

Chapter 3

A Report from the Field: Doing RRI from Scratch in an Assisted Living Technology Research and Development Project



Ellen-Marie Forsberg and Erik Thorstensen

Abstract The transdisciplinary Assisted Living project conducts research within ICT, health science, social science and ethics. The overall aim of the project is to advance responsible research and innovation (RRI) in the field of welfare technology. By adapting an RRI framework, the project aims to: (a) map how stakeholders and experts perceive the state-of-the-art of responsible welfare technologies, focusing on assisted living technologies (ALT), in Norway and internationally; (b) develop ALT solutions for users with mild cognitive impairment and dementia (MCI/D), through an RRI approach; (c) judge by an integrated HTA approach whether technologies introduced through an RRI process score better than currently implemented technologies; and d) create a wider dialogue on responsible welfare technologies for the future, reflecting on alternatives and options. In the project RRI is operationalized as involving four dimensions: (i) A specific focus on addressing significant societal needs and challenges, (ii) A research and development process that actively engages and responds to a range of stakeholders, (iii) A concerted effort to anticipate potential problems, identify alternatives, and reflect on underlying values, and (iv) A willingness from relevant actors to act and adapt according to 1–3. These dimensions are built into the project’s design in different ways. The project, funded by the Research Council of Norway, started December 2015 and we have by now had substantial experience with working with these dimensions in practice. This paper will describe the experiences with including needs assessment, engagement, anticipation, reflection and responsiveness in the project, after 1.5 years operation. The paper will highlight several challenges that

The original version of this chapter was revised: For detailed information please see Erratum. The erratum to this chapter is available at https://doi.org/10.1007/978-3-319-73105-6_13

E.-M. Forsberg (✉) · E. Thorstensen
Work Research Institute, Oslo and Akershus University College, Oslo, Norway
e-mail: ellenmarie.forsberg@hioa.no

E.-M. Forsberg · E. Thorstensen
Akershus University College (HiOA), Pilestredet 35, 0166 Oslo, Norway

© The Author(s) 2018
F. Ferri et al., *Governance and Sustainability of Responsible Research and Innovation Processes*, SpringerBriefs in Research and Innovation Governance, https://doi.org/10.1007/978-3-319-73105-6_3

have appeared in the project when doing RRI in practice, related to transdisciplinarity, communication, project planning and control, and quality. We believe that the challenges experienced in our project are typical of RRI projects, so it is important to create open discussions about the pros and cons of RRI projects in the community of RRI practitioners.

3.1 Introduction

Assisted living technology (ALT) is a generic term for a heterogeneous group of technologies, often used in care for persons with mild cognitive impairment or dementia (MCI/D), involving for example videophones, robotics, GPS technology and monitoring systems to enhance security and safety and enable people to live an independent everyday life at home and in the community. The political interest in ALT has been more pronounced than the actual use of these technologies, because of factors related to organisational culture among care providers, technological alienation among elderly, and a lack of anchoring of the technologies with the relatives of the persons with MCI/D (Calvaresi et al. 2017). In contrast, within a Responsible Research and Innovation (RRI) line of thought innovations should not be pushed *on* society, but rather be developed *with* society, to meet the needs *of* society. RRI has been interpreted as a comprehensive approach of proceeding in research and innovation in ways that allow all stakeholders at an early stage (A) to obtain relevant knowledge on the consequences of the outcomes of their actions and on the range of options open to them and (B) to effectively evaluate both outcomes and options in terms of societal needs and moral values and (C) to use these considerations (under A and B) as functional requirements for design and development of new research, products and services (European Commission 2013a: 3).

However, even if there seems to be a need for RRI in ALT development, practising RRI raises some specific challenges in this field. Many of the main stakeholders (persons with MCI/D) will have problems discussing technology options with researchers and developers. An RRI approach will, therefore, have to adapt to this situation by facilitating communication at a level on which the user is able and comfortable to engage, and also involve other relatives or supports the user may have. Another specificity of RRI in assisted living technologies is an apparent technological alienation among the main users.

The still rather philosophical concept of RRI has been operationalised in the ICT field through projects such as *FRRIICT*, *ETICA* and *Framework for RRI in ICT*, and specifically for assisted living technologies in the *Responsible Industry* project. However, there is as of yet no commonly agreed upon procedure or governance framework for RRI, neither for research and innovation in general, for ICTs nor for assisted living technologies. There is thus a need for case studies and experiments with incorporating RRI approaches in technology development in this field, and the Assisted Living project amounts to an important contribution to such experimentation.

3.2 A Case Study in RRI

The Assisted Living project engages in development of technological solutions to needs defined by persons with MCI/D themselves in an RRI process specifically adapted to the capacities of such user groups.¹ By adapting an RRI framework, the project aims to: (a) map how stakeholders and experts perceive the state-of-the-art of responsible welfare technologies, focusing on assisted living technologies, in Norway and internationally; (b) develop ALT solutions for users with mild cognitive impairment and dementia, through an RRI approach; (c) judge by an integrated HTA approach whether technologies introduced through an RRI process score better than currently implemented technologies; and (d) create a wider dialogue on responsible welfare technologies for the future, reflecting on alternatives and options. The project is designed to be both an important contribution in the process of ALT innovation in Norway and to enrich and inform RRI in both concept and practice. The project is transdisciplinary and integrated, with project partners from nursing science, occupational therapy, automation and electronic engineering, sociology, philosophy, ethics and technology assessment (TA), and includes a smart home/welfare technology company and close collaboration with Oslo Municipality.² The overall aim of the project is to advance responsible research and innovation (RRI) in the field of welfare technology.

The technology intervention in the project is carried out in a housing complex in Oslo, where elderly that have certain needs, but are still able to live independently at home, can rent apartments in a building that also contains a restaurant, physiotherapy, exercise groups, etc. On the generic level, the technology solutions explored in the project will provide an automated environment to support the patient's everyday activities and provide a framework of safety. We incorporate existing sensor, telecommunication and automation technology and develop self-learning solutions that interpret, anticipate and intervene as required. The specific nature of the solutions explored in the project is determined as a result of user engagement and is therefore still under development. However, the long-term goal of the project is to develop self-learning systems (i.e. machine learning) that can provide useful cognitive support in accordance with individual values, choices, and needs.

This paper will give a brief description of the RRI method in the Assisted Living project's technology development project. The project started up in December 2015 and runs over four years, so we here only present the RRI design of the project and some preliminary results.

¹See <https://assistedlivingweb.wordpress.com/>. The project is funded by the Research Council of Norway, under the SAMANSVAR programme (grant no 247620/O70).

²See <https://assistedlivingweb.wordpress.com/english/partners/>.

3.3 Operationalising RRI

In the project we refer to Wickson and Forsberg's (2013) spelling out of what they argue to be common dimensions in most RRI approaches:

For research and innovation to be responsible it needs to include:

1. A specific focus on addressing significant societal needs and challenges,
2. A research and development process that actively engages and responds to a range of stakeholders,
3. A concerted effort to anticipate potential problems, identify alternatives, and reflect on underlying values, and
4. A willingness from relevant actors to act and adapt according to 1–3.

These four dimensions are then operationalised in different ways. In the remainder of the paper we will go through these four dimensions and present some preliminary reflections on their operationalisation in practice.

3.4 Addressing Significant Societal Needs and Challenges

The project inherently addresses the grand challenge of the aging population. In addition, we have designed a comprehensive process to better understand the needs of elderly. We do this in several ways;

1. a survey among elderly who receive home-based services
2. open dialogue cafés with elderly at the study location in Oslo
3. inclusion of a selection of elderly from the study location in a technology intervention study, including a thorough assessment of their needs
4. focus groups with employees in home based services
5. focus groups with next-of-kin to the individuals included in the technology intervention

At this point, we already have quite a lot of results from activities a) to d), but we still include more elderly in the survey, will organise more dialogue cafés and will include more individuals in the technology trials.

An important challenge so far has been to uncover real needs. We have so far organised four dialogue cafés where we first explored general challenges in elderly's daily lives, then explored generic technological solutions to some of these challenges, proceeding to explore pros and cons of some concrete solutions and finally to invite the participants to try out two solutions. However, even if eight participants were willing to try out these solutions, it turns out that several of them do not actually have much need for them.

There are several ways to account for this situation. One important reason is that the elderly at this location want to be positive and collaborate with us even if they don't personally need the solutions. Another might be that in the design of the dialogue cafés we asked the elderly to discuss generic user stories in order to avoid creating socially awkward situations where too much personal information was shared. This has resulted in feedback on generic situations, and not necessarily the individuals' particularities. We have also asked the elderly to be co-researchers with us, rather than insisting on them having certain needs we will solve in the project. This is an empowering research strategy, but does not guarantee that the project meets actual needs of specific individuals (even if there is evidence that elderly in general may have such needs). So in the project, we have uncovered challenges that probably are reasonably representative (see Zouganeli et al. 2017 for a list of these), but the first technology solutions to be tested do not necessarily represent solutions to needs experienced by this particular test group.

3.5 A Research and Development Process that Actively Engages and Responds to a Range of Stakeholders

In the project, we engage with elderly at the study location through dialogue cafés and technology trials, as described above. We also meet them through the survey in the home-based services. Through focus groups, we have also engaged with staff in the home-based services and we will engage with next-of-kin. These interactions help us outline the direction for the technology development in the process.

In addition to this, we engage with a broader range of experts and stakeholders to discuss the design of the research project as such, methodological choices, project activities and preliminary results. This group, called the ProjectSTEP group, functions as a combination of a steering group and a sounding board. An important function of the group is to discuss the situation analysis in the project and critically reflect on the framing of the issues and the plans and methods for developing and assessing the ALT solutions in the project. The group follows a version of the procedures of the so-called TranSTEP group as described in <https://transtepapproach.wordpress.com/doing-transtep/> (see Forsberg et al. 2015).

Finally, we want the learning generated from the reflections in the project team, the ProjectSTEP group and dialogue cafés to be disseminated to and discussed with a larger group of national stakeholders. This will take place in two conferences; one focused on foresight and one on presenting and discussing the project's main learning points.

3.6 A Concerted Effort to Anticipate Potential Problems, Identify Alternatives, and Reflect on Underlying Values

As described above the mandate of the ProjectSTEP group is to help the project anticipate problems, identify alternatives and reflect on underlying values. In addition, such reflection has a dedicated slot in each consortium meetings' agenda. In this slot we specifically reflect on the learning processes in the project. In the kick-off meeting, we included the following reflection:

1. Write down 3 words that represent good transdisciplinary research cooperation for you
2. Any comments? Anyone who wants to explain their choice of words? Or comment upon others' choices?
3. How can we—and each one of us—ensure that these qualities are followed up in the project?

In the second consortium meeting we reflected on how much the different disciplines of the Assisted Living project need to understand of other disciplines and parts. Each team member was to fill in a three column set-up indicating what they believed they needed to know about other partners' research, what they would like to know and what they believed was not necessary for them to know.

In the third consortium meeting the reflective exercise was for each to fill in the following statement: When we present our solutions (as you envisage them) to the elderly, I expect [...] because [...]. The intention here was to explicate our assumptions and expectations about the elderly's relation to technology. As all project team members filled this out, it allowed us to better understand similarities and differences in assumptions and expectations within the consortium and reflect on these.

The fourth consortium meeting was a shorter meeting addressing a situation where it had become clear (referring back to the second reflection exercise) that some issues were elevated from being 'nice to know' to 'need to know', as they had implications for privacy questions, general research ethics and costs. The character of the technology research was here in focus and we discussed what characterizes RRI projects compared to other user-oriented research and development projects. A relatively unique feature of the Assisted Living project is that it is a technology development project lead by an RRI partner. In most integrated technology projects, the project leader is the technology partner and the RRI partner contributes in different ways to make the technology development process more reflective or responsive to societal concerns. In the Assisted Living project the balance between the partners—the technologists, the health researchers and the RRI partners—is tipped more in the direction of RRI, not least because there are four partners with RRI competence in the consortium.

These discussions are crucial, but challenging, as all partners need to reflect on their own roles, their own expectations to the project, assumptions about scientific quality, and wishes for project outcomes.

3.7 Responsiveness—A Willingness from Relevant Actors to Act and Adapt According to 1–3

The final dimension in the project is responsiveness. The project is designed to be responsive, and the funder,—the ‘co-responsibility’ program in the Research Council of Norway—has allowed for (and indeed encourages) flexibility to proposals from stakeholders during the project. An obvious expression of responsiveness is the way we have made decisions on technology solutions as a result of listening to the users.

Another expression of responsiveness is the project’s policy with regard to input from the ProjectSTEP group. During the meetings in the ProjectSTEP group, the project team is not supposed to respond immediately, but rather listen (and explain, when this is necessary). After the ProjectSTEP meetings, the project team discusses what we’ve learned and responds systematically to the input. Some input we take simply for our information, other we adapt to, and some input we deem out of scope for the project. These responses are then published on the project’s webpages (<https://assistedlivingweb.wordpress.com/the-projectstep-group/>), in order to transparently show how the project is responsive to input. An example of a change made from input from the ProjectSTEP group was to expand the project’s focus from the MCI/D diagnosis to frail elderly in general, as the technological research in the project is not only relevant for those with a diagnosis.

In addition to these planned responsiveness measures, we have also learned the necessity of being responsive to unexpected practical issues that affect the research, especially related to the engagement of the elderly at the intervention site. In order to be successful, the project must be sensitive to social dynamics at the site, to practical particularities of the individual elderly’s home, daily routines, varying health conditions and wishes, and to technical challenges related to sensor equipment, data transfer, etc. This makes it clear that the flexibility of such an intervention project is crucial. This flexibility also implies that ethical considerations cannot simply be carried out ex-ante, at the planning stage, but must be a continuous reflection as the project evolves.

3.8 Concluding Remarks

We are still in the very beginning of the technology trials in the process. These trials will give us more quantitative and qualitative data on de facto technology use among the elderly. Working with technology implementation in the field will also

likely bring up further issues concerning the transdisciplinary interaction in the project. These results will be discussed as the project advances.

References

- Calvaresi D et al (2017) Exploring the ambient assisted living domain: a systematic review. *J Ambient Intell Humaniz Comput* 8(239–257):239
- European Commission (2013) Options for strengthening responsible research and innovation report of the expert group on the State of Art in Europe on responsible research and innovation. http://ec.europa.eu/research/science-society/document_library/pdf_06/options-for-strengthening_en.pdf
- Forsberg E-M, Ribeiro B, Heyen NB, Nielsen RØ, Thorstensen E, de Bakker E, Klüver L, Reiss T, Beekman V, Millar K (2016) Integrated assessment of emerging science and technologies as creating learning processes among assessment communities. *Life Sci Soc Policy* 12:1–20. <https://ssjournal.springeropen.com/articles/10.1186/s40504-016-0042-6>
- Wickson F, Forsberg E-M (2014) Standardising Responsibility? The significance of interstitial spaces. *Sci Eng Ethics* 21:1159–1180
- Zouganeli E, Casagrande FD, Holthe T, Lund A, Halvorsrud L, Karterud D, FlakkeJohannessen A, Lovett H, Kjeang Mørk S, Strøm-Gundersen J, Thorstensen E, Norvoll R, ter Meulen R, Kennedy M-R, Owen RJ, Ladikas M, Forsberg E-M (2017) Responsible development of self-learning assisted living technology for older adults with mild cognitive impairment or Dementia. In: Röcker C, O'Donoghue J, Ziefle M, Maciaszek L, Molloy W (eds) Proceedings of the 3rd international conference on information and communication technologies for ageing well and e-Health., ScitePress. pp 204–209 <https://doi.org/10.5220/0006367702040209>

Open Access This chapter is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

