

Studying learning and innovation networks – a conceptual and methodological framework

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Abstract

This paper outlines the main concepts and methodology that the SOLINSA project uses in its study of learning and innovation networks. This project aims to identify barriers to the development of Learning and Innovation Networks for sustainable agriculture (LINSAs). In such networks, social learning processes take place, and knowledge about sustainable agriculture is co-produced by connecting between the different frames and social worlds of the stakeholders with the help of boundary objects. Studying such processes at the interface between different knowledge spheres of research, policy and practice requires a specific methodology. A transdisciplinary reflective learning methodology addresses the complex question of understanding learning and innovation. The paper highlights the challenges of this approach that involves stakeholders already in the phase of defining the research objectives and strategies. Results from a first round of application of the conceptual and methodological framework will be presented and discussed.

Introduction

The traditional view of innovation in agricultural contexts has been that it is linear, with agricultural research and development generating technologies that are transferred by extension services to agricultural producers for subsequent adoption (Leeuwis and Van den Ban 2004; Knickel et al. 2009). There are three underlying assumptions: a) Innovation is by definition 'good', generating growth in productivity and improving market competitiveness: both of which are crucial for progress; b) Official science is the only legitimate source of knowledge and driver of innovation; c) The views, needs, and knowledge of innovation end users need not be taken into consideration (Dosi 1988). Accordingly, the formal Agricultural Knowledge System (AKS), defined as the 'triangle' of agricultural research, education and extension (advisory service) establishments (Rivera and Sulaiman 2009), developed; the agricultural sector was well defined with clear goals.

This linear view of innovation in agriculture has been criticised for generating uneven impact on different sectors of a pluralistic society, for the neglect of societal actors as contributors to innovation, and for considering only one source of legitimate knowledge (Leeuwis 2004; Knickel et al. 2009). Furthermore, the ability of AKS to adequately support innovation for sustainable rural development is increasingly questioned. A purely productivist orientation of AKS is no longer able to support sustainable rural development policies embodied in the CAP.

As a result of these criticisms, the linear view is being replaced by systems approaches (e.g., Rölöing and Engel 1991; Hall et al. 2003; Sumberg and Reece 2004; Knickel et al 2009). As far as agriculture is concerned, the thinking has shifted towards including farmers as important actors in the Agricultural Knowledge and Information Systems (AKIS). The AKIS concept is used to analyse the gradual transformation, involvement of new actors and progression of new initiatives in the AKS (EU SCAR 2012). For specific innovation processes, these actors form flexible and dynamic innovation networks which have been referred to as 'innovation coalitions' (Biggs & Smith 1998), 'innovation configurations' (Engel, 1995), or 'public-private partnerships' (Spielman & Von Grebmer 2006; Hall 2006). In these networks, AKS actors are not the dominant providers of knowledge and information, but co-produce knowledge with many other stakeholders (Bruckmeyer and Tovey 2008; Schneider et al., 2009) and joint learning and negotiation takes place to shape an innovation (Leeuwis and Van den Ban 2004).

The networks which support the introduction of innovation in the AKS can be considered to be 'Learning and Innovation Networks for Sustainable Agriculture' (LINSAs), the overarching concept on which this article will elaborate. We define LINSAs as networks of producers, users, experts, CSOs, local administrations, formal AKS components, SMEs that create mutual engagement around sustainability goals in agriculture and rural development, and to this purpose they co-produce new knowledge by creating conditions for communication, share resources, cooperate on common initiatives. Yet, it should be stressed that this definition is not a static one, but will most likely change with the research on them.

The article will help to clarify the role(s) that the concept of LINSAs can play in changing our understanding of knowledge production, learning and innovation for sustainable agriculture. We will thereby build on first experiences of the EU 7th Framework project SOLINSA "Agricultural Knowledge Systems in Transition: Towards a more effective and efficient support of Learning and Innovation Networks for Sustainable Agriculture". Going beyond mere theory, the paper will present and reflect on the methodology put in place to implement the concepts in research practice, with the goal to help LINSAs become a tangible and workable concept. The research is still on-going. Therefore we cannot present ultimate findings, but nevertheless we dare to illustrate our approach with first experiences from the project work, in this way allowing the reader to participate in the challenging transdisciplinary research process.

Concepts for studying learning and innovation networks

Within the overarching concept of LINSAs we can find different conceptual elements that together are instrumental to understanding the processes of learning and innovation for sustainable agriculture: social learning, knowledge sharing, and boundary work.

Social Learning

Learning, can be defined as a change in the state of the mind which broadens the capacity of action of an actor in the world. 'Social Learning' is defined as "the process of iterative reflection that occurs when we share our experiences, ideas and environments with others" (Oreszczyn et al. 2010).

Learning is linked to an outside/inside dynamic both at individual and at collective/organization level, and looking at this dynamic it is possible to distinguish between learning in the sense of absorbing existing knowledge from others and learning in the sense of discovery or invention (Nooteboom 2006). In his discussion about 'Communities of Practice', Wenger (1998) stipulates that on the one hand learning occurs as progressive process of knowledge convergence inside an organizational space (absorbing existing knowledge). On the other hand learning occurs as exposure to new information and thence the need to interact with the outside (knowledge as invention or discovery). As Schneider et al. (2009) point out social learning is based on a philosophy of participatory processes of social change. This means integrating the knowledge of different people, which, in the case of sustainable agriculture, include farmers, scientists, advisors and other experts. Similarly, Brown (2008) describes an ideal system of collective social learning as one that respects the different cultures of knowledge, such as individual, local, specialised, organisational, and holistic knowledge.

Co-creation of knowledge and knowledge sharing

Davenport and Prusak (1998) define knowledge as

"a mix of framed experiences, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms." (Davenport and Prusak, 1998, p.5).

In a post-modern society, knowledge creation should be conceived of as a process of co-production of knowledge between academics and non-academics (see e.g. Funtowicz and Ravetz 1994; Gibbons et al. 1995; Nowotny et al. 2001; Steyaert et al. 2007). Here, the spiralling process of conversion between tacit and explicit knowledge as described by Nonaka et al. (2001) become relevant. According to these authors, explicit knowledge can be expressed in words and be transferred in the form of data, or scientific manuals. By contrast, tacit knowledge is highly personal and difficult to formalise, which makes it difficult to communicate. It is deeply rooted in the actions and experiences of individuals, and in their values or emotions. Co-production of knowledge will only happen if the different actors are able to cut across their different spheres of knowledge. Roux et al. (2006) conceptualize a 'knowledge interface' as a space where different knowledge cultures can meet, communicate, share knowledge, and collectively create new knowledge. They conclude that this requires a change of view of knowledge as a "thing" that can be transferred to one of a "process of relating" that involves careful negotiation of meaning among the partners. As Star and Griesemer (1989) stipulate, negotiation occurs over objects that connect different social worlds. These objects are characterised by interpretive flexibility, so that they allow communication even when people participating have very different goals, opinions, worldviews. They are named boundary objects.

Boundary objects

A number of agricultural innovation studies already explicitly refer to the importance of creating boundary objects (Schneider et al. 2009; Goldberger 2008; Klerkx et al. 2010; Bos 2009; Jakku and Thornburn 2010). They are formed in intermediary spaces where actors from different backgrounds, contexts, and frames meet and can take the forms of (i) *Artefacts*: Such as tools, documents or models; (ii) *Discourses*: Common language that allows people to communicate and negotiate meanings across boundaries; (iii) *Processes*: Shared processes, including explicit routines and procedures that allow people to coordinate their actions across boundaries. (Wenger 1998, 2000).

An important characteristic of a boundary object is that it enables the actors involved in the negotiation process to largely maintain their autonomy. Each actor can stay within its own frame, knowledge culture or social world, and only those parts of information that are needed for a coherent discussion about the boundary object are pooled in the intersection between the different worlds. Schneider et al. (2009) emphasise the importance of such boundary spaces for trying out

new forms of collaboration, and argue that the elements and processes involved need more attention to understand better social learning processes.

Methodology

The requirement to transcend different spheres of knowledge and the gap between theory and practice suggests the value of a transdisciplinary methodology. The defining feature of transdisciplinarity is the inclusion of non-scientific stakeholders in defining research objectives and strategies, while staying within the framework of scientific inquiry (Pohl and Hirsch Hadorn, 2007). To meet the challenge of meaningful and successful collaboration between researchers and stakeholders, participatory action research appears appropriate.

Participatory action research

Action research was pioneered by Lewin (1958) and is centred around three fundamentals: the problem, the stakeholder, and what action the stakeholder will undertake to solve the problem. The philosophy behind the approach is that the stakeholder and the researcher collaborate to identify and rank specific problems, devise methods for finding their real causes, and develop plans for coping with them realistically and practically (Bradford and Burke 2005).

Scientific method, in the form of data collection and analysis of results, does however remain an integral part of the process so appropriate tools should be selected to enable the participatory action research approach. The primary aim when conducting action research is to establish an ongoing, reflexive mechanism for maintaining and enhancing the effectiveness of the network (the LINSa) by providing the system with practical and useful tools for self-analysis and self-renewal (Bradford and Burke 2005).

Evaluation of participatory action research is often made on the basis of reflection by the authors on the success or otherwise of the participative process (Entwistle et al 1999; Connell 2001; Rowe and Frewer 2004; Sieber 2006; White 2006). Midgley et al. (2007) agree that there is clear value in this reflective evaluation but point out the danger of missing evidence that does not fit the researchers' beliefs about what is important (Romm 1996; Midgley et al. 2007). Midgley et al. (2007) suggest that these reflections should be supplemented by some systematic and theory based evaluation method.

The reflective learning methodology in SOLINSA: a dynamic research and learning agenda

The adaptation of a suitable participatory action research methodology in the SOLINSA project faces a number of challenges. First and foremost it has to be suitable to analyse social learning processes in networks (LINSAs). What is more, the research takes place Europe-wide, so the methodology has to comfort different socio-cultural backgrounds and contexts. The third challenge combines the two already mentioned: it is about bringing together the different research experiences from the countries and combining them into an overall understanding of social learning processes for innovation in European sustainable agriculture. Figure 1 illustrates the reflective learning methodology set up in SOLINSA, implementing a dynamic research and learning agenda.

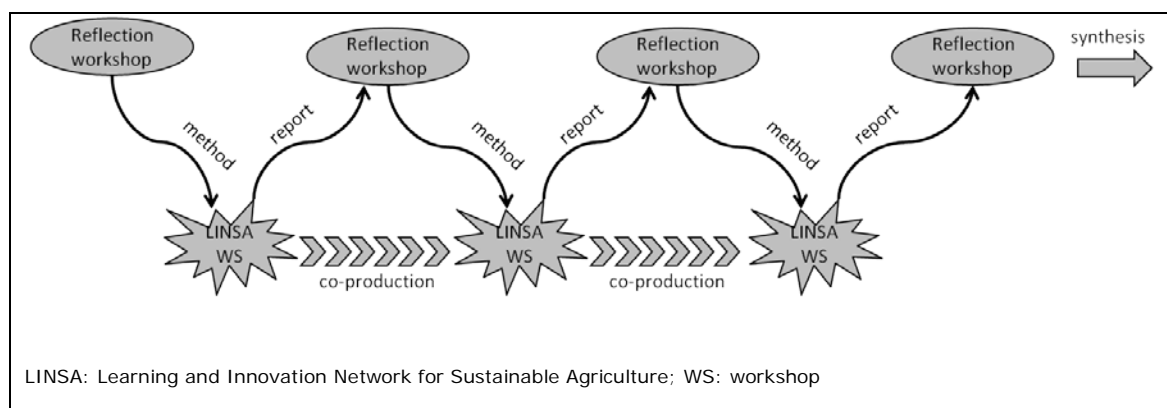


Figure 1: *Reflective Learning Methodology in SOLINSA*

The methodological framework in SOLINSA includes two spaces where learning takes place. On the one hand, the researchers meet in reflection workshops to develop the approach, and reflect on the outcomes of its application. On the other hand, learning happens in the LINSAs, where knowledge is co-produced with the researchers. These processes are interlinked: The outcomes of the researchers' reflection workshops feed in the work with the LINSAs in the form of suggested methods, and an initial set of research questions. Reports on the results of the LINSA workshops contain a reflection on the methods applied, responses to the research questions, as well as feedback to adapt the research agenda according to the LINSA's needs. The recurring reflective processes that flow through the research project thus make the learning and research agendas profoundly dynamic.

Experiences

At the time of writing this paper, the research process in SOLINSA has progressed from two initial researchers' reflective workshops to one learning workshop each with the LINSAs, and the results of these have been discussed in a third reflective workshop among the researchers. In the following, this process is described in more detail, and we reflect on our first experiences.

In a first workshop, the researchers developed and discussed the core concepts as well as the methodological approach of the project, including methods to be used in the workshops with LINSAs. In a second workshop, the researchers agreed on the selection criteria for the LINSAs to be studied, and the LINSAs (in total 17) were finally selected. These fall into one of three groups: consumer oriented network, non-food oriented network, and purely agricultural networks or networks for sustainable land use. A set of descriptive characteristics was derived, and cases selected for maximum variety according to these characteristics. These characteristics include scale, origin and function (market; pluralistic; non market), strength of links with the AKS, level of learning (imposed; co-learning), the degree of integration (alone; networks; communities), the level of innovation (incremental; radical), governance, temporality, and efficiency and effectiveness of support. An initial set of analytical questions to address in the workshops with the LINSAs were collated on the basis of past research and collective thinking. A research plan was developed to ensure commonality within the consortium, document progress, enable learning from each other, and ensure a commitment to the goals of the project. Then the first round of interaction and workshops with the LINSAs took place, focussing on understanding the socio-cultural context in which they operate, i.e. the social environment in which social learning takes place. The outcomes were reported to the research consortium. These reports contained first results regarding the analytical questions, and a reflection on the methods applied in the workshops. As a result, the methods for the LINSAs workshops are refined, and the dynamic research agenda is further developed.

Dynamics in the research agenda

Collection of descriptive data to understand the social environment for learning in the LINSAs was relatively straight forward, partly using non participative methods. The range of temporality and scale of the LINSAs is from new to old, and from local to pan-European. With regard to governance structures, the studied LINSAs range from loose informal networks, through organizations requiring membership, to structured cooperatives. Within this range of governance

structures, the LINSAs range from homogeneous through to extremely diverse. One exception to the straight forwardness of the collection of descriptive data is the possible existence of implicit governance structures, such as power brokers within the network. Identifying hidden agendas and background governance structures, and helping to find methods to solve the (sometimes underlying) tensions have been identified and included in dynamic research agendas for further consideration.

Following the dynamic research agenda logic helped to deal with the variety of data that still needs to be brought together for a comparative analysis. A common template was developed to structure the response to the analytical questions and identify emergent issues. However, as the research path in participatory research is largely participant driven, another issue that arose was the timing of the responses when questions and issues were addressed. In the third reflection workshop, the researchers therefore re-structured the common template in a way to give more time for answering the more demanding analytical questions, while defining shorter time periods to address others. In this way, comparison of results can take place in a structured stepwise way.

Usefulness of concepts

From the first round of researchers' interaction with the LINSAs we can reflect on the usefulness of the concepts introduced earlier. Common to the case study LINSAs was the issue of the networks' identity. In some cases, the interaction with the researchers was a trigger for the stakeholders to actually think of their activities as a learning network. This clearly relates to the concept of social learning with its important feature of an inside/outside dynamic. It also indicates the LINSAs' importance as knowledge interface. LINSAs are often a network within networks. In that they combine different types of knowledge and, in their role as a driver of change in the AKS, can themselves be viewed as boundary objects. In other cases, the discussion about what 'sustainable agriculture' means for the stakeholders in a Linsa represents a boundary object that e.g. helps to address the tensions between conservation of nature and food production, or between more traditional and innovative thinking. While the variety of actors within LINSAs stimulates mutual exchange of knowledge and experiences, and thus is a promising requisite for knowledge co-production, in some cases the need for knowledge brokers was identified.

Outlook

From a first round of application, the reflective learning methodology set up in SOLINSA is a promising approach. It provides space for reflection and is flexible, both necessary features as there is no 'one size fits all' method for understanding how LINSAs can best be supported. Since it is participant driven, the participatory action research methodology, particularly when applied using the dynamic research agenda method, ensures that the outcomes are relevant for the participants, who are in many cases those who are expected to implement these outcomes.

In the LINSAs workshops, social learning processes are being analysed, and some of the concepts involved have already been verified. Nevertheless, at this stage we can conclude that co-creation of knowledge between researchers and stakeholders remains a challenge for the process. The requirement of a participant driven research agenda effectively removes baselines against which the success of the collaboration, i.e. essentially the co-creation of knowledge can be evaluated. While the researchers have recorded their perceptions of the stakeholder – researcher interactions, the challenge remains to integrate the stakeholders' views in the assessment of success. The double role of the researcher as a scientist and facilitator of the LINSAs workshop makes this requirement even more demanding. It will take time, thoughtful methods, and further reflection – the process has just begun.

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