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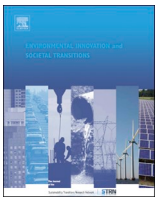

Editorial

Learning about learning in sustainability transitions

1. Introduction

Since learning plays a key role in sustainability transitions, it is not surprising that it is frequently mentioned in the related literature. Studies in this respect are often conducted in the context of specific governance approaches. Learning is key to strategic niche management, transition management and the functions of innovation systems approach (Hekkert et al., 2007; Loorbach and Rotmans, 2006; Raven et al., 2008). It is firmly linked to ideas of experimentation and generally has a positive connotation of progress. In the broader transition literature, learning tends to be treated as a steering mechanism or a governance tool. In this special issue, we address it as a core feature of transitions in need of a better understanding.

At the IST conference of 2016, a debate on learning in transitions was initiated by researchers from the Institute of Environmental Systems Research at the University of Osnabrück, including some of the co-editors. It was the start of the Learning Community, an international network of scholars interested in learning related to sustainable development and transformative change.[1] The organised dialogue attracted many researchers specialised in learning theory, but few from the transition community and showed a large divide between theories about learning and transitions. It was concluded that it would be useful to explore joint interests more explicitly and systematically. This motivated the guest editors to develop a special issue with the aim to foster a fruitful collaboration between transition and social learning researchers.

Why do we deem it pertinent to further study and better understand the role of learning in sustainability transitions? On the one hand, learning evidently connects to core ideas of transition studies. It is inherent to the experimental and action-oriented nature of transition pathways, which develop in uncertain and often contested wider contexts characterising transition processes. In addition, it links firmly to the actor and process perspective on transitions in the making. Yet, while transitions researchers frequently mention learning, related concepts are seldom clearly defined and theories on learning in sustainability transitions are hardly elaborated. True, some empirical studies provide an in-depth understanding of learning in processes of transformative change, but the specifics of such change – experimental, design, niche development, transition governance and broad, systemic structural changes (regime change) – remain mostly unconnected to learning theories.

On the other hand, well-established learning concepts and theories have been applied frequently to complex sustainability and more general environmental governance issues. The elaboration of these concepts and theories builds on a vast body of empirical studies. Insights about social learning in natural resources management or about collaborative learning in educational studies – to name just two examples – may provide inspiration, but have hitherto hardly been connected to transition studies.

This brings us to the scope and goals of the special issue. The idea was to collect theoretical, methodological and empirical research papers that build bridges between well-established learning traditions and sustainability transition studies. The aim of the issue is to advance knowledge on the role of learning in transitions and to provide good examples of how learning can be studied in this context. Established learning theories could then be translated to transition processes. A better understanding of learning in sustainability transitions could ultimately provide leverage for facilitating, triggering and strengthening transitions.

Several researchers in relevant networks were asked to contribute to this special issue. Despite initial enthusiasm, reflected in a large number of submitted abstracts, just a few were able to live up to our key selection criterion of crossing the boundaries between the two research fields and contributing to productive discussions in transition studies. Hence, we present a mini-collection of five papers, all conceptually highly original. Two of these offer empirical studies. The goal of this editorial is to reflect on both the results and the process of developing the special issue. In the following, we provide an overview of the articles included in this special issue, before presenting the overall results.

[1] https://www.tias-web.info/tias-activities/learning-community/

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2. An overview of the contributions

The special issue contains five contributions. A first paper by van Mierlo and Beers surveys the literature on learning in transitions, addressing the central aim of this special issue by discussing what several diverse learning traditions might offer to transition research and governance. To this end, they provide an analysis of four learning traditions and their applicability in the light of four key features of transitions. These traditions are: collaborative learning, organisational learning, social learning in natural resource management, and interactive learning in innovation systems. In their analysis of these traditions, van Mierlo and Beers take into account that the choice of a suitable learning concept/tradition depends on the focus of a particular study or intervention (e.g., learning in niches or in regimes, and in early or later phases of a transition). While they conclude that none of the presented learning traditions sufficiently addresses the complexity of transitions, they identify what the traditions offer for investigating new areas such as learning in socio-technological regimes, unlearning, or learning to resist change. Furthermore, the authors show how learning traditions offer specifications of learning processes and outcomes that are helpful for opening up the black box of learning in transitions. Their overview carves out the relevance of and benefit from the four learning traditions for understanding and fostering learning in transitions. Hence, the findings allow for an informed choice for a specific learning tradition or a combination of theories that takes the learning context of interest into account.

A second paper by Vinke-de Kruijf, Pahl-Wostl and Knieper assert that learning in wider units beyond the limits of the niche context is especially characteristic of transitions in the making. In their empirical study, they focus on knowledge utilisation beyond the limits of European cooperation projects as an example of such learning. Indications of so-called wider learning outcomes include changes in institutional and relational structures, both at organisational and administrative levels. The authors build on literature about social learning in natural resource management to identify conditions that potentially foster wider learning outcomes. In addition, they use methods for Qualitive Comparative Analysis (QCA) to compare and explain wider learning outcomes for 30 partner organisations in seven European co-operation projects. The results show that, in order to produce learning, project activities and results need to be carefully aligned with wider policy agendas. Furthermore, project actors and activities should have a clear focus on communication and dissemination. From a transition perspective, the need for alignment with existing policy agendas can be troublesome at first sight since projects that feature high levels of internal, transition-oriented learning fail to result in wider learning outcomes when these learning outcomes deviate too radically from the policy context. The authors conclude that whether project-based learning evokes wider learning outcomes – which are important for transitions – depends heavily on previous developments and learning processes that are external to transition-oriented projects.

A third contribution by Van Poeck, Östman and Block reviews the existing literature on why learning is considered important for sustainability transitions, what is learned or should be learned, and how learning takes shape in the context of sustainability transitions. On the basis of this it then develops a conceptual framework for learning in transitions based on educational theory. In their review, the authors identify arguments about learning as connected to niche development and upscaling, building up societal intelligence and transition governance. Additional arguments are about learning to contribute to creativity, in the sense of questioning one's own beliefs and values, and challenging what is societally held as self-evident. They conclude that the concept of learning is overflowing, up to the extent that it becomes indistinguishable from any productive social process. Moreover, the value and impact of learning for sustainability transitions are often overblown in instrumental approaches to learning. For their conceptual framework, the authors draw upon pragmatist educational theory, especially Dewey, to put forward an approach that addresses these criticisms while retaining a comprehensive view of learning in and for sustainability transitions. The framework integrates intrapersonal and contextual (interpersonal, institutional, material) elements that influence learning. Van Poeck and her co-authors suggest that studies on learning should: focus on the simultaneous and reciprocal relations between societal and human transformation; focus on how "moments" can be educational and foster creativity; regard learning both as an experiential and a dialogical process; and analyse learning as both resulting from active experimentation and reflectively undergoing change and the results of one's actions.

The authors suggest that studying learning using a pragmatist lens may produce innovative insight in learning in transitions, both as a reflective process and as something to be supported.

In a fourth article, Goyal and Howlett address the question "who learns what in sustainability transitions?" Based on a conceptual review, they find that existing research has not distinguished between different types of networks that might participate in learning in transitions. As a first step, the authors draw on the literature in innovation studies, international relations, political science, and policy studies to propose that four different types of collective actors are involved in transitions: technology constituencies, epistemic communities, instrument constituencies, and advocacy coalitions. Subsequently, they link these collective actors to different learning objects (what is learnt?) and the corresponding learning types. Specifically, Goyal and Howlett propose that technology constituencies facilitate learning aimed at the development of technologies; epistemic communities facilitate learning about the framing of sustainability issues; instrument constituencies facilitate learning regarding the design and implementation of specific policy alternatives; and advocacy coalitions facilitate learning necessary for enhancing the political feasibility and likelihood of adoption of a policy. This paper, therefore, nuances the conceptualization of learning at the network level and lays the foundation for further integration of policy studies and transitions research. The authors suggest testing and further refining this conceptualisation through empirical research and also examining the links between learning at the network level and learning at other societal levels in sustainability transitions, such as organisations, groups and individuals.

A fifth contribution by Scholz and Methner applies insights from the literature on transition management and social learning to a transdisciplinary climate change project for the agricultural sector in the Western Cape of South Africa. The authors adopt the concept of "transition arena" to assess whether the project lived up to the potential of facilitating the structural changes needed to make the sector more climate resilient. The project featured several elements that are critical from a transition management

perspective, such as motivated team members that were able to adopt a broad system perspective and a focus on anticipatory long-term planning. However, the project was embedded in prevailing institutional structures and did not include radical niche actors. Applying social learning theory, the authors examine process dynamics as well as learning outcomes and impacts. All team members reported social learning outcomes, such as a better understanding of the problem situation, and a shared vision that constituted itself in the developed climate change plan. Moreover, key governmental actors showed a high commitment to implement this vision. The authors state that, given the particularities of the agricultural sector in South Africa, developing an enabling environment for future collaboration and a pragmatic step-wise approach providing the required buy-in from the sector might be more likely to facilitate fundamental changes than aiming at radical change. They further conclude that the literature on transition management and social learning provides complementary perspectives, as the transition arena draws attention to factors conducive to promoting structural change whereas social learning theory allows to zoom into learning processes and outcomes.

3. Results and reflection

The contributions to this special issue all start from a similar observation: sustainability transition researchers often refer to learning without conceptualising or studying the concept in-depth. More generally, conceptual papers are lacking while empirical studies often remain implicit regarding who learns about what and why. Learning is just assumed to take place. This situation in the domain of learning in transitions mirrors, at least to some extent, the problem of learning studies in general. A recent review of learning studies in relation to environmental governance discovered that half of the selected papers do not explicate their theoretical approach (Gerlak et al., 2018). The field is utterly fragmented and scattered about theories of which several are unique and specifically developed for the purpose of the study. Moreover, evidence of factors influencing learning or links between learning and outcomes is scarce and the use of critical social theory is largely absent.

This special issue was initiated to contribute to an in-depth debate on the issue of learning in transitions, specifically by integrating concepts from the learning and transition domains. Despite the clear linkages and overlaps between these concepts, this proved surprisingly hard. Strikingly, hardly any transition researcher replied to the call. For some of the learning researchers who did reply, applying a transition perspective presented a challenge, even though their research data were collected in relevant contexts.

The crossing of boundaries for this issue was stimulated by intensive interdisciplinary exchange in the team as well as in the authors' workshop organised in 2017. We appeared to differ regarding the boundaries of what constitutes learning. Social learning researchers draw attention to the individual (who learns) and take individual and collective learning (in confined settings) as a starting-point. Insights from transitions are used to reflect on the impact of learning. Transition researchers take transitions as a starting-point and perceive learning as one of many factors in a complex process of change. This is why it takes effort to integrate both perspectives. It may also explain why learning has received little attention in transition studies.

The resulting special issue presented here offers substantially more clarity on how and to what extent the theories and methodologies in learning traditions might improve the current understanding of learning in sustainability transitions. Different as they are regarding the setting and methodology, the two empirical research papers address learning in innovative projects and the conditions for a wider impact (Scholz and Methner; Vinke-de Kruijf et al., this issue). The three conceptual papers analyse the value of learning theories for different aspects of learning in transitions; one provides a broad overview and the other two develop frameworks to study specific aspects (resp. Goyal and Howlett; Van Mierlo and Beers; Van Poeck et al., this issue). The collection of papers goes beyond a superficial use of notions such as social learning and double-loop learning and fully extends the scope of what has hitherto been regarded as learning in transitions.

The applied learning theories are: social learning (most prominent, i.e. in three papers), collaborative learning, organisational learning, interactive learning in innovation systems, policy learning and pragmatist education theory. Drawing upon this diversity of learning theories, the special issue provides a better and a more comprehensive understanding of learning in sustainability transitions. Learning can among others now also be imagined to take place in later phases of a transition and across multiple, layered actor networks. The papers suggest to include relational learning and situated learning to complement the techno-scientific, cognitive connotation of learning in the transitions literature (Scholz and Methner; Van Poeck et al., this issue; Vinke-de Kruijf et al., this issue, see also Neij et al., 2017). Summarising the papers, we perceive learning in transitions as a process of acquiring and generating new knowledge and insights, and of meaning-making of experiences in communicative interaction, in a reciprocal relationship with the social, (bio-)physical and institutional context. Moreover, it is a non-linear, iterative process in which ideas and possibilities for collaborative action are being developed, experimented with and pursued in a diversity of networks.

The papers agree in their assessment of the 'promise' of learning as a governance tool. They at least suggest that learning is essential for transitions to take place. However, the extent to which learning may lead to wider systemic change is highly contingent on institutional and other societal developments beyond the individual learner's control (Vinke-de Kruijf et al., this issue, see also Beers and van Mierlo, 2017; Halbe, 2016 and Halbe and Pahl-Wostl, 2019). The collection of papers suggests to have more nuanced expectations regarding the promise of learning 'for' transitions. It supplements the rather instrumental perspective on learning in transition studies with a more contextual and informal view of learning in the rich account of the many forms, instances, and situations of learning in a transition process under both organised and spontaneous learning conditions.

4. Outlook

In the recent agenda for transition research (Köhler et al., 2019) learning is mentioned shortly in only two out of nine topics. This reflects the currently limited interest in learning as an empirical topic in the transitions field and the assumption that it is particularly

relevant in the first phase of a transition process. An ironical interpretation is that the need for a better understanding of the topic is still enormous. As the papers show, there is among others little insight in autonomous processes of learning indirectly instigated by innovation initiatives. Such understanding should complement studies of learning interventions. Other key areas identified for further conceptualisation and grounding in empirical research, are 1) learning by incumbents; 2) learning in niche-regime interaction; 3) unlearning; and 4) continuous, superficial learning (in relation to deep learning).

There is also a lot to win by connecting learning to other key issues in transition studies. This could be done in empirical studies at the intersection of learning on the one hand and among others power, conflict, or daily practices on the other hand and by making crossovers between related theories. A good example is provided by Voß and Bornemann (2011) who address the politics of societal learning.

This special issue provides a glimpse of the various occasions, situations and conditions of learning in transition processes. The high diversity of theories used in the total collection indicates the breadth of the topic, which suggests there is much leeway to further explore those and other theories. The further integration of concepts from the learning and transitions fields entails dealing with conceptual overlap, redundancy and complementarity (Beers and Bots, 2009). A promising sign for a continuous and deepening dialogue are the lively discussions at the recurring learning sessions at the IST conferences. With the special issue, we hope to have inspired researchers from the domains of learning and transitions to cross boundaries, and to collaborate in interdisciplinary teams.

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References

Beers, P.J., Bots, P.W., 2009. Eliciting conceptual models to support interdisciplinary research. J. Inf. Sci. 35 (3), 259–278.
Beers, P.J., van Mierlo, B., 2017. Reflexivity and learning in system innovation processes. Sociol. Rural. 57 (3), 415–436.
Gerlak, A.K., Heikkila, T., Smolinski, S.L., Huitema, D., Armitage, D., 2018. Learning our way out of environmental policy problems: a review of the scholarship. Policy Sci. 51 (3), 335–371.
Goyal, N., Howlett, M., 2019. Who learns what in sustainability transitions? Environ. Innov. Soc. Trans. https://doi.org/10.1016/j.eist.2019.09.002. (in press).
Halbe, J., 2016. Governance of transformations towards sustainable water, food and energy supply systems. Facilitating Multi-Level Learning Processes for Water, Food and Energy Supply. University of Osnabrück, Osnabrück Ph.D. Thesis.
Halbe, J., Pahl-Wostl, C., 2019. A methodological framework to initiate and design transition governance processes. Sustainability 11 (3), 844.
Hekkert, M.P., Suurs, R.A.A., Negro, S.O., Kuhlmann, S., Smits, R.E.H.M., 2007. Functions of innovation systems: a new approach for analysing technological change. Technol. Forecast. Soc. Change 74 (4), 413–432. https://doi.org/10.1016/j.techfore.2006.03.002.
Köhler, J., et al., 2019. An agenda for sustainability transitions research: state of the art and future directions. Environ. Innov. Soc. Transit.
Loorbach, D., Rotmans, J., 2006. Managing transitions for sustainable development. Understanding Industrial Transformation. Springer, pp. 187–206.
Neij, L., Heiskanen, E., Strupeit, L., 2017. The deployment of new energy technologies and the need for local learning. Energy Policy 101, 274–283.
Raven, R.P., Heiskanen, E., Lovio, R., Hodson, M., Brohmann, B., 2008. The contribution of local experiments and negotiation processes to field-level learning in emerging (niche) technologies: meta-analysis of 27 new energy projects in Europe. Bull. Sci. Technol. Soc. 28 (6), 464–477.
Scholz, G., Methner, N. (in press). A social learning and transition perspective on a climate change project in South Africa. Environ. Innov. Soc. Trans.
Van Mierlo, B., Beers, P.J., 2019. Understanding and governing learning in sustainability transitions: a review. Environ. Innov. Soc. Trans. https://doi.org/10.1016/j.eist.2018.08.002. (in press).
Van Poeck, K., Östman, L., Block, T., 2019. Opening up the black box of learning-by-doing in sustainability transitions. Environ. Innov. Soc. Trans. https://doi.org/10.1016/j.eist.2018.12.006. (in press).
Vinke-de Kruijf, J., Pahl-Wostl, C., Knieper, C., 2019. Wider learning outcomes of European climate change adaptation projects: A Qualitative Comparative Analysis. Environ. Innov. Soc. Trans. https://doi.org/10.1016/j.eist.2018.09.004. (in press).
Voß, J.-P., Bornemann, B., 2011. The politics of reflexive governance: challenges for designing adaptive management and transition management. Ecol. Soc. 16 (2), 9.

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