

A close-up photograph of a hand holding a molecular model. The model consists of black spheres connected by white rods, representing a complex structure. The background is a clear blue sky. The text is overlaid on the left side of the image.

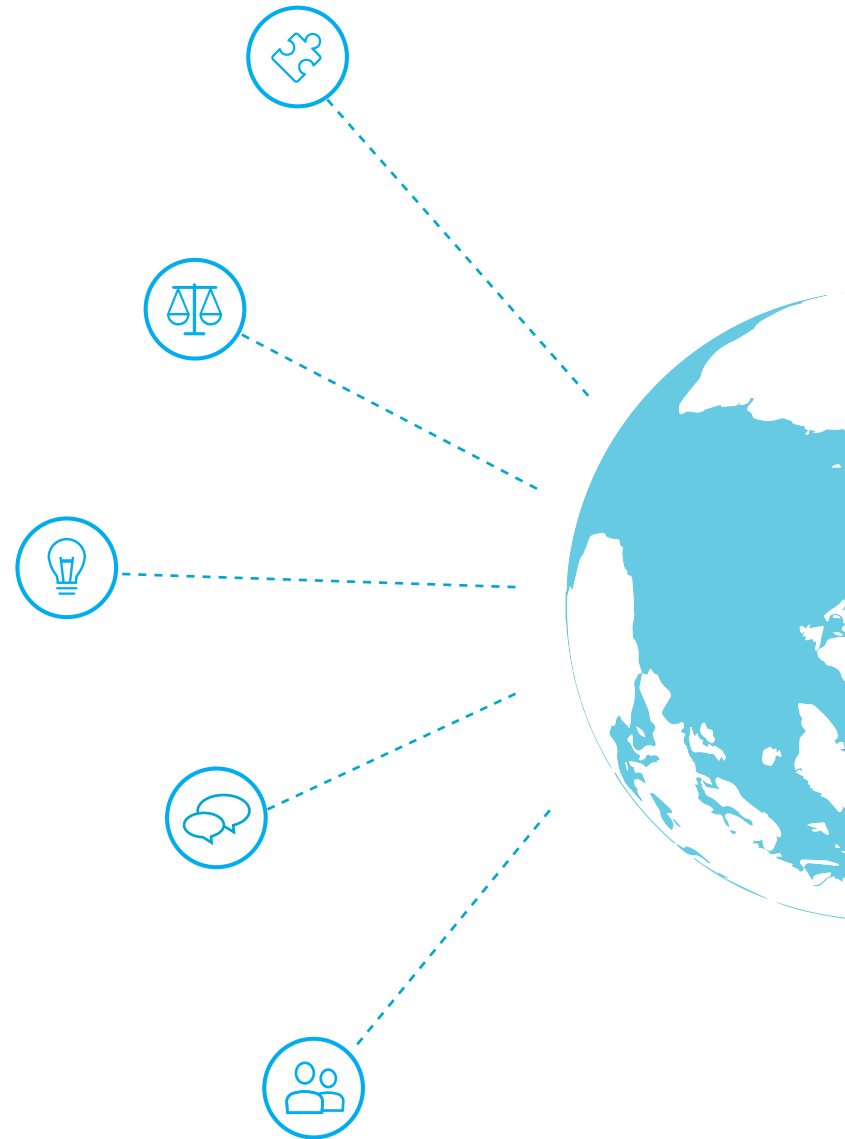
# BUILDING EVALUATION CAPACITY IN A COMPLEX WORLD:

Practical Lessons for  
Organization and  
Project Leaders

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# EXECUTIVE SUMMARY

**Today institutional and project leaders are faced with two critical dilemmas:**

**(1) building the capacity to respond to the increasing evaluation and accountability demands of funders and stakeholders; and**


**(2) managing the complexities of interconnected, multifaceted, ongoing institutional and cross-institutional work.**

These challenges require leaders to go beyond traditional approaches to professional development and consider the complex ways that systems of professionals communicate, interact, and evolve.

This report draws from three years of research as part of the National Science Foundation-funded *Complex Adaptive Systems as a Model for Network Evaluation* (CASNET) project to provide concrete, evidence-based recommendations for professionals seeking to address these challenges. The information is particularly designed for those working to develop evaluation capacity in complex organizations or in projects with multiple partners. However, we believe the recommendations can inform efforts to support evaluation at any scale and might also suggest approaches to other initiatives beyond evaluation capacity building. Similarly, although the CASNET project focused on education professionals working in museums and

science centers, we believe the findings may be of relevance to any field grappling with the challenges of supporting evaluation capacity building within complex networks of individuals and institutions.

In this report, we outline four themes that emerged from the research about how leaders can support the growth and spread of evaluation capacity within a complex system:

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- 1. Fostering a shared value for evaluation**
  - 2. Ensuring both diverse and redundant staff skillsets**
  - 3. Balancing centralized and decentralized control**
  - 4. Considering the broader evaluation ecosystem**

Following an introduction to the project as a whole, the report is organized into four chapters, one for each of the four themes. Each chapter includes an overview, concrete recommendations for leaders wishing to address the theme in their own organizations and projects, and an example of an organization that grappled with issues related to the theme in their own work. We end the report with a brief conclusion and a list of resources for those wishing to go deeper.



# INTRODUCTION

For those trying to build evaluation capacity in a world more interconnected than ever before, simplicity has become a thing of the past.

Professionals in today's workplace often work across boundaries, both physical and conceptual, moving fluidly between teams and work groups and learning from and collaborating with colleagues across the globe as easily as those across the hall. So how do we build the capacity of our teams, our organizations, and our networks within this exciting (but messy) new world? This report attempts to address this question by sharing what was learned through a case study of evaluation capacity building within one complex system—the Nanoscale Informal Science Education Network (NISE Net).

Evaluation capacity building (ECB) is a relatively recent conceptual development that has gained prominence in the last decade.<sup>1</sup> Scholars have described ECB as a change effort that fosters individuals' skills and knowledge to conduct evaluation, as well as organizational structures and cultures to support evaluation use.<sup>2</sup> Importantly, the ultimate goal of ECB has been described as “a sustainable evaluation practice—where members continuously ask questions that matter, collect, analyze, and interpret data, and use evaluation findings for decision-making and action.”<sup>3</sup> Despite the appeal of this goal, however, for those interested in fostering the growth of evaluation capacity within a team, an organization, or a network, the interconnectedness—the *complexity*—of the modern workplace has brought with it both challenges and opportunities.

Complexity theory, long used by biologists, ecologists, computer scientists, and physicists, has recently been adapted for use in exploring organizational change.<sup>4</sup> The characteristics of complex systems can be thought of in three broad categories: (1) those related to behaviors within a complex system, such as adaptation or evolution, randomness, and emergence; (2) those related to the



## WHAT WAS THE NISE NET?

The NISE Net ([www.nisenet.org](http://www.nisenet.org)) was a national community of researchers and informal science educators dedicated to fostering public awareness, engagement, and understanding of nanoscale science, engineering, and technology. Instituted in 2005 through NSF funding, NISE Net quickly expanded. As of 2015 NISE Net was comprised of over 550 science museums, universities, industries and other partners. In 2016, The NISE Net transitioned into a new, ongoing identity as the National Informal STEM Education Network.

During the initial years of the network, professional evaluators conducted nearly all NISE Net evaluation studies. In response to an expanding use of evaluation across the network, the NISE Net team later instituted the Team-Based Inquiry (TBI) process in conjunction with and supported by an annual survey of all its partners. Through network support of the TBI process, non-evaluation NISE Net professionals developed their own inquiry questions, data collection methods, data analyses, and interpretations, using the annual partner survey as a resource if desired.

attributes of individuals within the system, such as internal diversity, internal redundancy, and neighbor interactions; and (3) those related to the overall network structure, such as nested structure, open systems, and massive entanglement.<sup>5</sup> This theoretical lens can be helpful in understanding the conditions through which change can emerge, specifically as “a framework that offers explicit advice on how to work with, occasion, and affect complexity unities.”<sup>6</sup>

Understanding the unique characteristics of the complex systems within which we live and work can allow us to make the most of new opportunities and at the same time recognize and overcome related challenges, such as adapting to shifts in staffing or building buy-in for new initiatives among peers and leaders. With this in mind, it’s vital for anyone who is considering an organization- or network-wide ECB initiative to understand the characteristics of complex systems that will make it more or less likely for that initiative to take root and flourish. Perhaps you are planning for future efforts to foster evaluation capacity,

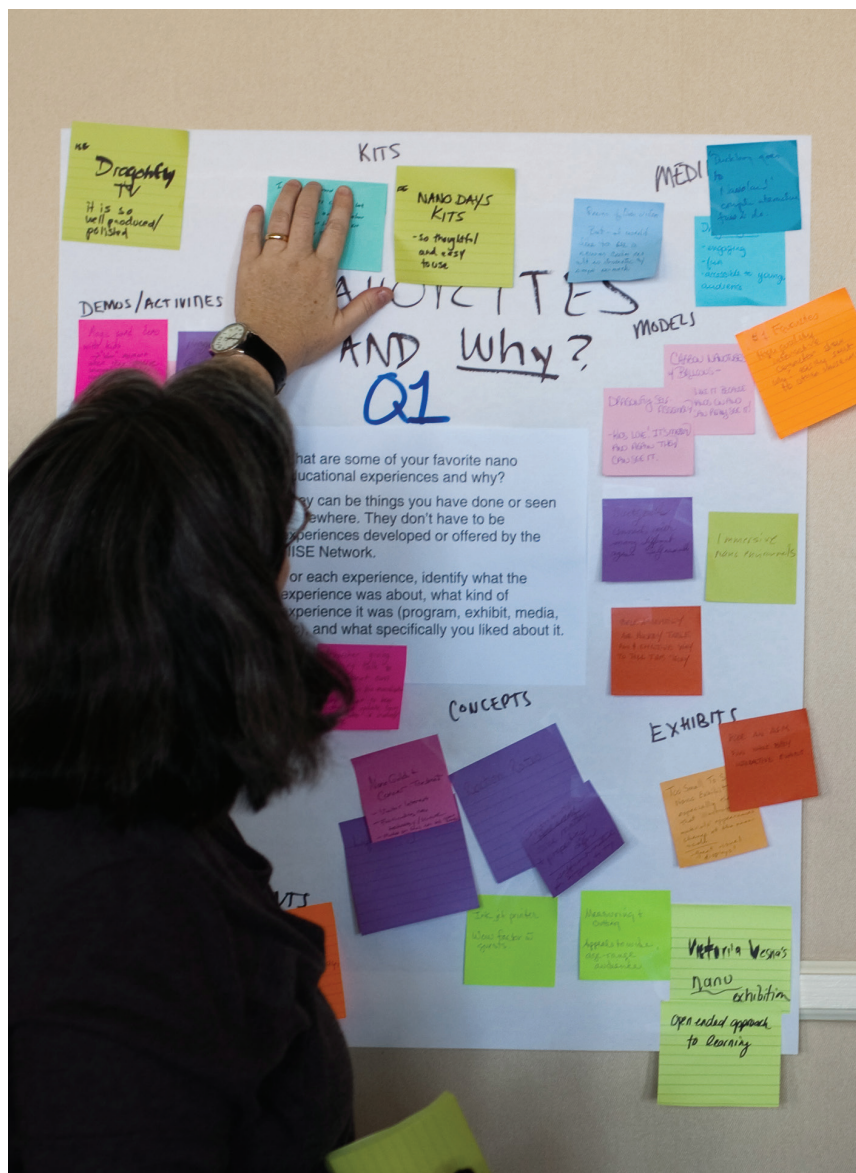


or perhaps you are currently in the midst of implementing such an initiative. Whatever the case might be, we hope that the information and examples provided in the following pages will help you to chart a course toward successful evaluation capacity building in a world of complexity.

This report draws on the findings of the CASNET project, a cross-institutional research study that explored the nuances of ECB within a complex adaptive system (the NISE Net) situated with the field of informal science education. While this study yielded many findings, the following pages focus on providing information that may be useful and relevant for administrators, consultants, and others interested in learning more about the factors that can support or hinder the growth of evaluation capacity in a complex system, whether at the level of a project, an institution, or a large network like the NISE Net.

## WHAT WAS THE CASNET PROJECT?

The *Complex Adaptive Systems as a Model for Network Evaluations* (CASNET) study was a research project funded by NSF and led by the University of Minnesota. During the project’s three years, the CASNET team reviewed meeting notes and other documents from NISE Net working groups, analyzed NISE Net survey data, and interviewed NISE Net professionals across multiple organizations. The team used a lens of *complexity theory* to learn more about how and why ECB occurs—or doesn’t occur—within a large, cross-institutional network.



In this report, we outline four key findings from the CASNET project, as well as the practical implications of these findings for professionals who are planning or conducting ECB initiatives within complex systems. Throughout each section, we have included participant quotes that were generated as part of the CASNET study data and that illustrate the findings being discussed. Each section also includes an example of the finding in action within a real-life setting, as described by the professionals who participated in the CASNET study. As you read through these sections, it is important to remember that although each describes a different finding, the underlying dynamics and themes are fundamentally interrelated—the various factors described may each play a part in supporting or inhibiting an ECB initiative, but no single one on its own will guarantee success or failure. The report concludes with a few closing thoughts and a list of resources to consider as you plan your own initiatives, including more information about ECB and complex systems and links to evaluation resources developed through the NISE Net project.

<sup>1</sup>King & Volkov, 2005; Preskill & Boyle, 2008

<sup>2</sup>Huffman, Thomas, & Lawrenz, 2008; Kowalski, Limber, & Agatston, 2008; Preskill & Boyle, 2008

<sup>3</sup>Preskill & Boyle, 2008, p.444

<sup>4</sup>Davis & Sumara, 2005, 2006; Dyehouse, Bennett, Harbor, Childress, & Dark, 2009; Eoyang & Berkas, 1998;

Hargreaves, 2010; Lemke & Sabelli, 2008; Mason, 2008, 2009; Mitchell, 2009; Patton, 2011; Wolf-Branigin, 2013

<sup>5</sup>King et al, 2014

<sup>6</sup>Davis & Sumara, 2006, p. 130



## THEME 1: Fostering a Shared Value for Evaluation

The degree to which individuals feel that they belong to an organization or project that values and supports evaluation influences their ability and inclination to share capacity-building knowledge and strategies with colleagues and leaders.

Building evaluation capacity is not only about skills and knowledge, it's also about values and attitudes.<sup>7</sup> Individuals ultimately need to see the value for evaluation to be motivated to incorporate it into their work. More than that, professionals wishing to grow the evaluation capacity of themselves, their organization, or their project teams also need to feel a shared sense of value from their leaders and their colleagues.

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“I think a lot of people at our museum feel that evaluation helps to validate a lot of the work that we’re doing.”

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In our study of NISE Net staff and partners, we repeatedly saw how museum professionals developed their own evaluation knowledge and skills through the trainings that the Network provided. For example, participants of the team-based inquiry (TBI) cohorts left the experience feeling energized, expressing a strong sense of value for evaluation and motivation to incorporate

TBI into their practice, and possessing a broader toolbox of resources and skills to use evaluation and data-informed decision-making. However, whether or not this passion and new knowledge translated into long-term changes at their own institutions depended on the support of their leaders and colleagues.



Some trainees returned to institutions that already had a strong and shared value for evaluation across the organization. Leaders expressed interest in and initiated new evaluation efforts, staff meetings regularly involved discussion of evaluation data, projects incorporated evaluation in a variety of ways, and staff members were eager to collect data on their own programs in order to make improvements. In these cases, we often documented stories of TBI flourishing and becoming integrated across the organization. In other words, there was strong evidence in our research that a shared value for evaluation within the organization supported evaluation capacity building.



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“If they don’t want it then I don’t do it. It would have to come from someone other than me. I don’t think there’s a lot of buy-in to the necessity of evaluation. I’m not sure why.”

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In other cases, excited individuals returned from the Network professional development only to be reminded that there was little support for evaluation from their organizational leaders, creating significant challenges for using what they had learned from the training to build the evaluation capacity of their museums. These professionals often told stories of resistance from leaders, lack of time and opportunity to try out evaluation or TBI, and frustration at not having the support to move forward with new ideas. In short, while the trainings almost universally supported the evaluation skills of participants, shared value for evaluation at their home organizations played a significant (although not universal) role in determining whether or not capacity spread beyond these individuals.

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<sup>7</sup> Preskill & Boyle, 2008; Stockdill, Baizerman, & Compton, 2002; Suarez-Balcazar et al., 2010; Taylor-Powell & Boyd, 2008

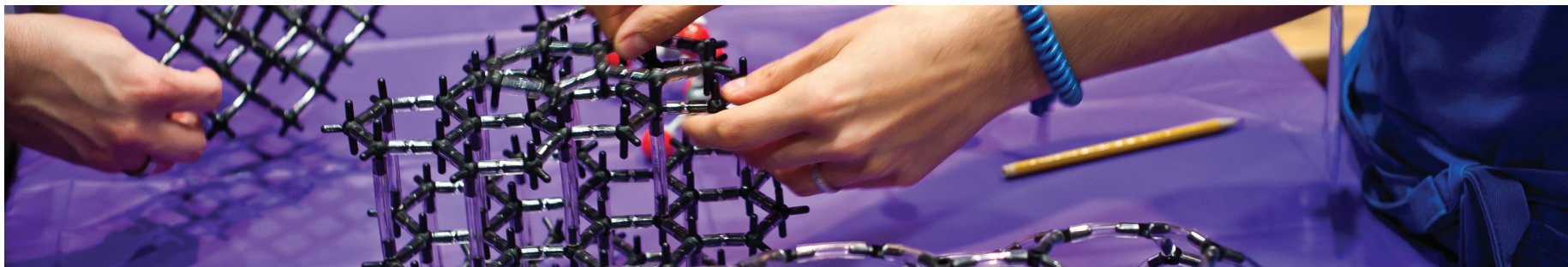
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## IMPLICATIONS FOR PRACTICE

Whether you are thinking about how to grow the evaluation capacity of your organization or you are beginning a new project and hope that evaluation and data-based decision-making will be integrated from the beginning, considering how to foster shared value for evaluation can be an important first step. The following recommendations are intended to help build a culture of shared value and support for evaluation.

- **Partner with other organizations that already have a strong shared value for evaluation and seek out local evaluation experts.**
  - **Regularly dedicate staff meeting time to discussing data or evaluation results or use staff meetings as a mechanism for team-based inquiry.**
  - **Share evaluation results and highlight evaluation success stories with board members, institutional leaders, and other staff.**
  - **Set aside time and space for staff who have participated in professional development opportunities to discuss their experiences and share what they learned with the team.**
  - **Empower and encourage staff members to formally and informally evaluate their work.**
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## THEME 1 VIGNETTE: *Amazing Science*



“*Amazing Science*”<sup>8</sup> is a small science center in a suburban setting outside a large city in the Midwest. As our study participant described it, the institution had been developing a strong value for evaluation over the last decade, under the leadership of the director of education and the executive director. These senior leaders had pursued a variety of strategies for integrating evaluation across the organization, including engaging staff members in an Appreciative Inquiry process<sup>9</sup> to identify guiding questions for the evaluation of museum programs; bringing in an outside evaluator to lead a variety of evaluation activities at the museum; regularly dedicating staff meeting time to discussing evaluation findings and prioritizing goals and questions; involving team members from different departments in collaborative evaluation work; and leveraging the small size of the institution to quickly act on evaluation findings and make meaningful changes to programs and practices.

As a result of these activities, the institution had gone from “dabbling” with evaluation to integrating it across the organization and making it a central part of its business practices. As our research participant noted, staff members were consistently excited about working in teams to

carry out evaluation studies and improve their programs. On several occasions, two or three staff members would be on the museum floor simultaneously collecting evaluation data for different projects.

Although *Amazing Science* did not participate directly in the NISE Net’s in-depth cohort-based TBI training, the shared value for evaluation within the organization appeared to position it well to incorporate and build on evaluation resources and concepts presented through different Network opportunities. For example, during the workshop on universal design,<sup>10</sup> the concept of prototyping was introduced. The staff member from *Amazing Science* attending the workshop found this idea extremely useful and immediately brought it back to his institution, where it has become part of the professional vocabulary. Staff members at *Amazing Science* have also used online NISE Net evaluation-related resources to develop evaluation questions, furthering their capacity to focus and conceptualize an evaluation study.

<sup>8</sup>All institution names used in this report are pseudonyms; actual names have been removed to ensure the anonymity of study participants.

<sup>9</sup>Cooperrider & Whitney, 2005; Cooperrider, Whitney, & Stavros, 2008

<sup>10</sup>NISE Network, 2010

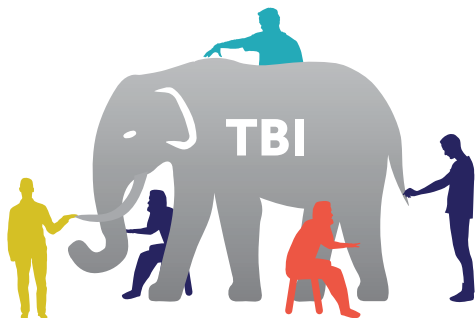


## THEME 2: Ensuring both Diverse & Redundant Staff Skillsets

The presence or absence of diverse and redundant skillsets, backgrounds, and approaches in a team influences how (and whether) ECB takes place.

Complex systems, by their very nature, tend to result in collaborations between individuals with a wide range of knowledge, proficiencies, and interests. While these teams may include some overlap in terms of skills and experience, it is not unusual for such overlap to be counterbalanced by substantial diversity. While this pairing of diversity and redundancy does occasionally present difficulties, the CASNET study suggests that it also enables teams to be resilient and react to challenges and opportunities with remarkable nimbleness.

Think of the parable of the blind men and the elephant, in which each individual reaches a conclusion about what an elephant is based on their ability to perceive only a small part of the whole (Figure 1). Based on the results of our study, it appears that a team in which all members have similar perspectives may



**Figure 1.** People may perceive a situation or intervention differently depending on their perspectives

struggle to gain a holistic understanding and act flexibly and creatively when faced with an unfamiliar task. A diversity of backgrounds and problem-solving approaches, in contrast, has the potential to allow a team to understand and respond to new situations, including issues that arise through evaluation capacity building.

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“ We used [TBI] just one time as a test and soon after that, unfortunately, the other person who’d been trained on it left... [We’d like] to get another person up to speed and keep that going and just try to do those types of things that would really contribute to what we do, but unfortunately the time is never there.”

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At the same time, it is important to recognize the value of redundant knowledge and skills within teams that are part of a complex system. One of the defining characteristics of such systems is that they adapt and change over time.<sup>11</sup> This can take the form of staff turnover, shifts in priorities and structures, and any number of other dynamics. Teams merge and divide, individuals change roles, and new team members join as others leave.

The ability of a team to maintain its sense of identity and momentum throughout these changes is vital for ensuring the success of evaluation capacity building initiatives. If each member holds a unique set of skills, knowledge, and responsibilities with no overlap, it becomes very difficult for a team to continue effectively engaging in evaluation (or any activity) or develop a shared sense of purpose and process if one or more of the individuals leave the group.<sup>12</sup>

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“I’ve only been a part of the NISE Net evaluation process from the outside, and I don’t know enough to really speak to it...I’ve never worked with evaluators outside the NISE Net evaluation.”

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In studying various teams and working groups within the NISE Net, we noticed that individuals within these groups tended to bring a range of different backgrounds and experiences related to evaluation. Each group often included at least some members with extensive experience in evaluation, providing some level of redundancy, but there was generally not significant overlap in terms of specific types of experiences. For example, some individuals might be familiar with data collection and analysis, while others had experience with evaluation planning or had been involved in evaluations only as participants.

In many cases, the teams that demonstrated the greatest levels of success and comfort in conducting TBI studies and using evaluation results were those that included a diverse set of knowledge, skills, and backgrounds and encouraged all members to contribute and build a shared sense of proficiency. These teams often expressed feelings that evaluation was becoming a part of what they did and how they thought on both an individual and a group level, and that their diversity and redundancy of skills made them more resilient to change, as when members left, others joined, or the needs of the network shifted. Similarly, participants in the TBI cohorts expressed an appreciation for the opportunity to learn from the diversity of experiences and ideas that were shared during group calls and in-person meetings.

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<sup>11</sup>Eoyang & Berkas, 1998; Patton, 2008

<sup>12</sup>Davis & Sumara, 2006; Mason, 2008, 2009

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## IMPLICATIONS FOR PRACTICE

Based on findings from the CASNET study, you may find it helpful as a leader within your organization or network to assemble teams that include both diverse and redundant knowledge, skills, and interests in order to support the development of evaluation capacity. Below are a few ideas to keep in mind in order to set your teams up for success and support the resiliency of your organizations and projects.

- **Partner with other leaders within your organization or network to identify and pull together team members with diverse backgrounds and proficiencies.**
  - **Be thoughtful in your professional development offerings, ensuring that teams have the opportunity to become change-capable by developing shared skills.**
  - **When possible, send multiple team members to professional development offerings in order to build redundant skill sets.**
  - **Plan for the eventuality of staff turnover by building succession-planning and knowledge-capturing mechanisms into your teams’ work processes.**
  - **Seek out and recruit individuals with skill sets that are complementary to those already represented on your teams.**
  - **Listen to your teams. Seek their feedback regarding areas of strength and opportunities for growth, and offer PD opportunities and capacity building initiatives accordingly.**
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## THEME 2 VIGNETTE: *STEM Within Reach*



“*STEM Within Reach*” is a small science center where our study participant held a leadership position in the education department. This institution has a small staff, with each member wearing many hats in addition to their official job title, and our participant noted that it was often challenging to carve out the time and resources to conduct evaluation, even when institutional support and buy-in exist. However, simply having at least one additional staff member who had received the same TBI training—and who was equally willing and able to participate in planning, data collection, and analysis—was immensely beneficial and meaningful. Without the participation of another colleague from *STEM Within Reach*, returning from TBI meetings and taking sole responsibility for using and sharing what had been learned would have been, according to our participant, a daunting challenge.

Something else that was emphasized was the value of working on evaluation activities alongside another educator, including the ways in which the results of their evaluation benefitted as a result of their

backgrounds and shared knowledge and skills gained through the TBI cohort. For example, their differing backgrounds and perspectives were helpful when analyzing data, since one was more comfortable with numbers while the other was more proficient in other kinds of analysis.

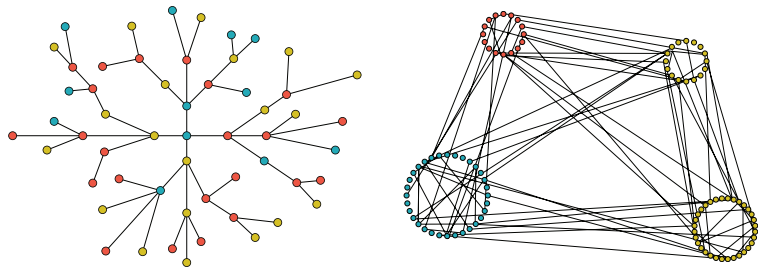
As a result of participating in the TBI cohort, our participant saw a change in the way the educators at *STEM Within Reach* perceived their ability to evaluate their work. She has written TBI studies into several documents to be shared between informal and formal education professionals, which will likely result in further development of a redundant evaluation skillset among educators and others involved in these assessments. Through these and other efforts, our participant, and *STEM Within Reach* as a whole, has continued to foster both diversity and redundancy of evaluation skills among institution staff and support long-term evaluation capacity building.



## THEME 3: Balancing Centralized and Decentralized Control

Providing some central leadership and guidance, while at the same time empowering individuals and teams to make decisions and take action, can help evaluation capacity to spread and flourish.

From the perspective of complexity theory, an important characteristic of a system, like an organization or project, is the degree to which it exhibits centralized or decentralized control.<sup>13</sup> Centralized control involves many individuals within the system primarily communicating with and reporting to a single individual or group, such as a director or project management team.<sup>14</sup> In contrast, decentralized control is often characterized by a variety of interconnections and lines of communication among individuals, many of which may not be filtered through a central authority (see Figure 2).

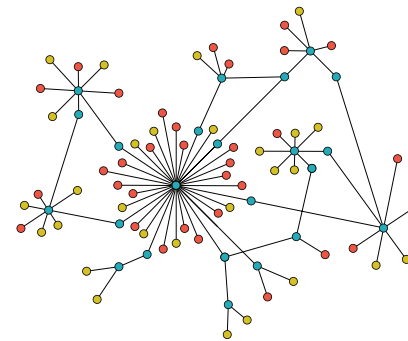


**Figure 2.** Examples of systems with clear centralized (left) and decentralized (right) control.

For example, you can imagine an organization in which all decisions and communications must go through the president or executive director. All individuals within this organization report

to this person and departments have very little autonomy to act without his or her approval. This would be an example of centralized control. Alternatively, you may have been involved in a project where many small groups work independently, communicate with each other as needed, and act without the direction of a central leader or team. This is an example of decentralized control.

In studying the NISE Net, we found many examples indicating that a balance between centralized and decentralized control (e.g., Figure 3) can be most effective for supporting evaluation capacity building. Some centralized control



**Figure 3.** Example of system with characteristics of both centralized & decentralized control.

appeared to be important, such as communicating a shared vision and value for evaluation within the Network and providing guidance to help teams and organizations work together. However, when teams had the autonomy to take

these broad visions and guidance and flexibly tailor them to their own needs and goals, working both with project leaders and across teams, it was more likely that evaluative thinking and practices would be adopted and would persist.

This balance was very evident in the core group of NISE Net funded partners. When evaluation capacity building efforts were first being rolled out to this group, through the formal introduction of the TBI process, there was a clear expectation

and mandate from the project leadership team that TBI would become a required part of Network processes and deliverables. All of the Network working groups participated in the TBI training during the annual project meeting and each one was asked to develop a TBI plan as part of their yearly goals and scopes of work. Throughout the year, the teams were provided support from project evaluators to use and implement TBI, and during a subsequent annual project meeting, all teams presented on their progress and the results of their TBI work.

Beyond these expectations and mandates, however, teams were afforded considerable flexibility in how they incorporated TBI into

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“It’s been so prevalent as part of what we’re doing with our staff meetings. I think people are getting more invested in it. In workshops that we do, we try to mix folks up in different groups; we make sure there are departments within each of the different sections when we’ve done those evaluations.”

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their work. This resulted in an almost universal adoption of the TBI process across the working groups and rich examples of how TBI and evaluation could look in different contexts. For example, one group used TBI to formalize their prototyping and peer-review process, while another group incorporated TBI as part of their annual partner tracking and feedback system. A variety of mechanisms also allowed teams to talk with each other and share information about TBI, further promoting evaluation capacity building across the project and

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“I have recently become the department head at my institution and have started to include the entire team in discussion about programming we currently offer, and if we should continue in the same direction we have been traveling in. I would like to incorporate more formal evaluation like TBI to help us with our decision-making in the future.”

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illustrating the importance of *neighbor interactions*. Such interactions between agents within a complex system, which tend to be more common in systems demonstrating greater degrees of decentralized control,<sup>15</sup> provide a powerful means by which information and resources can spread.

We saw similar patterns as TBI was rolled out to the broader group of unfunded Network partners. For these individuals, the institutional context was often a critical factor. In some cases, strong control from organizational leaders made participants feel that they didn’t have the flexibility or authority to try out TBI or evaluation within their work. In other cases, it was an absence of leadership that hampered evaluation capacity building—participants had control

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“I work a lot on coming up with new things or reviewing things that we already have in place, so it’s part of my job to make sure that they’re actually worthwhile. Being able to evaluate that is part of what I’m expected to do.”

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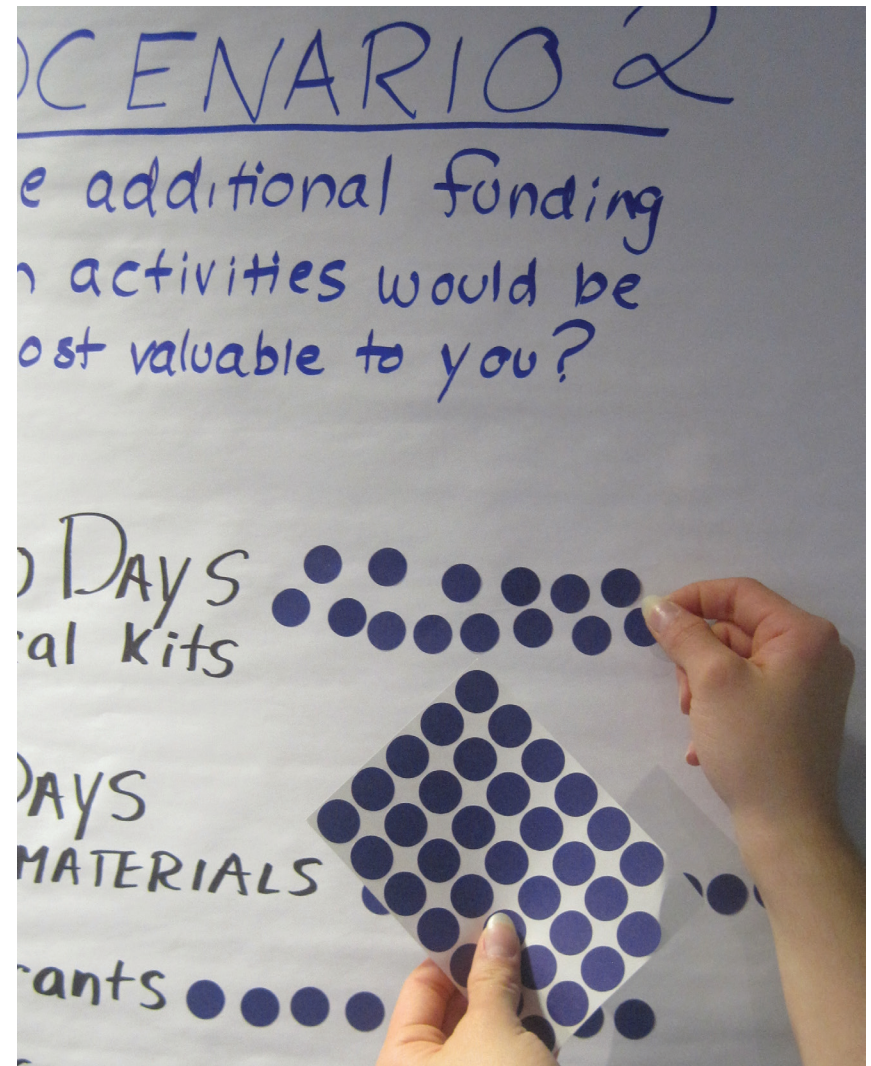
over their work but they felt very little support or motivation from their leaders to pursue evaluation capacity building efforts. As with the funded Network partners, it seemed to be that when a balance was struck between these two situations—when leaders supported and communicated their value for evaluation and TBI but also allowed teams the flexibility to try things out, talk to colleagues, and figure out how evaluation might look in their own work—we saw the most evidence of evaluation capacity building.

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<sup>13</sup>Davis & Sumara, 2006; Lemke & Sabelli, 2008; Mason, 2008

<sup>14</sup>Davis & Sumara, 2006

<sup>15</sup>Davis & Sumara, 2006; Mason, 2008





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## IMPLICATIONS FOR PRACTICE

Building on Theme 1, it's clearly important that organization and project leaders help communicate shared values and expectations around evaluation. However, you may also want to consider ways that you can empower those that you work with to take charge of their evaluation efforts and have control over how evaluation capacity is shaped and built in relation to their work. Below are ideas to help strike this balance in organizations and projects.

- **Ask employees and departments to develop their own plans for incorporating evaluation into their work. Have employees set individual goals related to evaluation and evaluation capacity building during annual performance review meetings.**
- **Bring employees and team members into discussions and decision-making processes about evaluation and evaluation capacity building.**
- **Help staff members build time into their schedules to experiment, take risks, and collect data. Encourage teams to try out low-risk evaluation projects that give them the chance to take charge and succeed, fail, and learn from what they've done.**
- **Consider as a leader what decisions you need to be involved in and what decisions you can entrust to your staff members. Consider when it is necessary for you to take on an oversight role versus a thinking partner role.**
- **When rolling out your ECB initiative, provide time and resources for engagement by individuals and team, and allow flexibility for adaptation to specific project settings.**
- **Develop systems of communication that support project leadership but also facilitate a sense of project ownership and investment among teams and team members.**

## THEME 3 VIGNETTE: *Explore Your World*



“*Explore Your World*” is a small science center with a history of support for evaluation. For example, the executive director frequently contracted with external evaluators and the museum regularly used visitor feedback to assess and improve programs.

Since becoming involved in the NISE Net, the leadership team at *Explore Your World* used the project as an opportunity to further deepen and extend the organization’s evaluation systems and capacities. The executive and associate directors, along with the board, approached this process by not only communicating a clear mandate for evaluation across the museum but also empowering staff members to lead these efforts and determine how best to respond to evaluation findings. As a result of this combination of centralized and decentralized control, participants in the CASNET study reported that support for evaluation had grown, systems for evaluation and

data-based decision-making had evolved and flourished, and the organization had become involved in new projects specifically focused around evaluation capacity and use.

As an example of this approach, the board asked for evaluation to inform updates to the organization’s website. Based on this direction, the associate director formed a small team with members of the marketing department to design and carry out the evaluation and determine implications of evaluation findings. Members of the marketing department were then responsible for determining how to change the website based on these findings. Overall, the combination of centralized and decentralized control appeared to support broad buy-in for evaluation across the organization and empowered staff members to incorporate data collection and data-based decision-making into their work.



## THEME 4: Considering the Broader Evaluation Ecosystem

“Structured” evaluation capacity building initiatives are helpful, but they are only one of the many factors influencing individuals within a complex system, the entirety of which shapes evaluation capacity and use.

Even after having read through the previous three themes that arose from our study of the NISE Net, you may still feel that planning and implementing an effective evaluation capacity building initiative within a complex system is, well, too complex to try. If so, this fourth and final theme emerging from our study may offer a helpful perspective. The results of this study clearly indicated that within the NISE Net at least, and likely within other organizations or networks, planned and structured evaluation capacity building initiatives are valuable. At the same time, however, every individual and team has the potential to be exposed to evaluation concepts and practices through a myriad of other channels and as part of the overall professional ecosystem.

Over the course of the CASNET project, a theme that emerged with great regularity was that the NISE Net—and indeed, the

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“It seems like they are evaluating all aspects of the Network—from the network itself, to programs, to exhibits, to evaluations after every NanoDays...Every meeting I’ve ever been at, the evaluators are part of the process, so it seems like a pretty extensive evaluation of the program.”

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science center and museum field as a whole—tended to be supportive and encouraging of evaluation on multiple scales. Even individuals who were not directly involved in the oversight of the Network and who did not participate in the Network’s TBI cohort experiences were often able to identify multiple ways in which evaluation was present within the NISE Net. Individuals within the Network could point to specific evaluation activities, reports, and resources, and several mentioned using these to inform their own work. Tracing participants’ ECB stories throughout the course of the CASNET project, a variety of evaluation-related influences highlighted the importance of an evaluation-rich ecosystem, beyond specific ECB initiatives.

Although not always considered in staff professional development, the influence of factors beyond structured training makes sense from a systems perspective. Because complex systems are also *open systems*<sup>16</sup>—that is, individuals within a complex system are influenced by things both within and



beyond its boundaries—what is learned about evaluation within a given system has the potential to influence interactions outside that system, and vice versa. Also, because complex systems are *nested structures*<sup>17</sup>—meaning they contain multiple layers of subsystems, such as a working group operating within a larger institution that is itself a part of a multi-organizational network—the overall ecosystem can help shape individual perceptions and behaviors, which in turn, reverberate back up and contribute to the system’s evolution. Lastly, because complex systems are *massively entangled*<sup>18</sup>—with interconnected individuals and organizations having the potential to work with and learn from others in a variety of ways over time—the constant sharing of knowledge and attitudes can also contribute to the overall evaluation ecosystem.

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“I think museum-wide you’re seeing more papers that are being written about [evaluation] and you’re seeing some highlights in... Dimensions magazine... Museum 2.0...I think the industry in general is taking [evaluation] on and trying it in different ways and I think that’s what’s exciting.”

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During the CASNET project, numerous participants mentioned bringing past experience with evaluation to their roles within NISE Net, even when these roles were not “official” evaluation positions. Likewise, several people mentioned feeling more able to participate in evaluation activities beyond NISE Net as a result of their exposure to the Network’s resources and climate. For instance, one participant noted feeling more involved in evaluation at their institution after participating

in the TBI cohort, as well as feeling more equipped to advocate for evaluation with their supervisor and others outside the Network.

With all of this in mind, our findings from the CASNET study indicate that while it is certainly important to be thoughtful and creative in

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“When we were involved with a small exhibit cohort at another science center, we did evaluation for them. They sent us a traveling exhibit here and while it was here we surveyed guests, and they also sent one of their evaluators here so we could watch a little bit and try and learn a few things during that phase.”

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planning and implementing dedicated ECB initiatives, it is equally vital to foster a holistic environment that supports evaluation in general. Individuals within complex systems build and use evaluation skills in a multitude of ways and settings, and have arrived at their current position through a multitude of paths and experiences. As a result, we should never assume that the simple implementation of an ECB initiative will create a sudden and irresistible shift

in how people do their work, or that a structured ECB initiative is the only way in which evaluation capacity and use can increase. However, based on the CASNET study, we believe an accessible, actionable, and inclusive ECB initiative—when developed with the overall ecosystem in mind—does have the potential to offer an evaluation touchstone that can guide and support individuals and teams as they incorporate evaluation into their work.

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<sup>16</sup>Eoyang & Berkas, 1998; Patterson, Roth, & Woods, 2010

<sup>17</sup>Davis & Sumara, 2006; Mitchell, 2009

<sup>18</sup>Hargreaves, 2010; Lemke & Sabelli, 2008

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## IMPLICATIONS FOR PRACTICE

As a leader within your institution or network, there are a number of ways in which you can set your teams, your ECB initiative, and yourself up for success. Some of these have to do with recognizing and capitalizing on the characteristics of the specific system in which you're working, while others relate to influencing the system itself. In all cases, it is vitally important to remember that nothing in a complex system happens in a vacuum. The following suggestions offer starting points for thinking about and capitalizing on this interconnectedness.

- **Learn all you can about the evaluation ecosystem in which in your ECB initiative will take place and structure your initiative with this specific context in mind, building on unique strengths and areas for growth.**
- **Seek out local evaluation expertise, such as universities, external evaluators, and other evaluation-minded institutions, and foster collaborative relationships with these partners.**
- **Identify leaders within the system who are not bought into evaluative practices and work with them to address their concerns and points of contention.**
- **Consider not only the outside influences that might relate to your planned ECB initiative but also how individuals or teams might be able to use what they learn from your initiative to influence the ecosystem as a whole.**
- **Pay attention to what else is happening in the system in terms of evaluation aside from your initiative, and acknowledge, support, and celebrate the opportunities people take to build their capacity outside structured ECB initiatives.**
- **For projects with multiple institutions, consider how institutional contexts and factors will influence project team members and provide individuals with tools and resources to help navigate challenges at their institutions, such as lack of leadership buy-in or support.**

## THEME 4 VIGNETTE: *Imagine That!* and *Science Station*



Two of our participants worked at different mid-sized science centers, “*Imagine That!*” and “*ScienceStation*,” and each brought knowledge about evaluation that they had acquired outside of NISE Net evaluation into their institution. Both had not only participated in but had planned and led evaluation efforts outside their roles within the NISE Net. The skills and experiences gained through these external activities helped them feel more comfortable with evaluation and led to a desire to encourage its use within their organizations, supporting the institutional evaluation growth and capacity of both *ScienceStation* and *Imagine That!*.

One of these participants had prior experience and training around evaluation, including both college coursework and practical experience working with seasoned evaluators at a prior institution. Although it was developed outside his current job, his prior experience and existing knowledge of evaluation continued to benefit *Imagine That!*, as he led a collaboration with the local university to develop a camera-

based timing and tracking system and helped develop evaluation forms for their summer camps. Similarly, our other participant led *ScienceStation*’s evaluation of afterschool programs as required by the state, and also praised the experience he gained through a large cross-institutional evaluation project and how it increased his evaluation skills and confidence when helping with the institution’s website survey.

While the details of their external evaluation experiences were different, both of these participants brought these experiences to bear on NISE Net activities. Although neither were involved in the in-depth TBI training or cohort experience, by allowing the knowledge gained outside the system to inform multiple aspects of their professional roles, these individuals contributed to the growth of evaluation capacity within their organizations. Their experiences don’t imply that large-scale initiatives are not important or valuable, but they do illustrate the interwoven influences at play within a complex system.

# CONCLUSION



Our hope for this report was to translate findings from a research study into practical recommendations for other organizational and project leaders seeking to foster evaluation skills and practices within their own teams. Every one of us working in museums and other informal learning environments is faced with the reality that we must critically evaluate the results and effectiveness of our efforts in order to remain accountable to our communities, our funders, and to ourselves. Building the skills and capacities of professionals within our organizations and across our projects to engage in this type of evaluative work is a challenge and requires, we suggest, a shift from traditional professional development thinking to systems and complexity perspectives.

Research from the CASNET project suggests that leaders can begin to take this new perspective and support evaluation capacity building by (a) fostering a shared value for evaluation across team members, (b) capitalizing on the strengths of both diverse and redundant staff skill sets, (c) balancing centralized and decentralized control, and (d) taking into account (or even helping to shape) the broader evaluation ecosystem that influences museum and informal science education professionals. We encourage others to extend this work and continue investigating the complex system factors that shape the way professionals and organizations adapt and grow, both specific to evaluation and beyond.



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## FURTHER READING

### ■ Evaluative skills and evaluation capacity building

- *Principal Investigator's Guide: Managing Evaluation in Informal STEM Education Projects* retrieved from [http://www.informalscience.org/sites/default/files/caisevsapi\\_guide.pdf](http://www.informalscience.org/sites/default/files/caisevsapi_guide.pdf)
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- Williams, B. & Hummelbrunner, R. (2011). *Systems Concepts in Action: A Practitioner's Toolkit*. Stanford: Stanford University Press.

### ■ Team-based inquiry

- *Team-based inquiry guide*: [http://www.nisenet.org/catalog/tools\\_guides/team-based\\_inquiry\\_guide](http://www.nisenet.org/catalog/tools_guides/team-based_inquiry_guide)
- *Team-based inquiry training videos*: <http://nisenet.org/catalog/team-based-inquiry-training-videos>
- *Examples of team-based inquiry projects, from the NISE Net TBI professional development cohorts*: <http://www.nisenet.org/catalog/team-based-inquiry-tbi-cohort-2014-organizations-describe-their-evaluation-capacity-building> and <http://www.nisenet.org/catalog/team-based-inquiry-tbi-cohort-2015-organizations-describe-their-evaluation-capacity-building>

**Also check out the References section above for additional resources!**