industry) realize the benefit they can gain from openness. Then, the team's expertise in science communication will help to make any content not only open, but really accessible.

Anticipation & Reflectiom

As B. Dosseur puts it **"The Dome's whole challenge is to question the evolving world around us"**. Each project is therefore fully steered toward this aim, whether talking about connected textiles, smart cities or experimental music, the team is careful

about convening all currents of reflection on the topic and documents the results.

Responsiveness & Adaptive Change

The Dome is strongly tied to its ecosystem and the team is made of people with very different backgrounds and networks. There is an intrinsic diversity which is the solution the rest of nature has found to best cope with unexpected changes. Whether it will be sufficient enough, it's too soon to tell. But as Bruno Dosseur puts it: **"The Dome will probably slip from our grasp, it's going to become something else, to evolve with other social mutations"**.

Contact the developers: Relais d'Sciences – Le Dôme www.relais-sciences.org/

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RRI Toolkit: Science Animation is one of the partners in the RRI Tools project.

See resources made available by Science Animation here.

RRI is 'how', not 'what'

Community planning Le Dome, France

5 TRY THE RRI TOOLKIT ON FOR SIZE

By now you have seen a range of examples demonstrating critical thinking at its finest. Now it's time to unleash your own curiosity by exploring the RRI Toolkit – the online repository of resources and experts. Below you will find an overview of some useful tools, projects and practices that are available in the Toolkit.

Getting up to speed

If you're getting started, try the introductory video to Science Education or Public Engagement. The DESIRE Toolkit can be useful for planning and implementing dissemination activities of the science education projects. You also might want to check out the open access Journal of Science Communication to learn about the latest trends in the field.

Citizen science

For organisations engaged in citizen science, the Citizens create knowledge project can provide plenty of inspiration on developing citizen science, while the User's Guide for Evaluating Learning Outcomes from Citizen Science provides a tool to measure the impact of such activities. More resources specific to citizen science can be found here.

Gender

The TWIST Guidelines, targeting mostly science centres and museums, will help to reflect on how to incorporate gender perspectives in exhibitions and activities.

Evaluation

The Evaluation Practical Guidelines will also help you to develop an evaluation framework for public engagement activities. Due to their roles as 'intermediate agents' promoting dialogue between different stakeholders, science engagement organisations can position themselves as active shapers of RRI and become local RRI hubs in their communities.

Join our RRI Community of Practice to discover new partners or connect with an expert, and to upload your own resources and practices on the RRI Toolkit!

Anticipation & reflection is triggered during each project supported by the Atelier Art-Science by selecting a project for which the LivingLab approach makes sense and with project managers genuinely ready to take feedback (from researchers & citizens) into account. The involvement of a diversity of stakeholders at the early stage, together with the involvement of the Atelier Art Science helps to raise new questions and issues in each project.

By presenting projects to diverse audiences at different stages, each project manager is in a position to respond and adapt his/her project to the constant feedback gained from those exchanges.

RRI is
about realizing that all of us are experts in different fields

RRI Tools Project partners and hub members

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UCL

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Euro Science

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efc EUROPEAN FOUNDATION CENTRE

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science animation

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