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■ *Research Paper*

Transforming with a Soft Touch: Comparing Four Learning Networks

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In this paper, we consider how learning networks build capacity for system transformation. We define learning networks as inter-organizational voluntary collaboratives that nurture professional expertise and describe their potential to catalyse systemic change by disrupting old habits, fostering new relationships, and providing freedom to experiment. We conducted a parallel study of four learning networks, which vary in age since founding from 2 to 25 years, applying three exploratory questions across our cases. We conclude by considering how learning networks can foster transformative capacity within social-ecological systems when they are designed and facilitated with a soft touch so that network members in different sites have the freedom to define their place and purpose within their system, as well as their role in bringing about a desired transformation. We suggest that system transformation is not just the sum of similar efforts at different sites and scales or a least common denominator between them but is emergent from interaction between the partially shared understandings of actors within and between sites, and across network scales. A well-designed network is a learning system that encompasses these multiple perspectives, and good netweaving mediates different ways of system knowing without collapsing them into one perspective. Copyright © 2017 John Wiley & Sons, Ltd.

Keywords learning networks; networking; transformation; communities of practice; social learning

INTRODUCTION

This paper aims to extend our understanding of how learning networks contribute to system resilience. Effective learning networks develop an open culture of inquiry and trust, a willingness to take risks to extend learning opportunities, the transparency and openness to feedback required to test and challenge embedded values, and the capacity to create shared meaning and understanding. We explore four networks, focusing on how they are designed and facilitated to operate across scales and their potential to build transformative capacity. This cross-case

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analysis considers network facilitation as a set of practices we call 'netweaving' and organizational learning as key features of learning networks. Collectively, these reveal that a network may strengthen its potential for transformative capacity building when managed with a 'soft touch'.

LEARNING NETWORKS

Learning networks can be seen as one of many inter-organizational, voluntary, collaboratives that are being proposed as a way to promote resilience, which we define as a social-ecological system that adapts to stress and shocks by absorbing disturbance and reorganizing as it undergoes change (Biggs *et al.,* 2015). Collaborative interaction enables communities to ask the critical question of 'resilience of what and for whom' and to define system parameters and relationships on their own terms, using experience that is contingent, contested, and only partially sharable (Goldstein, 2009; Manyena and Gordon, 2015). Learning networks focus on nurturing professional expertise in fields such as environmental management, public health, and education (Dolle *et al.,* 2013) and are often attempted when deeply-rooted obstacles to institutional change have proven resistant to both top-down and bottom-up changes (Butler and Goldstein, 2010). A relatively loose, nimble management structure enables ongoing adaptation as network membership becomes more confident and experienced and as new needs and opportunities are recognized.

Learning networks rely on intentional design and ongoing facilitation to function effectively. The practice of netweaving across multiple scales builds social capital, which can enable learning networks to persist through the vicissitudes of sponsor funding and political climate. This endurance can enable learning networks to affect transformative change, which can often be slow moving or punctuated and may occur only when rare windows of opportunity for adaptation enable networks to rapidly mobilize resources and disseminate innovation across sites (Pelling, 2010). Effective learning networks amplify the potential for transformative change by combining place-based innovations with community-spanning interactions and exchanges (Goldstein and Butler, 2009, 2010; Butler and Goldstein, 2010; Goldstein, 2012). Each participating site in these networks defines problems in its own way, accommodating local contexts and contingencies to generate distinct strategies and solutions. This autonomy is balanced with a network-wide coherence that advances collective action across organizational, temporal, and spatial scales. Many of the features that provide learning networks with transformative potential also make them difficult to organize and maintain. For example, learning networks often require a high level of engagement and commitment to identify deep-rooted problems and coordinate disparate actors to implement solutions that are both site-specific and network-wide. Hereafter, we examine key questions about how networks are designed and facilitated to foster transformative capacity and how they engage in organizational learning while remaining nimble and adaptive.

METHODS

This paper combines four case studies, which we conducted as participatory action researchers (Baum *et al.,* 2006; Chevalier and Buckles, 2013) with cooperative and interactive roles in the networks and with levels of embeddedness ranging from formal employment, steering committee membership, and serving as an invited researcher and collaborator. Each of our four cases is the subject of longer term research. We utilized a common research protocol using semi-structured responsive interviews (Lofland *et al.,* 1984; Weiss, 1995; Rubin and Rubin, 2005; Bernard, 2011) conducted with netweavers and network members in each network. We gained additional insights from participant observation of network meetings and examination of network documents. This protocol enabled us to compare network structure and process across the cases. Analysis of individual cases was guided by grounded theory (Corbin and Strauss, 2015) with an emphasis on identifying emergent themes

Syst. Res **34**, 537–543 (2017)
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and insights (Law, 2004). Cross-case synthesis was conducted collaboratively and iteratively, focusing on common themes about transformative capacity building.

CASE STUDY SUMMARIES

National Alliance for Broader Impacts

The National Science Foundation requires research proposals to articulate 'broader impacts' that demonstrate societal benefit of research. Universities have found themselves ill-equipped to address these requirements because of a lack of researcher training to address broader impacts, unsupportive reward structures, and challenges in establishing necessary partnerships across disciplines and organizations. The National Alliance for Broader Impacts (NABI) was established in 2013 to address this shortfall. NABI builds individual capacity by cultivating a set of shared practices and a supportive community for members to learn how to navigate the boundary between science and society and create change at their home institutions. The network also serves as a resource to federal funding agencies working to support broader impacts. The network functions as a loose web of connections and relationships, with a variety of activity hubs and has nearly 600 members participating with various levels of engagement. An annual Summit is the network's central event for connection and learning, and interaction is sustained between Summits through an active listserv. The network is supported by a principal netweaver along with a small logistical staff, a steering committee that represents member interests and identifies strategic direction and activities, an advisory board, and subcommittees that tackle specific needs such as financial planning, event planning, and connecting with federal entities.

100 Resilient Cities

The 100 Resilient Cities (100RC) network is focused on building resilience in city governments around the world. 100RC has a dedicated staff that serves as the network hub, providing support to 100 member cities. The Rockefeller Foundation (hereafter, the Foundation) identified city governments as the fundamental unit for identifying and responding to resilience challenges, as cities contain most the world's population and have ongoing and often strained demands on infrastructure making them vulnerable to acute and long-term stresses. The key problems the Foundation identified were fragmentation within city departments and inadequate resources to both scale solutions at the local level and guide regional and global collaboration around issues relating to resilience (Lipper, 2015). To address these obstacles, the Foundation created a learning network to build knowledge and resilience capacity in city governments (100RC, 2015). Each participating city received grants and services valued at $1m over a 2-year period to support the work of a Chief Resilience Officer (CRO). Each city's CRO is responsible for creating a city-wide resilience strategy built upon the 100RC resilience framework and serves as the primary link between the city and the network. After a city is selected through a competitive application process, local municipal leadership hires a CRO to lead the city's resilience efforts and coordinate with Platform Partners who are part of a 'marketplace' of Foundation-vetted organizations and research institutions. CROs are paired with 100RC network staff known as Relationship Managers who act as liaisons between 100RC, CROs, and Platform Partners. CROs provide feedback to their Relationship Managers, who share that information with other 100RC network staff, including other Relationship Managers and the 100RC management team, who then may adjust their overall strategy.

Fire Adapted Communities Learning Network

Fire Adapted Communities Learning Network (FAC Net) was created in 2013 as a joint effort between NGOs and federal agencies who shared the aim of fostering adaptable and resilient fire adapted communities while addressing system-level barriers to community-based management.

Syst. Res **34**, 537–543 (2017)
DOI: 10.1002/sres.2479

FAC Net was designed to maximize knowledge sharing among sites and support adoption of novel techniques and approaches that account for local contexts while addressing national resource management strategies and policies. FAC Net currently consists of about 20 participating communities, with a team of about six netweavers employed to manage the network by facilitating members' relationships and curating network documents and communications.

Global Change System for Analysis, Research and Training

Global Change System for Analysis, Research and Training (START) began in 1992, to involve developing countries in conducting regionally based research that would promote understanding of the global climate system and address gaps in knowledge of climate impacts in the developing world. START's programs and activities aim to create and strengthen relationships among scientists, engage scientists in developing countries in global climate assessments, train the next generation of science leaders, and promote knowledge sharing. A regional network approach was necessary to account for differences in biogeography, socio-economic systems, and climate and obtain a global perspective and understanding of change in the earth system. START provides a framework to (i) conduct research on regional aspects of global change, (ii) assess the impacts of the regional findings, and (iii) provide regionally important, integrated, and evaluated information to policymakers and governments (IGBP, 1998). The International START Secretariat (hereafter, the Secretariat)—located in Washington, DC—coordinates START programs and network activities. The Secretariat staff collaborates with representatives from regional centres and affiliated partner institutions in Africa and Asia-Pacific to carry out joint initiatives and advance common goals. This system of active regional centres and affiliates enables START to strengthen partnerships, develop needs-driven programming, and expand implementation capacities and local legitimacy.

FINDINGS

Netweaving

Netweavers are the nucleating agents in a network—they aim to enhance communication, facilitate connection, and bolster collaboration in support of network learning and development (Holley, 2012). We identified shared characteristics among netweavers in the four networks. Netweaving in each of our cases included horizontal, vertical, and diagonal facilitation (e.g. relationships, peer-to-peer exchanges, and multiple communication channels and opportunities) as well as bridging other related programs and initiatives outside the networks. However, the networks had different approaches to mediating the tension between local and network-wide identity. While netweavers in three of the networks (NABI, FAC Net, and START) emphasized remaining responsive to member needs at local scales, netweaving in the 100RC network emphasized assisting CROs in different cities to pursue a common planning and implementation approach. Accordingly, 100RC's CROs were observed engaging in less boundary navigation, cross-scale interaction, and peer-to-peer connections when compared with the other networks.

Transformative Capacity

We considered what features of the network contributed to the capacity for transformation. These features can include a qualitative change in perception, practices, and identity and social-ecological processes. In NABI, these features were observed at the individual, institutional, and national scales. Individuals came to identify with broader impacts as their individual professional identity and collectively sought to advocate with the mission of creating a society that values science. These objectives were tied together by a NABI netweaver who described the purpose of the network as '… changing my community and making things better for my kids and impacting my institution'. In this way, NABI cultivated the skills required to navigate across

Syst. Res **34**, 537–543 (2017)
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structural boundaries to promote change. FAC Net was more like NABI, cultivating a strong shared social identity, vision, and language all centred on desired change. START was like FAC Net in that it strengthened skills and capacities at the individual and organizational levels. In contrast, 100RC struggled to generate opportunities for collective action and impact. While there is evidence that some CROs succeeded in brokering relationships and actions across well-established local silos at the city level because of their liminal position within city governments, network members had limited access to each other because of difficulties in fostering peer-to-peer connections between CROs beyond those within close proximity.

Organizational Learning

Three features emerge from our cases that support organizational learning: (i) open communication and opportunities for feedback within the network; (ii) a capacity to flexibly adjust the network's structure over time; and (iii) the role of network leadership in fostering a shared network identity and purpose. NABI's netweaver encouraged open communication and comfort with the unknown and open discussion between the steering committee and network members along with frequent opportunities for dialogue contributing to group identity building and collective action across scales. In FAC Net, questioning standard operating procedures, open and relatively transparent network feedback processes, and responsive leadership supported ongoing adaptation in network practices. FAC Net's netweavers were committed to receiving active and ongoing participant feedback and actively facilitated member opportunities to collaborate with one another on network-sponsored projects. In START, network retreats laid the groundwork for ongoing connection when participants returned to their disparate countries of origin. 100RC fostered a vibrant learning culture among Relationship Managers, the network's netweavers. However, in some instances, there were difficulties passing information 'upstream' when CROs had to rely upon Relationship Managers to communicate with 100RC's leadership. Upstream communication was more effective when Relationship Managers assumed more of a mentoring rather than an oversight relationship with their CROs. This underscores how networks need to cultivate an organizational structure that permits ongoing reflection about network structure and process.

DISCUSSION

In this study, we examined how four learning networks can promote transformation to achieve a sustainable future in the domains of city governance, living more safely with wildfire, climate adaptation, and the broader impacts of scientific research. The most consistent transformative feature we found across our cases was how interaction between sites supported expression and adoption of a new professional identity. NABI supported emergence of a specialty in broader impacts, along with shared expression of its moral purpose, enabled members to identify best practices, and support collective efforts to begin to influence researcher and research funding agency practices. FAC Net engaged its members in ways that supported a common identity of the community fire adaptation professional grounded in a social-ecological perspective on the inseparable relationship between communities and ecologies. START's focus on strengthening scientific participation in climate change adaptation was notable for addressing entrenched power dynamics and the political constraints on collective action. In contrast to the other cases, we did not observe high potential for collective action and impact in the 100RC network, although the CROs did have an explicitly defined, shared identity and were able to make remarkable achievements in a very brief time period in many cities.

Netweavers performed a crucial nucleating role in each network, supporting individual members and promoting the functioning of the collaborative. Netweavers operated at different scales of network action, from site-based netweaving by the 100RC's CROs and Relationship Managers, to regional netweavers

Syst. Res **34**, 537–543 (2017)
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coordinating learning exchanges in the FAC Net and START, to network-wide netweaving in NABI. While netweavers in three networks (NABI, FAC Net, and START) could respond flexibly to the tension between supporting individual sites and promoting overall network objectives, netweaving in the 100RC network was relatively rigid, with relationships pre-determined and subordinated to a chain of command. This exacerbated tension between local and network-wide identity and overall network objectives. Netweaving requires the ability to operate within and across participating sites while valuing the differences between them. Netweavers who were more fluid in operating within and across network levels were also more capable at facilitating information flow, forging social ties that enabled members to identify shared interests and challenges, engage in learning, and develop a shared professional identity.

In each of our cases, capacity to engage in organizational learning was essential to ongoing network adaptation. We associated three network features with organizational learning: (i) multiple opportunities for communication and feedback; (ii) encouragement to experiment with different approaches to network interaction; and (iii) whole-network meetings where network governance was explicitly addressed. Organizational learning was supported by opportunities for rapid feedback between netweavers and members, both through formal evaluation and regular and open communication. While all four cases presented instances where network procedures and practices were examined and altered, some difficulty in bilateral communication was noted at the interface between Relationship Managers and CROs in the 100RC Network. In addition, networks that encouraged members to take the initiative to experiment with different ways to collaborate could adapt their procedures more readily, such as in FAC Net where netweavers encouraged members to develop additional partnerships and projects (e.g. regional subnetworks), and then once the approach showed promise, encouraging other members to adopt and adapt the approach. Finally, annual meetings that engaged network members in critical deliberation about network governance could address underlying tensions and support agreement on new approaches, such as the annual retreats that brought together START staff, Board of Directors, and regional representatives.

CONCLUSION

One synthetic conclusion we can offer from this set of comparative case studies is that learning networks can foster transformative capacity within social-ecological systems when they are designed and facilitated with a soft touch. Members often engage in learning networks to bring about system change and so they need to have the freedom to define their system as it is, as well as how they think it ought to be. This sense-making process is often more like storytelling than formal analysis; because network members not only define system parameters, they also define their place and purpose within it and their role in bringing about a desired transformation. In a multi-sited and multilevel learning network, this is happening in many places at once, amidst many perspectives on how to bind a system in space and time and which actors and organizations to take into consideration while accounting for perspectives that may not be entirely coherent with one another. They construct alternative system futures in different sites in ways that are grounded in real-world conditions and shaped by power-laden choices about what system, whose resilience, and to what purpose and overall aims. Transformative capacity in this setting is not just the sum of similar efforts at different sites and scales or the least common denominator between them but is emergent from interaction between the partially shared understandings within and between sites and across scales of the learning a network. Accordingly, a network that supports system transformation encompasses multiple perspectives across site and across scale, while good netweaving mediates between different ways of system knowing, being, and organizing without collapsing them into one perspective. Organizational learning is a critical feature of good network practice as it enables ongoing adaptation with evolving needs and perspectives and as different participants

Syst. Res **34**, 537–543 (2017)
DOI: 10.1002/sres.2479

come into the network. Prescribing a specific approach to professional practice across network membership may short-circuit the feedback and open dialogue that fuels this ongoing process of discovery.

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