

## The use of the Research Ethics cards for enhancing reflexivity: Case study on detection of microplastics in salmon

H.S. Bjerklund<sup>1,2</sup>, T. Antonsen<sup>1</sup> and A.I. Myhr<sup>2,\*</sup>

<sup>1</sup>UiT-The Arctic University of Norway, Institute of philosophy and first semester studies, 9037 Tromsø, Norway; <sup>2</sup>NORCE-Norwegian Research Centre, SIVA Innovasjonssenter, 9019 Tromsø, Norway

\* Corresponding author, e-mail: [anmy@norceresearch.no](mailto:anmy@norceresearch.no)

### Abstract

Over the past ten years, the concept of Responsible Research and Innovation (RRI) has gained visibility, both in policy context as well as within academic discussions concerning science and technology. Research funding bodies in Norway do now include RRI as a requirement in calls for funding, especially in emerging technologies projects. However, the concept of RRI has been criticized for its unclarity in how the idea of RRI should or could be interpreted practically. Here we present our experiences of using the Research Ethics cards as an RRI approach to help researchers and research participants to enhance reflexivity regarding the effects and potential impacts of research. Our task was to apply RRI concepts to guide the development of the projects methodological approach for the study on nano- and microplastics in marine animals, e.g. salmon, to identify and reflect on the ethical aspects of their research. The methodological approach utilized in the project includes for example novel technologies such as advanced microscopy and modern gene technologies as -omics approaches. By using the Research Ethics cards in applying the RRI concepts, we found that the RRI facilitator can decide what role one wish to take, and it provides a common conceptual understanding prior to discussion. This approach allowed for open discussions and circumvented the challenge that employing RRI in technology projects become a one-way discussion and that the RRI facilitator owns the questions and the answer. Yet, common to other work on reflexivity, this methodology was not suited to address power asymmetries within the research group. We suggest that adding cards addressing the social situatedness can contribute to building awareness about potential power asymmetries in a research group. This may facilitate that all viewpoints become a part of the knowledge production and help researchers and research participants to reflect on ethical responsibilities in research and innovation projects.

**Keywords:** converging technologies, ocean health, power relations, responsible research

### Introduction

In ensuring that research processes and outcomes are in line with societal values, needs and expectations, research funding bodies have in the past years included the concept and the approach of Responsible Research and Innovation (RRI) as a requirement in calls for funding, especially in emergent technologies projects. As a policy concept, RRI entails a dynamic approach which aligns both the research/innovation process and its outcome with the values, needs, expectations and concerns of stakeholders and the society (Stilgoe *et al.*, 2013). Research funding programs in EU, UK and Norway have described RRI in terms of a set of process characteristics: anticipatory, inclusive, reflective and responsive (Forsberg and Wittrock, 2022; Owen *et al.*, 2012; Stilgoe *et al.*, 2013). Integrating these dimensions thus provides a general framework. Yet, the framework has been subject of considerable criticism due to its unclarity in how to interpret RRI practically (Borget *et al.*, 2017; Forsberg and Wittrock 2022; Owen *et al.*, 2012). In their systematic literature review of RRI practices, Schuijff and Dijkstra (2020) suggest that all RRI elements seem too complex to be realized in practice, and by focusing on specific characteristics, dimensions or values will lead to a more complete uptake. In this paper, we suggest an alternative methodology helping

researchers, managers, and research participants to identify and reflect on the ethical aspects of research and innovation.

Reflexivity, as one of the four RRI characteristics, is defined by reflecting ‘on underlying purposes, motivations, and potential impacts, what is known (including those areas of regulation or other forms of governance that currently exist) and what is not known, associated uncertainties, risks, areas of ignorance, assumptions, questions and (ethical) dilemmas’ (Owen *et al.*, 2012: p. 755). A commonly discussed practice geared towards stimulating reflection during ongoing research has been midstream modulation (Schuijff and Dijkstra, 2020). Midstream modulation includes an ‘embedded humanist’ which engages their ‘host’ in what can turn to be ‘high impact’ critical reflection as an ongoing part of their normal routines and activities’ (Fisher and Rip, 2013: p. 174). Similar methodology has also been discussed by Myskja and Myklebust (2022). Making use of Socratic dialogue in unstructured group interviews, the Socratic methodology begins by participating in an embedded humanist. Yet, since Socratic dialogue ‘entail a mutuality where both parts pose questions and give answers with a reciprocal critique of what the other says’ (Brinkmann and Kvale, 2005: p. 171 quoted in Myskja and Myklebust, 2022), such methodology, they argue is helpful in balancing the power relations between the interviewer and the interviewees and fostering exploratory dialogues within the group.

Building on insights from both midstream modulation and Socratic methodology, we suggest a methodology that balances the power relations between the moderator and the research consortium even further than the traditional Socratic method. By using the Research Ethics cards, we found that the RRI facilitator can decide which role to take. The approach allowed for open discussions and circumvented the challenge that employing RRI in technology projects become a one-way discussion where the RRI facilitator owns the questions and the answer. More so, this methodology helped researchers identify and reflect on important ethical aspects in their research on nano- and microplastics in marine animals, such as underlying purposes, motivations and potential impacts of the research project, and the researchers’ areas of ignorance and assumptions. Through a description of the approach and discussion of some key challenges, we show this method’s potential as a supplement to the catalogue of practical approaches to RRI.

## Methodology: the use of the Research Ethics cards in a project

Taking part in a cross-disciplinary research project performing a system biology approach to examine the nano- and microplastics impact on welfare of fish, applying RRI concepts were suggested to guide the development of the methodological approach. With the aim of strengthen the cross-disciplinary in the consortium, to introduce the concept of RRI to project’s researchers, and to generate an inclusive and broad conversation, we utilized the Research Ethics cards (Millar *et al.*, 2022). The cards are developed to help researchers, managers and research participants to identify, explore and reflect on their ethical responsibilities in research and innovation. Designed to raise awareness and ask questions about a wide range of values, aspects, attitudes and assumptions underlying research and innovation, the cards come in 14 categories: Social implications, environmental implications, economic implications, values and principles, participants and stakeholders, provocations in research, structural issues, research quality assurance, research practice, research dissemination, research engagement, research misconduct, research planning, and research questions.

Carrying out a two-hour workshop with the project consortium, the RRI facilitators prepared an introduction to RRI, followed by a conversation plan that including three categories: planning, conducting, and implications of research. We believed this structure would give the conversation an intuitive flow for the participants. In planning research, conversation starters included cards on research quality, aim, co-creation, research question, why, experimental design, hypothesis, research framing, and

## Section 6

risk assessment. For the conversation on conducting research, we had chosen 11 cards as conversation starters: hubris, reproducibility, publication concerns, non-maleficence, care, respect, research animals, you, your colleagues, whistleblowing, and uncertainty management. For the conversation concerning implications of research, we had chosen nine cards as conversation starters: economic cost, sustainability, pandoras box, dual use, retrospective view, accessibility, benefit sharing, biodiversity, and waste. Each of the cards includes a definition of the concept, a question, and a picture. The cards were chosen by the facilitators through discussion until agreement was reached prior to the workshop.

The facilitators randomly divided the group into two, including seven participants in each group. In both groups, every participant randomly received one card per category of conversation. Each conversation category lasted for about 15 minutes. In group I, participant A read out what was written on their card, and then chose participant B to answer the question. This was followed by opening the table for other participants to answer and bring in their perspectives. After a few minutes of conversation concerning participant A's card, participant B then read out their card to participant C, a round which we continued all through the conversation. In group II, a slightly different method was used. Like group I, one participant read out what was written on their card, including the question. However, in group II, the question was asked to everyone. In this group, the facilitator took a more confronting approach and thus contributed to the conversation with either comments or following-up questions, in line with a Socratic interview approach. After some time, the group moved on to a new card and a new question as the facilitator asked another participant to read out their card.

### Key topics identified in planning and performing research in the project

In the workshop, using the Research Ethics cards, the researchers identified and reflected on important ethical aspects in their research on nano- and microplastics in marine animals, both in line with the overall aim of RRI as well as the goal of enhancing reflexivity. In accordance with the RRI goal of enhancing reflexivity, the cards initiated reflections and discussions concerning underlying purposes, motivations and potential impacts of the research project, and the researchers' underlying assumptions. Among some of the topics discussed, the participants reflected on their role in the research project, the project's overall aim, how they are working on co-production, and questions concerning the moral status of their research animals. When discussing the card on 'respect', one researcher noted a moral difference between the farm salmon and the wild salmon, suggesting that also treating them differently seemed appropriate. The facilitator followed up by asking why the participant thought this way. Doing so, the groups began to discuss this assumption but also extending the conversation to respect for cells and cell cultures as well. By revealing certain assumptions, the methodology initiated reflections and discussions concerning these assumptions.

In line with both the specifics of the overall aim of RRI as well as the goal of enhancing reflexivity, the methodology facilitated a conversation about the potential impacts of the research results and in what way certain outcomes may impact societal needs and expectations in a negative way. In the past years, awareness of our extensive plastic usage has prompted serious considerations, leading to governmental attempts to address this pressing issue. By realizing that their research results may suggest no harm by micro- and nano-plastics, the researchers reflected on how this result could impact the use of plastic to increase even further than of today, inquiring whether such result would not align with societal values, needs and expectations. On a later topic concerning sustainability, the researchers acknowledged how the project itself employs great amounts of plastics. Since the research project is part of this societal mission of reducing such use, the participants discussed how they could reduce the usage of plastics in their research.

In addition to the goal of reflexivity and the overall aim of RRI, the methodology brought about awareness and discussions concerning research misconduct, dissemination, and quality assurance. On these topics, the facilitator took a more 'informing' role. When discussing the card 'whistleblowing', it became clear that the researchers did not know what to do in situations of, for example professional wrongdoing. Arguing that their group was very open and thus there would be no problem, the facilitator informed that whistleblowing could include fraud, corruption and so on. The facilitator then asked what the researchers would do if for example the research leader were corrupt. Following discussion, the facilitator informed the group of who to contact and the system which were in place for these situations. On the topic of 'publication slicing', the card itself informed the researchers of the concept and the card allowed the researchers to share their experiences of how expectations of publications from their research institutions can push the limit to what extent they used data and maximized outputs. Similarly, on the card concerning retrospective view, the researchers agreed that such review should take part in all research as in quality assurance and to support further reflexivity, yet, due to time constraints and economic reasons in project-based research there were rarely opportunities for this.

Overall, by facilitating reflections on topics which were new for many participants, the methodology ensured a common conceptual understanding prior to discussion. As the Research Ethics cards dictate the topic of the discussion, the facilitator can choose if one wants an 'organizing role' or if one wants to participate in the same way as the other participants. This flexibility thus eliminates power asymmetries between the facilitator and the participants even further than the Socratic methodology. In the same way as the Socratic methodology, the participants had the opportunity to challenge the active facilitator, as well as the cards' definitions and questions. Yet, the definitions provided by the cards balanced the power relations even further, ensuring that everyone started from the same point regardless of their prior knowledge of the concept. In addition, letting the questions from the cards dictate the topic of discussion circumvented the challenge that employing RRI in technology projects become a one-way discussion and that the RRI facilitator owns the questions and the answer. However, as a common problem in the RRI work on reflexivity, the methodology was not able to uncover power asymmetries between the participants within the research group.

## Power relations and knowledge production

Scientific practices are today the dominant force of knowledge production and circulation. This knowledge not only shape contemporary life but also the material conditions of existence through resultant technologies, science-based policies, and science-based decision-making (Grasswick, 2007). In the late twentieth century the question of who an epistemic agent is began to challenge mainstream epistemology as the 'neutral' epistemic agents mirrored certain social groups of society (McHugh, 2007). Analysing how power operates within and around particular social positions influencing knowledge production, Fricker introduces the notion of identity power, defined as 'a form of social power which is directly dependent upon shared social-imaginative conceptions of the social identities of those implicated in the particular operation of power' (McHugh, 2007: p. 4). In everyday testimonial exchange, the hearer makes use of shared social-imaginative conceptions of social identities about how far the speaker is trustworthy. In this interaction between the speaker and hearer, these shared social-imaginative conceptions can wrongfully undermine or overestimate the speaker in their capacity of knowledge. Further elaborated by Pohlhaus (2012), the social-imaginative conceptions also impact how the knower experiences the world and what the knower is more or less likely to notice and pursue as an object of knowledge. In both ways, identity power can by excluding certain perspectives and voices, hinder deliberations crucial to scientific inquiry and to undermine RRI's internal goals.

## Section 6

As recognized by many philosophers of science, scientific practices are dependent on discussion and deliberation (Hardwig, 1991; Kitcher, 1990; Popper, 1962). In a similar way, both the overall aim of RRI as well as the internal RRI goal of enhancing reflexivity requires a diverse spectrum of voices and perspectives to assess potential implications and societal expectations. Not to mention, to address what is known, what is not known, assumptions, questions, and so on. Going back to the methodology using the Research Ethics cards, identity power can play a crucial role in who gets to take part in the conversation, as well as what perspectives that are included and elaborated on. Both approach I and II described could potentially avoid one person talking too much (approach I), and make sure no participant gets a leading role, as everyone was challenged by the moderator (approach II). Yet, we experienced that the conversation was not equally shared between participants and the cards did not make visible the participants' social situatedness impacting how far a speaker is trustworthy, or the facts of hierarchies and power within the group. By not being aware nor addressing these power dynamics, important perspectives crucial to good scientific practice remain silence, thus failing to also align with RRI's overall aim and the goal of enhancing reflexivity. However, by adding cards addressing both the social situatedness as well as hierarchies and power within the group, the methodology could uncover and address the power asymmetries potentially hindering knowledge production. Importantly, it is by recognizing these power dynamics that one can ensure all viewpoints being voiced and that hidden structural effects of power imbalances are illuminated (Preston and Wickson, 2016).

## Conclusion

The Ethics Cards has been presented in our project as a new RRI tool to be used in natural science or technology projects. Although our project is not directly placed under the heading of emergent technologies but aims more in a basic research approach to use new technology to develop new methods for detection of effects by micro- and nano-plastics on salmon, the intention behind RRI makes it relevant also for such projects. For us in this project we aimed to promote reflexivity, to ensure high ethical standards, as well as promote openness. The Research Cards helped us to facilitate reflections on topics which were new for many participants, it created a possibility to reflect about the process of planning, conducting and implications of research, and the potential social and policy impact by the outcome of the research. To identify power asymmetry within a project and between the researchers and society we recommend developing Ethics Cards that can facilitate discussions about social situatedness.

## References

- Burget, M., Bardone, E. and Pedaste M. (2017). Definitions and conceptual dimensions of responsible research and innovation: A literature review. *Science and Engineering Ethics*, 23, 1–19.
- Fisher, E. and Rip, A. (2013). Responsible Innovation: Multi-level dynamics and soft intervention practices. In: Owen, R., Bessant, J., and Heintz, M. (eds.) *Responsible Innovation*. Wiley, Chichester, pp. 165–183.
- Forsberg, E.-M. and Wittrock, C. (2022). The potential for learning from good RRI practices and implications for the usefulness of RRI as an umbrella concept. *The Learning Organization*, 30: 671–687.
- Fricker, M. (2007). *Epistemic injustice: power and the ethics of knowing*. Oxford University Press, New York, NY.
- Grasswick, H. (2017). Epistemic injustice in science. In: Kidd, I.J., Medina J. and Pohlhaus, G. (eds.) *The Routledge handbook of epistemic injustice*. Routledge, London, pp. 313–323.
- Hardwig, J. (1991). The role of trust in knowledge. *The Journal of Philosophy*, 88, 693–708.
- Kitcher, P. (1990). The division of cognitive labor. *The Journal of Philosophy*, 87, 5–22.
- McHugh, N.A. (2017). Epistemic communities and institutions. In: Kidd, I.J., Medina J. and Pohlhaus, G. (eds.) *The Routledge handbook of epistemic injustice*. Routledge, London, pp. 270–278.
- Millar, K.M., Hyde, R. and Craigon P.J. (2022). Constructing ethics for the 'Ethics in Research' card-based tool: Concepts and categories. Presented at EURSAFE.

- Myskja, B.K. and Myklebust, A. (2022). Socratic dialogue on responsible innovation – a methodological experiment in empirical ethics. *Nordic Journal of Applied Ethics*, 17(1), 29–44.
- Owen, R., Macnaghten, P. and Stilgoe, J. (2012) Responsible research and innovation: From science in society to science for society, with society. *Science and Public Policy*, 39, 751–760.
- Pohlhaus, G. (2012). Relational knowing and epistemic injustice: Toward a theory of willful hermeneutical ignorance. *Hypatia*, 27, 715–735.
- Popper, K. (1962). *Conjectures and refutations: The growth of scientific knowledge*. Routledge, London.
- Preston, C.J. and Wickson, F. (2016). Broadening the lens for the governance of emerging technologies: Care ethics and agricultural biotechnology. *Technology in Society*, 45, 48–57.
- Schuijff, M. and Dijkstra, A.M. (2020). Practices of responsible research and innovation: A review. *Science and Engineering Ethics*, 26, 533–574.
- Stilgoe, J., Owen, R. and Macnaghten, P. (2013). Developing a framework for responsible innovation. *Research Policy*, 42, 1568–1580.