DOWN TO EARTH: FROM ENVIRONMENTAL ABSTRACTION TO ACTION USING INTERACTIVE RESEARCH

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ABSTRACT

Contemporary knowledge production is characterised by the inclusion of a multitude of participants in the research process. Considering environmental issues this is also necessary to be able to reach solutions to these issues. This paper discusses three cases of cross-sector collaboration where interactive research was used. It was shown that interactive research can facilitate the interaction between the abstract issue in the research system and actual action in the research system. This was mainly done by creating collaborative spaces in the form of dialogue arenas which are discussion forums initiated by the interactive researcher. Here the abstract issue can be discussed on a level of practice which makes it easier to comprehend and paves the road for action among the participants.

INTRODUCTION

In the past, collaboration has been the way to solve complex problems for humanity. Collaboration founded on abstract goals has been part of this, for example building nation states and engaging in complex scientific endeavours (Harari, 2014; Pagel, 2012). We now face environmental challenges that are complex, abstract and difficult, to the degree of wicked problems which are difficult to define and find solutions for (Blythe et al., 2008). Abstract environmental challenges exist on a macro level in the research system and require input from a large scientific community to be established. One such challenge is the realisation that we live in the Anthropocene, meaning that humans are changing the environment to a degree that the current epoch we live in is defined by this (Steffen et al., 2007). The concept of planetary boundaries has shown us the limits of our earth and that we are surpassing several of those limits (Steffen et al., 2015). Further, climate change is another such issue that cross sector boundaries and influences people on all levels. It is exactly these problems humankind need to work together through means of collaboration to solve (Cornell et al., 2013; Gray and Stites, 2013). Collaborative research is one way to gather our competences and solve these challenges. It has been noted that action research methodology can be particularly helpful in approaching environmental issues collaboratively (Bradbury, 2001; Wittmayer and Schäpke, 2014). The aim of this paper is to answer how interactive research, a type of action research, can be used to bridge the gap between research and practice when undertaking abstract environmental challenges.

The idea of a Mode 2 of science argues that the embeddedness with society is a key aspect of current science (Gibbons, 1994). Further on, it has been proposed that science is now conducted in a Mode 3 where democracy and participation are considered important parts of research and innovation. Here environmental problems can even be framed as possible drivers for knowledge-production and innovation (Carayannis and Campbell, 2014) rather than hindrances. In a Mode 3 of science (Carayannis and Campbell, 2011) the natural environment works as an overarching framework for cross disciplinary and cross sector collaboration. This paper will discuss the ways in which interactive research can facilitate collaborative processes.

In particular the paper discusses previous cases of collaborative research within environmental science. Environmental scientists have considerable knowledge about environmental issues but this knowledge needs to be shared and developed collaboratively with other disciplines and sectors. However, complexity arises when interacting with other disciplines and sectors. While the environmental problem are motivate the collaboration, challenges related to the collaboration itself and social processes emerge (Cortner, 2000). Such collaborations are often motivated by ideas on an abstract level which can be overarching environmental issues or ideas that collaboration is important for innovation development. When undertaking such issues the actual collaborative process itself is often neglected. Here interactive research can help to facilitate collaborative processes as well as the technical processes.

While large scale environmental problems seem abstract to most people, these problems can also be effective as common goals when coordinating efforts towards solutions. At the same time these need to be connected to a level of practice to be used in local agendas meaning action to approach these issues occur among participants. In this paper a model for environmental collaboration based on previous interactive research is presented. In this model the interactive researcher works as a facilitator between research and practice. Solutions to complex environmental problems require collaboration between sectors and disciplines. New ways of interaction are needed to tackle these challenges.

THE INTERACTIVE RESEARCH APPROACH

The interactive researcher, the main author of this paper, had the role of a sociologist working in an environmental technology research group. Interactive research differs from action research (Greenwood and Levin, 2007; Reason and Bradbury, 2006) in a couple ways. It was developed as a Scandinavian approach in the area of workplace learning. An important feature is downplaying the responsibility for the researcher to provide change in an organisation, balancing the distance and closeness to practice. Further action research has had issues of developing theory and getting stuck with descriptive accounts of the research process (Svensson et al., 2007). Interactive research strives to keep a theoretical foundation for the study and thus keeping one leg in academia while working in the field. The researcher participated actively in these different collaborations by attending project meetings, establishing a rapport with most of the core participants and at the same time collecting data. Methods used included interviews, document analysis and observations to capture the collaborative processes.

Interactive research also created the means to facilitate the interactions between the research system and practice system (Ellström, 2008; Svensson et al., 2015). The research system consists of the researchers and their

research based knowledge. The practice is the organisation and its members and their professional knowledge. Practice then is the everyday context where practitioners work, being professionals in their corresponding areas (Schön, 1991). Practitioners use their experience and know-how to meet everyday challenges. It can be the expert at the municipality, the environmental consultant or the engaged citizen. Interactive research acknowledges that practice benefits the collaborative processes and provides new knowledge about these. The main way this was performed was by the creation of common dialogue arenas (Rosenlund and Rosell, 2017). These were workshops, seminars and other meeting places, with a defined agenda based on the problem at hand. The aim was to create a democratic dialogue about the problem by including a variety of actors from different disciplines and sectors. This encouraged an engagement between research and practice and formed a collaborative understanding of the problem.

In these dialogue arenas participants got the opportunity to discuss the collaboration itself as well as the environmental issue. A total of five arenas were performed in three different projects. As the ideas from the research system was brought down to practice here this opened up for participants to deliver their own understanding of these ideas. This also meant that the interactive researcher could validate the results from the data collection and analysis. The empirical material will be presented below as a narrative highlighting particular events in the research process.

A NARRATIVE FROM THE RESEARCH PROCESSES

The following narrative is based on the recent PhD process of the main author. It entails three instances of interactive research (Rosenlund et al., 2017; Rosenlund, 2017; Rosenlund et al., 2015). These all had in common the challenge of the collaboration between multiple sectors and disciplines to solve environmental problems. The collaborations were based on problems covering a Europe wide cluster aiming to solve wastewater issues in the olive oil industry, solving wastewater issues in a local wood industry and a regional approach to the circular economy in the form of increased waste recycling and management. These three instances were studied and analysed separately and this paper aims to discuss the common lessons that emerged from these three. While the situations varied between the three main cases this narrative serves as a way to capture the research environment for the interactive researcher. It serves to be a representation of the full empirical material focusing on the interactive process.

It all started when a sociologist came for a job interview concerning a position as a project assistant in an environmental technology research group. The group had a tradition of working collaboratively with industry and the professor had an interest in learning more about the collaboration itself and how to make this work

better. When this turned to a PhD project the researcher became involved with three different projects with the common theme of cross-sector collaboration. As the researcher was part of these collaborative projects and did research about them this called for a methodology to deal with the dual role of researcher and practitioner. Thus, the researcher adopted an interactive research approach, which provided the tools necessary to deal with distance and closeness to the processes and participants.

The interactive researcher saw a common theme in these projects: these were motivated simultaneously by environmental concerns and theories of knowledge production based on the idea that collaboration between sectors was crucial to find innovative solutions. One such idea was the triple helix model. The original intent of the triple helix idea was to analyse contemporary knowledge production and the role of innovation creation in the intersection between university, government and industry sectors (Etzkowitz and Leydesdorff, 2000). The triple helix became something else than originally intended in these projects and there was a constant discussion in the projects of what to do with the idea of triple helix. Participants included representatives from industry, business, municipality, regional councils and university. It served as a way to get the funding for the project in the first place and as a good intention of getting closer to solving the environmental problems by including non-university participants.

The environmental scientists that participated in the collaborations contributed with good technical research about the problems but this was in many ways separated from the other actors. For example, the sampling was performed within the industry but the lab work and final results were published in scientific journals and PhD theses. This academic writing created a distance from the collaborative partners as these were not as accessible as for example technical reports.

There were project meetings and a constant dialogue with the other sectors but there was also a need to share the results and the possible impacts of these results. The dialogue arenas gave room for discussing both the collaborative issues and the environmental problems in a democratic manner. The scientists were encouraged to present and share their results by other means than scientific publications. These dialogue arenas also provided an opportunity to discuss the collaborative challenge where the voices from industry and public sectors were valued on the same level as the scientists.

For the interactive researcher these dialogue arenas provided an exciting opportunity to study collaborative understanding of the environmental issue and the collaborative challenge. It was also the interactive researcher that took the initiative for these dialogue arenas. It was shown that there was also a bottom-up understanding of these issues that weren't shown in the official project documents, reports or publications.

Participants started to ask questions such as "what does this issue mean for me?" or "what can we do in our collaboration to approach this issue?". The research showed that these issues or ideas become something else in practice that might not be the original intention. By reflecting in this manner these issues were brought closer to practice which. In doing so these were translated form abstract aims to possible action.

This occurred in particular during one case where the scientists had statistical data but did not know how this could contribute to change. A report was written and distributed to non-university participants. During the interviews it was shown that the participants did not really use or understand the report fully. They mentioned that it was too long and too academic and requested more pictures and short overviews. But during the dialogue arena the participants were encouraged to think about the environmental problem beginning with a starting point from their own organisations and private life. This meant that they found the results more useful and even brought back their thoughts to their own organisations.

Further, the abstract concept of circular economy, aiming for a more responsible use of resources, was discussed with a wide variety of participants. The concept was new to them but could be understood by the participants by means of discussing actual resource use and waste management in their respective organisations. This was done by creating a series of dialogue arenas where the circular economy was briefly presented. Then the participants were divided into groups to discuss the challenges that occurred in their life and organisations. Here they discovered good examples from each other and began to reflect upon solutions in their own organisations. Also they appreciated the opportunity to talk with participants from other sectors that they would not have met otherwise such as the waste management organisations.

A MODEL FOR ENVIRONMENTAL COLLABORATION

In the narrative above the research processes were to a large extent characterised by the challenge of bridging research and practice. By means of interactive research the abstract ideas from the research system were presented in dialogue arenas. However, it was the participants themselves that engaged in a dialogue about these abstract ideas and used their professional language to connect these to local and organisational challenges. This also helped to identify how these ideas from the research system could be used in practice. As such this also was a way to coproduce new knowledge that also benefited the research system. This supported the division of labour which is important for interactive research (Svensson et al., 2015) compared to action research which put emphasise the role of the researcher as a change agent.

Still the abstract nature of these issues also creates confusion and debate on a level of practice. These issues can be difficult to understand and to grasp. The problem is that these challenges do not translate well to a micro level of action. In research collaboration the research process is usually the main goal and the collaborative and communicative processes come second.

In research collaboration concerning environmental issues there is also a physical component that is outside of the control of the collaborators. This physical component is sometimes only available by means of collaboration. For example in one of the cases where the scientists studied wastewaters in an industry and contribute to establishing a pilot plant there. The physical world is understood by natural scientific means but the interactive researcher does not have to be an expert in this. Rather the interactive researcher works as a negotiator and boundary spanner (Long et al., 2013; Williams, 2002) working across the disciplinary and sector boundaries and connecting these. In these cases the dialogue arenas was the main method to facilitate a dialogue between sectors.

Without any facilitation or dialogue the different ways of working, organisational goals and values can create tensions in cross-sector collaboration (Ruuska and Teigland, 2009; Adler et al., 2009). Developing a common agenda and goal the partners can agree upon is therefore important for the success of collaborations. A boundary spanner can help with this process. Collaboration for the sake of collaborating is problematic if this does not leave room for addressing the issues that occur during the process (Thomson and Perry, 2006; Bozeman et al., 2015). If we then consider top-down ideas as starting points for collaboration this puts pressure on the collaborating partners to perform and solve the challenge at hand.

Researchers in the research system often define the abstract issues and provide scientifically sound knowledge about these. For the interactive researcher,

who often comes from social science, there can also be a tension between disciplines as mentioned in the narrative. The attitude to the extent of involvement from non-university participants differs between the natural scientific and social scientific paradigms (Lowe and Phillipson, 2009; Eigenbrode et al., 2007). The inclusion of practice is a new form of validation and knowledge-production compared to established natural science, in this case environmental science.

The model (Figure 1) is based on the previous interactive research presented in the narrative. It describes the tension that can occur when going from an abstract environmental issue, via collaboration, to viable solutions. These tensions can be managed by interactive research functioning as a mediator between the research system (abstract ideas) and the practice system (concrete solutions). As the abstract environmental issues are grounded in the research system these need to be brought down to practice to form a basis for a collaborative dialogue. The interactive researcher can facilitate a dialogue about the issues in dialogue arenas. This means that the concept is brought to the practice system and discussed on the terms that exist on that micro level. This provides opportunities for action among the participants in the collaborative environment as it brings the abstract issue closer to concrete solutions in the practice system.

Following a straight path without interactive research is the go-to method of many technically oriented projects. As shown on the left side of Figure 1 this can create tensions especially when the abstract issue is directly brought down to the level of practice. One example from the narrative is the introduction of academic writing without translating this to practical knowledge. While solutions might be found in this manner this does not always help to create change in the practice system. For change to occur, rather than just informative meetings, the collaborative process and the abstract issue require more attention.
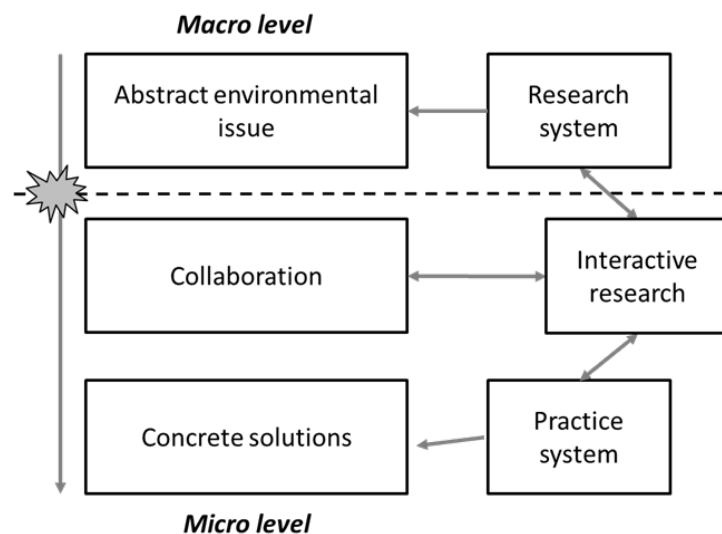

Figure 1: Interactive research to connect research and practice in environmental collaboration.

The right side of the model show the inclusion of interactive research to mediate between the research system and the practice system. This is mainly done by creating a collaborative environment where these two systems meet, through means of dialogue arenas or other common forums for dialogue. Here the abstract challenges can be discussed and input from both systems is equally important. Researchers get the opportunity to explain and provide knowledge about the issues while participants from practice can reflect upon the issues and how they approach these in their own context. In this way, the participants bring these issues "down to earth" by their own ways of thinking:

> *Researchers and practitioners enter into modes of collaboration very different from the forms of exchange envisaged under the model of applied science. The practitioner does not function here as a mere user of the researcher's product. He reveals to the reflective researcher the ways of thinking that he brings to his practice, and draws on reflective research as an aid to his own reflection-in-action (Schön, 1991, p. 323)*

In this process the interactive researcher aids the practitioners to become co-producers of knowledge using their knowledge of practice (Wigblad and Jonsson, 2008). As in action research, interactive research should not separate theory and practice (Reason and Bradbury, 2006). The involvement of participants understanding of the issue at hand also bring the issue closer to action as it is difficult to act on a concept that is "stuck" in the research system. The researchers can communicate the abstract issue but it is when participants in practice use this information in their own organisations or cross-sector work it can lead to action

The interactive researcher serves as a boundary spanner to improve upon the collaborative processes but the responsibility for action still lie with the participants. These are part of the process, hopefully engaged and interested, but cannot be forced to approach the issue when it is translated to the practice system. There were also examples of the interactive researcher failing in adopting the boundary spanner role, for example in the beginning of one of the cases the natural scientists did not quite understand what role a social scientists had in the project. Later when the interactive researcher facilitated dialogue arenas this role became clarified.

CONCLUSION

The research which formed the basis of this paper was interactive processes where scientists engaged with other sectors to discuss environmental issues. In such a Mode 3 environment scientific knowledge need to be integrated into practice and action to provide change. The integration between research and society has been debated for some time and there are many ideas about the state of contemporary science. The triple helix,

quadruple helix and quintuple helix are a few of these. These state the importance of engagement between sectors for innovation development.

In Mode 3 the democratisation of science is a key concept as well, with the inclusion of stakeholders in research processes, something that can be performed using an interactive research approach. Such democratisation also provides a potential for the research results to be used in society. A democratic inclusion of participants is therefore an important step towards action. An inclusive process helps to create an understanding of both the challenge at hand and to reach viable solutions on the target level which can be people, organisations. The process can be summarised as in Figure 2 where democratic dialogue fills the gap between the abstract issue and action in practice.
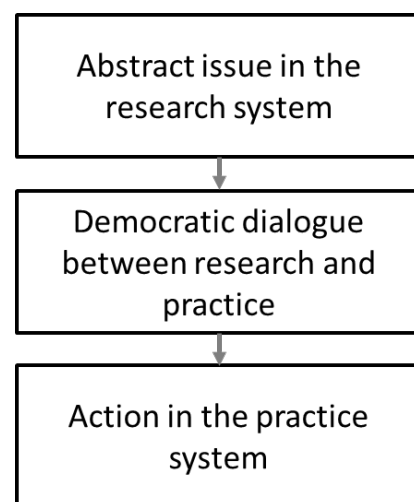
Figure 2: From abstraction to action.

Mode 3 calls for a democratisation which should be an integral part of the collaborative process. There are different ways to do this but the inclusion of participants in the research process is the example used in this paper. This democratisation need to consider the differences between participants and their respective sectors. For example, building trust between participants has been one identified key activity (Tartari et al., 2012; Barnes et al., 2002). Democratisation in the context of this paper means reducing the gap between research and practice, where the issue is defined in the research system. Facilitating a process where the issue is brought to practice through dialogue aims to reduce this gap.

Dialogue arenas are one way to create a growth ground for a dialogue were research and practice meets and different participants can develop a collaborative understanding of the issue at hand. Environmental issues require input from numerous actors that all have their own view and knowledge. As such this calls for a knowledge creation where researchers and practitioners both need to chip in. Going back to the aim of this paper, interactive research can be used to bridge the gap between research and practice by creating such dialogue.

The strength of interactive research is to function as a bridge between research and practice which is especially necessary when approaching complex issues and wicked problems. These issues cannot be solved by one sector or discipline. The increasing emphasis on collaboration is increasingly becoming important in knowledge production. As such the collaborative challenge, managing different ways of working, need to be addressed as well.

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