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ENHANCING THE IMPACT OF RESEARCH: EXPERIMENTING WITH NETWORK LEADERSHIP STRATEGIES TO GROW A VIBRANT NATURE-BASED LEARNING RESEARCH NETWORK

Catherine Jordan, PhD; Cheryl Charles, PhD; and Avery Cleary

Abstract

Research can fall short of having societal impact due to traditions of the research enterprise as well as the perceptions of researchers about their appropriate role. What if researchers saw their work as part of a social movement to make change, and the research enterprise was designed to encourage that view and to facilitate relevance, rigor, activation of research, and a collaborative approach to address research questions aligned with a common goal? What would such a research enterprise look like? In this article, we describe the application of “network leadership strategies” to develop a “generative, social-impact network” to support the efforts of a nature-based learning research network to advance knowledge of the natural environment's impact on children's learning and educational outcomes. The activities and achievements of the nature-based learning research network are examined through the lens of network-building approaches aiming to create social impact. Though inspired by and grounded in these approaches, the reality is that certain constraints influenced our ability to function collaboratively as a generative, social-impact network and to fully realize the potential of this approach. We describe these challenges and offer recommendations for other researchers interested in enhancing the social impact of research.

Keywords: network building, network weaving, network design, social impact, nature-based learning, research collaboration, research network, generative network

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“Networks have unique capabilities for achieving social-impact that distinguish them from other forms of social organizing, and generative social-impact networks are particularly suited for addressing complex problems.”

(Plastrik, Taylor, & Cleveland, 2014, pg. 13)

Research is intended to have an impact on society. Sometimes, however, the research enterprise can fall short of that ideal. The reasons can include failing to ask the most important questions, using research methods and designs that do not advance knowledge, or paying inadequate attention to the translation, dissemination, and application stages. A system of research that focuses on individual projects and that occurs within siloes also contributes to this shortfall. Another reason may be related to how researchers view their role. What if researchers saw their work as part of a social movement to make change—a movement to which researchers might contribute knowledge, skills, and evidence? What if the research enterprise was designed to encourage that view and to facilitate relevance, rigor, activation of research, and a collaborative approach to addressing research questions aligned with a common goal? What would such a research enterprise look like?

This was the motivation to apply “network leadership strategies” to undergird the *Science of Nature-based Learning Collaborative Research Network* (NBLR Network), a three-year project funded by the National Science Foundation (NSF 1540919, 9/15 - 9/18). The work of Peter Plastrik, Madelaine Taylor, and John Cleveland (2014), Jane Wei-Skillern (2008), and June Holley (2016) provided the foundation for our network-building approach.

The purpose of this paper is to describe this project, with an emphasis on the network leadership strategies employed. First, we provide information about the network leadership strategies adopted, followed by background information on the purpose, specific aims, organization, and funded activities of the NBLR Network. We then illustrate the ways in which the network leadership strategies informed the design and implementation of the NBLR Network and examine, through the network leadership strategy lens, the NBLR Network’s progress, challenges, and plans for the future. We conclude the article by offering recommendations for other researchers who might consider adopting an intentional approach to building a generative, social-impact network as their collaborative research structure.

Though nascent, research suggests that natural views, elements, settings, and pedagogy utilizing the natural environment as the context for learning—what we will refer to as “nature-based learning” (NBL)—produces a host of developmental benefits (Strife & Downey, 2009; Chawla, 2015) including enhanced learning and academic achievement (Williams & Dixon, 2013). The underlying premise of the NBLR Network is that increased understanding of the science of NBL, including which nature-based experiences impact learning, for whom, how, and under what circumstances, will enhance the practice of educators, educational administrators, policy makers, planners, and designers, resulting in better educational outcomes. The founders of the NBLR Network envisioned its work forming the basis of a systemic, cultural shift toward an evidence-based approach to enhance learning through nature contact that multiplies other developmental benefits of nature. To increase understanding of this complex phenomenon we must accelerate the pace of research, asking critical NBL scientific questions that utilize rigorous research methods, as well as effective communication of findings to audiences that can take action on the evidence. NBLR Network project designers adopted intentional network leadership strategies to provide the structure, process, and resources to facilitate such acceleration.

To our knowledge, our project is unique; it is the first time that the NSF, or any other major funder, has invested in understanding the mechanisms of NBL. And it is the first time that a social-impact network-building approach utilizing such network leadership strategies as articulated below has been adopted to serve as the means by which to develop and further scientific understanding of how nature impacts learning.

NETWORK LEADERSHIP STRATEGIES

Learning is complex, and understanding it requires multiple disciplinary approaches. Cognitive, biological, and social sciences and design disciplines all have something to say about how, why, and in what contexts children learn. They also each have something to learn from the others. And just as important, as academic disciplines they have something to learn from professionals working directly in the education and

environmental education sectors. NBLR Network activities outlined in the section below are supported through an organizational structure and approach that were modeled on three network leadership models in an attempt to build intentional space and processes that support interdisciplinary and cross-sector work.

Plastrik, Taylor, and Cleveland's (2014) Network Design model of building generative social-impact networks, described in more detail below, guided our network building. Jane Wei-Skillern's (2008) four Network Leadership Principles helped us frame the vision for our work together: focus on mission before organization; manage through trust, not control; promote others, not yourself; and build constellations, not stars. June Holley's (2016) Network Weaving approach provided practical steps to intentionally introduce and link people together to strengthen their relationships and build bridges among groups that were not previously connected, thereby expanding the network's reach, influence, and innovation.

The Network Design model of building *generative, social-impact networks* (Plastrik, Taylor, & Cleveland, 2014) was most formative in designing and launching the NBLR Network. Such networks are generative as "they are designed to be a platform for generating multiple, ongoing kinds of change, not just accomplishing a single outcome" (p. 5). They are considered to be social-impact networks because "they specifically focus on achieving change that results in social good" (p. 6). These networks comprise a set of people

...whose connections with each other enable them to generate more and more collaborative effort over time. The members don't just connect, share, and collaborate online; they forge powerful, enduring personal relationships based on trust and reciprocity that are supported by face-to-face engagement as well as digital tools for connectivity. . . Connecting makes it possible for them to undertake numerous activities, many of which emerge over the years. (Plastrik, Taylor, & Cleveland, 2014, p. 6).

NBLR Network members are working on multiple approaches to advancing the science of NBL, including enhancing research capacity, conducting exploratory research, developing a long-term research agenda, and synthesizing and disseminating evidence-based information for practice and policy application. Though members approach this topic from multiple angles, aligning within the NBLR Network allows members to pursue this work for a common social goal: to improve learning and educational outcomes for children and youth, and, in particular, for disadvantaged children and youth experiencing significant educational disparities.

PROJECT BACKGROUND

The long-term goal of the NBLR Network is to establish a nationwide network of researchers, organizations, and practitioner leaders across diverse disciplines and sectors to advance research on the science of NBL. In the short term, the NBLR Network aims to build robust and sustainable partnerships within the Network and with others, and to establish the solid framework needed to launch a successful multi- and interdisciplinary research agenda to advance understanding of how exposure to nature affects learning, including content and skills, component functions such as attention and retention, and related processes such as motivation, regulation, and engagement in learning.

Our intended outcomes most related to partnership studies include:

- cross-fertilization among cognitive, biological, and social sciences and design disciplines and among academic and practitioner sectors.
- research to understand NBL while enriching the knowledge, strategies, and approaches of established and emerging researchers.
- broadened participation of groups and sectors not typically included in setting the research agenda or conducting research, such as educators, policy implementers and community organization leaders.

- attention to the needs of underrepresented groups by focusing research on disadvantaged students.
- infrastructure to form interdisciplinary and cross-sector partnerships to conduct research, and translate and disseminate findings to practitioners and change-makers.
- dissemination of evidence for effective integration of nature into the learning context to formal/informal educators, administrators, and policymakers, to improve learning and educational outcomes.

In our grant application we proposed the following specific aims:

- Exchange knowledge about NBL across the disciplines and sectors represented in the Network, including disciplinary knowledge, findings, methods, resources, theories, approaches, and priorities.
- Identify gaps in the field's knowledge about NBL.
- Formulate a long-term interdisciplinary agenda for the field, appropriate for sustained collaborative research, specifying critical research questions and proposing methodological recommendations to enhance rigor.
- Conduct exploratory research into the impact of nature on learning and of the explanatory mechanisms of this effect, particularly for disadvantaged students.
- Synthesize and disseminate existing research as well as our research findings.

Membership

This project was conceived by a team of principal investigators (PIs) from the University of Minnesota, the Children & Nature Network (C&NN), and the North American Association for Environmental Education (NAAEE). The NBLR Network currently comprises 24 invited individuals: academic researchers, practitioners, organizational representatives, and funders from across the US. The NBLR Network is coordinated by the co-authors of this paper—the project PI (Catherine Jordan) and two C&NN staff members (Avery Cleary and Cheryl Charles), who also participate as NBLR Network members.

This coordinating team sought a diverse network membership based on variety of disciplines, areas of expertise in the science of learning and methodological approaches, and relevant stakeholder connections. Some were identified through a literature review of U.S.-based investigators publishing in the area of NBL, nature and design, nature and cognition, or related areas of inquiry. We included for consideration individuals who had not worked in the area of children and nature but whose knowledge and methods might be harnessed to better understand the science of NBL in children. We invited others based on the recommendations of those initially recruited.

Academic disciplines and areas of expertise represented include educational science, early childhood education, environmental education teacher preparation, cognitive science, ecopsychology, developmental psychology, environmental psychology, environmental neuroscience, stress neurobiology, environmental design, and landscape architecture. A wide variety of methodological approaches are also represented within the Network, including qualitative and quantitative methods, field observation studies, intervention studies, cortisol sampling and other methods of assessing autonomic nervous system function, neuropsychological assessment, behavioral mapping, and participatory research approaches.

In addition to researchers, we invited members of other sectors including teachers, teacher educators, professional society leaders, funders, and science communicators. These members help generate training-, practice-, and policy-relevant research questions; provide “reality checks” of the relevance and feasibility of research questions and designs; and offer communications strategies tailored to specific audiences. These individuals and their connections and networks also offer access to diverse sectors for translation and dissemination of research evidence.

The diversity of backgrounds and areas of expertise represented within the Network creates opportunities to expand the knowledge bases and repertoires of all Network members and to approach the identification of research directions from multiple angles

as is needed to address a complex issue such as the intersection of learning, nature, and sociodemographic background.

Activities

In order to achieve the specific aims proposed in the grant, we are undertaking four primary activities: setting a research agenda for the field; designing and implementing an exploratory study of NBL's mechanisms; catalyzing collaborative research ideas and partnerships in response to the research agenda; and "activating" research for the field. Each is described briefly below.

Setting a research agenda for the field. Setting a research agenda involves determining what we already know from research, gaps, and the needs of practitioners for evidence-based information. We began the agenda-setting process by surveying our members early in Project Year 1 to understand their perspectives on the current state of knowledge in the field and to solicit their recommendations for the critical research questions we should pose and the methodological advances we should promote. We utilized an "action lab" session at a C&NN conference in April, 2016 (mid-year 1) and a NAAEE constituent survey in the summer of 2016 (end of year 1) to gather feedback from over 250 individuals about critical directions for future research. Participants in the survey were primarily practitioners in education, early childhood education, environmental education, design, and planning. This input was weighed during the NBLR Network's second annual retreat in fall of 2016, and priority research questions and methodological concerns were identified based on members' expert opinions. We also conducted a thorough and rigorous literature review in the summer of 2016, including a gap analysis, on the impact of nature on learning processes and educational outcomes. Practitioner input and the results of the literature review were combined to develop the NBL Research Agenda. This agenda briefly documents the state of our knowledge about the impact of nature on learning, including gaps in our knowledge, proposes research questions that will advance the field most effectively, and offers recommendations for approaches to enhance the quality and rigor of both qualitative and quantitative research designs. Manuscripts documenting the literature review and

disseminating the NBL Research Agenda are in preparation by two writing teams, one composed of an NBLR Network member, a graduate research assistant supported on the grant, and the project PI, and the other composed of two Network members and the project PI.

Designing and implementing a study of NBL's mechanisms. As noted above, although gaps in knowledge exist, research has demonstrated a connection between nature and positive learning outcomes. The mechanisms that underlie this connection are less clear. In addition, the state of the research is not sufficiently advanced or rigorous to provide information about who may benefit most from nature exposure, and why. As part of our grant application, we proposed an exploratory research project to begin to answer these questions. The project PI and an NBLR Network member who is providing leadership to the exploratory research project are developing a partnership with an urban school district serving a large number of children experiencing economic disadvantage. Together we are designing a research project intended to elucidate the mechanisms—such as attention function, stress regulation, emotional and behavioral regulation, and engagement in or motivation for learning—that may help to explain why nature exposure enhances learning. In addition, building on literature findings of differential impacts of nature on various health and educational outcomes based on economic disadvantage, this exploratory research aims to examine the extent to which socioeconomic status (SES) moderates the relationship between nature and learning, and to elucidate possible explanations for this effect.

Catalyze collaborative research ideas and partnerships responsive to the research agenda. Although the NSF grant cannot fund additional research projects, one purpose of the NBLR Network is to develop research ideas responsive to the research agenda discussed above and to assist in forming collaborations within the Network and with outside partners to design projects and proposals for funding. To date, two possible collaborative projects have been catalyzed. For example, a small group of NBLR Network members are joining around a common interest in the impact of nature-based preschools on the development of executive functions and school readiness. They will

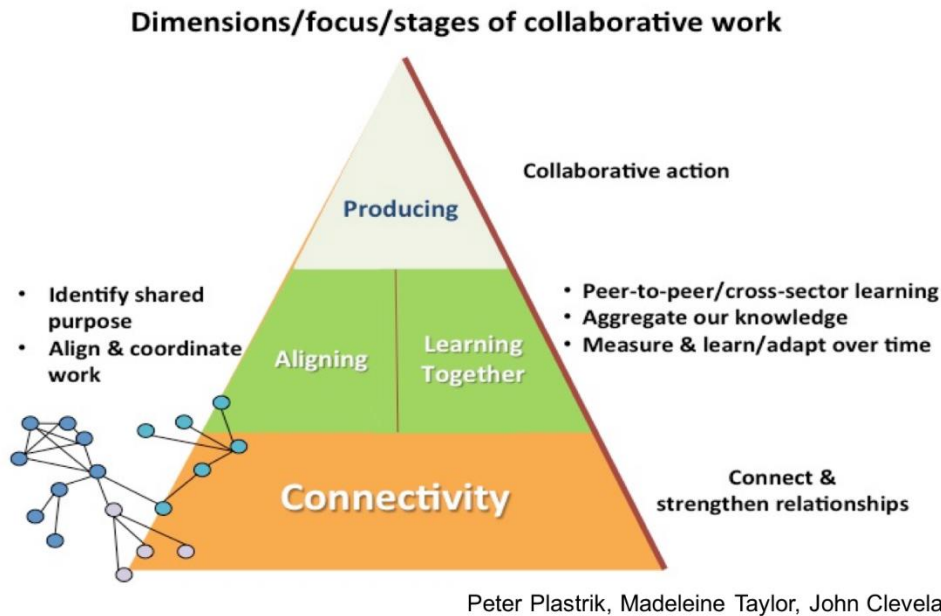
work together to identify research questions, share methodological approaches, develop research designs, and explore funding sources.

Activate the research. NBLR Network membership and co-PI leadership was designed to provide expertise and resources to support synthesizing, translating, and disseminating existing research, the evidence that will emerge from the Network's exploratory research project, and collaborative research endeavors, as well as the Network model. C&NN and NAAEE have considerable capacity to reach broad audiences of practitioners and decision makers. Each have online mechanisms to identify, translate, summarize, and synthesize existing research for the field (C&NN's Research Library, <http://www.childrenandnature.org/learn/research>; NAAEE's EEPro, <https://naaee.org/eepro/research>) as well as communication teams that can develop mechanisms for disseminating the NBLR Network model and the results of its research studies. The Network's academic members have capacity to disseminate results of the Network's research to academic peers. Practitioner members of the Network who have expertise in science communication will help develop innovative and creative modes of communication to diverse audiences.

NETWORK LEADERSHIP STRATEGIES AS APPLIED TO THE NBLR NETWORK

Plastrik and Taylor (2006) posit that there are three stages of network development (see Figure 1) that are, to a degree, sequential. However, networks often move between and revisit them as needed. These stages inform decisions about the functioning of the NBLR Network over the duration of NSF funding and beyond, the structure and purpose of in-person and virtual meetings, the activities undertaken at various times, and for what purposes the activities are undertaken.

Figure 1. Stages of Network Development



Early in a network’s lifespan, the focus is on “connectivity,” typically followed relatively quickly by “alignment and learning together.” These phases focus on building relationships among members, identifying a common vision and direction, and exchanging resources. These areas of focus move a network from a set of individuals connected to each other but working in relative isolation, to a collective unit with aligned purposes, priorities, strategies, and resources. In order to do this, networks build in processes for co-learning and for knowledge and resource exchange.

The coordinating team (the authors of this paper) launched the Network at an in-person retreat at a wildlife refuge in November, 2015. In planning for the retreat, we considered the practical strategies of Holley (2016) to help members connect and build relationships. The coordinating team asked members to prepare for the retreat by submitting personal and professional biographies and illustrative examples of professional activity. During the retreat, we focused on learning about each other through short presentations, speed networking, trust-building activities, and mapping of the Network’s connections, attributes, and assets (see Social Network Analysis in the

Evaluation section below). We also developed definitions, a vision and mission statement, and ground rules. Afterward, the coordinating team encouraged members to follow up with each other virtually to learn more and establish deeper one-on-one connections. Over the first two years of the grant, the coordinating team continued to tap the expertise of Holley (2016) and Wei-Skillern (2008) through readings, webinars, and direct consultation. For example, Network members were encouraged to “close the triangles” by linking two people they know, who don’t yet know each other (Holley, 2016).

Work within the first two phases of connecting and aligning and learning together continues through Years 1 and 2 through virtual meetings using platforms such as UberConference and Zoom. The second NBLR Network retreat was held in fall of 2016 and included whole-group and small-group interactions. We made use of techniques such as Open Space Technology, in which participants created and managed their own agenda of parallel working sessions focused on the issues they wanted to communicate or learn about. At this retreat, in virtual meetings of the whole group in winter and summer of 2017, and in ongoing small working groups, the focus is on exchanging disciplinary expertise, knowledge about nature and children from the various lenses represented in the group, methodological and analytical approaches, funding strategies, and dissemination and application approaches.

The final stage is about producing—doing the work together in collaborative, intentional ways that utilize individual and collective resources identified and nurtured within the group, with the intent to move the needle on an issue. We began producing during Year 1, and in earnest in year 2, and will remain in this phase for the rest of the grant period, revisiting earlier phases as needed in order to support the production phase. In this way, the full extent of the NBLR Network’s resources can be brought to bear on the activities listed above, and the production of the three major deliverables of this project: the research agenda for the field, an exploratory research project, and collaborative research ideas and proposals.

To be most effective in the production phase, we utilize Holley's (2016) concept of "tapping the periphery." Whereas members of the NBLR Network form the core of our network, members' connections to relevant individuals and organizations outside our network form the periphery. We encourage members to connect NBLR Network activities and members to resources in their individual networks, thereby expanding the Network's connections to external collaborators to contribute to the Network's activities.

Two examples illustrate this concept. As noted above, one member is exploring with other members the potential for a collaborative study of the impact of nature-based preschools on development of executive function. With those members' agreement, he is connecting prior work he conducted with a faculty member at another institution to this effort. He is contributing preliminary data from that project to inform research question and design development and to support a grant request. He is also leveraging relationships developed with preschool administrators during that project as well as his broader connections in the field, to secure participation of several preschools as research sites. By tapping his periphery in this way, and potentially the peripheries of his collaborating Network members, we have the opportunity to create a more effective, expanded research partnership. Other examples relate to the exploratory research project. This project has required consultation with numerous experts in the field of learning sciences. We have tapped colleagues at the University of Minnesota for advice, as well as other experts in those colleagues' networks. We have also pursued partnership discussions with several candidate school research sites. In each case, members of the NBLR Network have tapped their connections within their own professional networks, and sometimes connections of those connections, in order to gain entry to a school system or broker a relationship with a school administrator.

Evaluation Using the Lens of Network Leadership Strategies

Based on our proposed aims, activities and intended impact, several questions guided the development of our evaluation plan:

1. Is the Network strengthening interconnections, co-learning, and information/resource exchange among members, particularly across disciplines and across sectors?
2. Is the Network enhancing understanding of the science of NBL?
3. Is the Network generative in terms of creating directions for future research, pursuing joint funding strategies and developing new collaborations?
4. Is the Network effectively contributing to the movement to improve learning and educational outcomes by disseminating evidence-based information to practice, policy, and research sectors?

Two primary strategies are being used to answer these questions. To answer questions 1 and 3, Social Network Analysis (SNA) is a method for documenting patterns of relationships and their changes over time. It helps visualize as well as quantify the depth and breadth of relationships within or among people and organizations. Fredericks and Durland (2005) identified three primary strategies using SNA: a) examining the total structure of a network; b) examining sub-networks formed within the total network structure; and c) examining the connections of particular “nodes” of key players (or expertise) in the structure. All three strategies will be useful for examining the NBLR Network. A baseline analysis (prior to our first retreat) provided a visual mapping of the people and organizations involved in the Network. A follow-up analysis (at the end of year 3) will show the extent to which the Network has grown and changed over time. The SNA will specifically help to examine changes in connections across disciplines and sectors.

To answer all of the questions, with an emphasis on 2 and 4, Ripple Effect Mapping (REM) is a group participatory evaluation strategy for developmental and impact evaluation (Kollock, Flage, Chazdon, Paine, & Higgins, 2012). REM engages program participants and stakeholders to retrospectively and visually map the intended and, especially, unanticipated outcomes or “ripples” resulting from a program or complex collaboration. REM employs, within a focus group type process, elements of Appreciative Inquiry (Cooperrider, 2005), mind mapping, and qualitative data analysis.

It is particularly useful for complex initiatives such as a multidisciplinary, multi-sectoral network because it provides an opportunity to engage key stakeholders in the evaluation process and typically motivates participants and stakeholders to continue their collaborative work. This strategy is intended to reveal information pertinent to all evaluation questions, but the focus will be on questions 2 and 4. We conducted our first REM during our second retreat in fall, 2016. Detailed results of this REM and the end-of-project REM will be reported in a future publication. Briefly, themes that emerged from our first REM are noted below. The NBLR Network:

- expands thinking through interdisciplinary dialogue
- connects researchers to practitioners, generating new energy and alliances
- creates the social infrastructure for collaborative work moving forward
- increases enthusiasm for, and generates opportunities for communicating about, NBL in new venues
- builds relationships and trust to accelerate progress in the field
- strengthens existing, and creates new, connections
- strengthens C&NN and NAAEE and their constituents
- provides new opportunities for professional development

Challenges specific to the network leadership strategies are important ones to address briefly in this paper, as they have grounded our thinking about the future direction of the NBLR Network. The original NBLR Network is a limited group of individuals who were invited by a small coordinating team to be part of a network with grant funding for a certain number of members to engage in specific activities, with pre-defined deliverables, over a finite duration. These circumstances are typical of traditional research collaborations; they are less characteristic of the generative, social-impact networks described earlier in this paper. Though inspired by and grounded in the principles of Network Design, the reality is that these circumstances have influenced the ability of the NBLR Network to function collaboratively as a generative, social-impact network and to fully realize the potential of this approach.

The most distinct difference between our ideal and our reality is related to governance, exemplified in Wei-Skillern's (2008) principle, "manage through trust, not control." This has had implications for composition and scope of the Network. Generative, social-impact networks typically develop into self-organizing bodies with distributed leadership; in our case, the project PI has needed to maintain more centralized control in order to assure appropriate progress on the grant deliverables. As described earlier, the NBLR Network is generative to a degree; however, the need to maintain focus on the activities and products promised in the grant proposal has, for now, constrained more expansive thinking and action. Similarly, initial enthusiasm of many members of the Network for growing the membership and expanding the topical and disciplinary boundaries needed to be, at least temporarily, quieted in favor of maintaining the focus on the goals of the grant.

Another challenge has emerged as a result of the necessity to maintain focus on the research-related grant deliverables. Although practitioner and non-researcher members of the Network have made important contributions, it is also true that it has been easier for the academic members to find their place in the work and for the coordinating team to effectively engage them in project deliverable activities.

THE FUTURE OF THE NBLR NETWORK

Based on the potential for network leadership strategies to support generative, social-impact networks, one of the co-PI partners, C&NN, is adopting an "action network" strategy to enhance its ability to support the growing children and nature movement. This is a strategic decision consistent with C&NN's founding principles, that will be implemented in a parallel process during the third year of the NBLR Network project.

C&NN will assist existing geographic-based grassroots organizations as well as emerging thematic networks aligned with its strategic initiatives. It will do this by providing infrastructure to support effective communication, clear pathways for people and organizations to join action networks, platforms to encourage cross-collaboration, and

assistance in conceptualizing measurement of impact of action networks. The action network strategy provides a framework for C&NN to engage individuals and organizations to advance their own agendas while aligning those efforts to the broader goals of the children and nature movement.

The opportunity to align with this new strategic direction—to become one of C&NN’s action networks—and to be part of C&NN’s efforts to build a social movement to connect children to nature offers a unique opportunity to transform the NBLR Network from a closed research collaborative to the generative, social-impact network we originally envisioned. The action network strategy will be launched in 2018 at a national action network summit convened by C&NN. This timing aligns well with the timeline of the NBLR Network as we approach the final months of our grant period, complete activities related to our deliverables, ready ourselves to expand membership, and refocus our attention on action.

CONCLUSION AND RECOMMENDATIONS

We have described the application of network leadership strategies to the NBLR Network to create a research enterprise designed to facilitate relevance, rigor, activation of research, and collaboration to address research questions aligned with a common social impact goal. The adoption of network leadership strategies to a research collaborative network, as opposed to its more common application to social issues and advocacy activities, has been an experiment. Our experience offers lessons for other researchers interested in enhancing the social impact of research.

In many ways, the focus of the Network Design model—as a partnership approach—on building connections, aligning interests, exchanging knowledge and resources, and producing collaborative action has resulted in achievements that would likely not have happened without such intentional focus. The development of a research agenda to influence both the pace and rigor of research that can advance practice and inform policies that benefit children is a case in point. The cross-fertilization that has directly

contributed to enhanced communications and connections—from invitations for speaking engagements, to jointly authored articles, to potential research projects—is another.

Along with the successes, we have encountered hurdles, as we identified above, that stem predominantly from the nature of the traditional research enterprise, the very system we intended to challenge by attempting to develop a research-focused generative, social-impact model. Most notably, we have realized that the responsibilities to fulfill our commitment to achieving a specified set of deliverables on a finite timeline constrained our capacities to expand NBLR Network membership and focus, especially during the first two years of this project.

We believe that network leadership strategies can promote the goals of the research enterprise and are key to facilitating the contribution of evidence to a social impact movement. However, researchers need to anticipate the constraints some grant funding might impose. Researchers might consider some creative funding plans:

- sequential funding providing increasingly flexible sources of funds over time to move from research product support to support that responds to the will of the network to grow and transform to best address social impact, or
- parallel tracks—one providing funds for the deliverables expected in research studies and another, more flexible source that funds network expansion and social impact functions.

An alternative interpretation is that our challenges were related less to constraints or expectations of our funder, and more to limited capacity to manage both production of grant deliverables and network growth. Researchers, therefore, may wish to consider alternative models of staffing and coordinating a research-focused, generative, social-impact network. In a related way, project PIs and coordinators need to anticipate the tension inherent in maintaining fiscal responsibility and producing deliverables while nurturing trust, encouraging distributed leadership (particularly from non-researcher

members), and releasing control, in order to move a network to a stage of generativity and social impact.

With recognition of the limitations, as well as the benefits, we recommend application of network-building leadership strategies, both to accelerate research in areas of need and to learn more about the benefits and limitations of generative network-building approaches for accomplishing positive social change.

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