

# Building a STEM Evaluation Community: Evaluation and Evaluation Capacity Building Resource Landscape Study

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## 1. Introduction

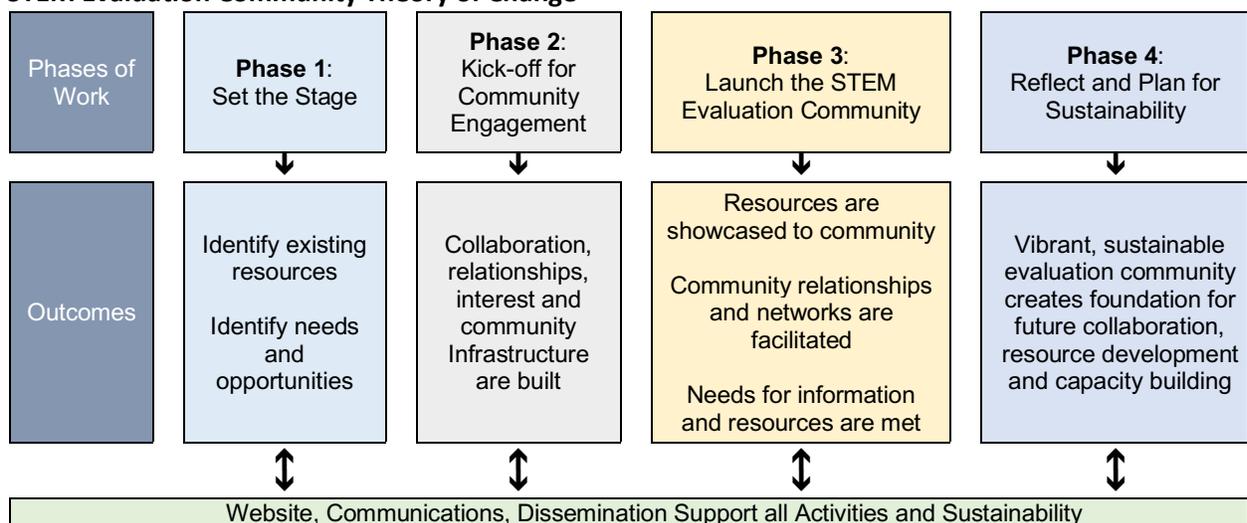
Education Development Center, Inc. (EDC) received a grant to develop a STEM Evaluation Community from the National Science Foundation (NSF). The primary goal of this project is to increase the capacity of evaluators to produce high quality, conceptually sound, methodologically appropriate evaluations of NSF programs and projects, specifically in the area of STEM education and outreach.

In response to a need for support for evaluation capacity, articulated by those who evaluate NSF programs and projects, the STEM Evaluation Community planned to connect evaluators across directorates, divisions and programs so that evaluation theory and practice innovations, advances and resources can be shared; connections and collaborations can be fostered; evaluation capacity and quality can be raised; and new ideas and innovations can be sparked through dialogue across experiences and expertise. To achieve this goal, EDC collaborated with key NSF evaluation stakeholders consisting of Program Resource Center PIs, staff and evaluators (PRCs), STEM Evaluation Community Project Advisors, and representatives of NSF project and program evaluators.

The STEM Evaluation Community Project was designed with four phases of work:

1. **Set the stage:** A thorough review of existing evaluation resources, interviews with NSF program officers, and consultations with PRC staff will inform a survey of evaluators that will identify awareness of resources, capacity building and technical assistance needs, and issues of concern.
2. **Kick-off for community engagement:** A first convening of community stakeholders will share findings from the first phase, solicit input on an infrastructure for the community, and lay the foundation for collaboration. Following the meeting, working groups will focus on topics of interest identified during Phase 1 and the kick-off meeting.
3. **Launch of the STEM Evaluation Community:** A subsequent convening event will widen the audience to evaluators across NSF programs, sharing resources, facilitating community relationships and fostering the development of networks.
4. **Plan for sustainability:** While the issue of sustainability will be woven throughout the project, the final phase will engage key stakeholders in identifying and planning strategies to sustain and maintain the evaluation community of practice.

### STEM Evaluation Community Theory of Change



This Landscape Study, part of **Phase I** of the project, was designed to serve as a springboard for engaging key NSF STEM evaluation stakeholders in understanding the current state of evaluation and evaluation capacity building resources available to NSF program and projects and identifying the needs and opportunities that a STEM Evaluation Community may address and build upon. To this end, the Landscape Study effort aimed to do the following:

- Identify common evaluation resources – both in terms of content and approach/strategies
- Identify the gaps in evaluation resources
- Describe the focus and approach to ECB of individual resource centers (including presence on web sites)
- Articulate current expectations for NSF project evaluations as articulated in program solicitations

### Approach and Methods

NSF is a complex organization that supports a vast array of programs and projects. The STEM Evaluation Community work is focused on programs and projects that include STEM education and outreach as an articulated goal. The first step in our review process was to identify the Directorates and Divisions within NSF that addressed STEM education and outreach. We did this by reviewing NSF's organization chart and scanning information available on the NSF website. We included both active and inactive program areas in our scan.

With a list of Programs in hand, our team undertook a review process that included the following:

1. A review of the Program page on the NSF website, and identification of any evaluation-related links, references, and resources included.
2. A review of Program solicitations, going back to up to 10 years. In reviewing solicitations, we noted the following:
  - a. Evaluation requirements, including requirements for an external program evaluator. In noting requirements, we also copied the text from the solicitation for later review.
  - b. Other reporting and monitoring requirements.
  - c. References or resources related to evaluation cited in the solicitation.

At the same time, we identified NSF program Resource Centers. Resource Centers are organizations funded by NSF Programs with the explicit role of supporting projects within a program. The specific goals and responsibilities of Resource Centers vary; the activities range from providing ongoing technical assistance, to facilitating Project Director meetings, to managing project monitoring. Most Resource Centers serve as a repository for resources designed to support project implementation, and these resources may or may not address evaluation and evaluation capacity building. In reviewing Resource Centers, our process included the following:

1. We conducted a comprehensive review of the Resource Center website, wherein we searched for any and all resources that specifically address evaluation and/or evaluation capacity building. Resources were identified and logged in an Excel file. In logging resources, we indicated:
  - a. Type of resource (e.g., guide, blog post, webinar, checklist).
  - b. Content or area of focus (e.g., planning, data collection, reporting)
  - c. Audience (e.g., Project Director, Evaluator)
  - d. Author, or who developed the resource (e.g., the Resource Center, outside experts)

2. We searched for information about other Resource Center activities, communicated via the website, that support evaluation and evaluation capacity building. This included report of activities such as convenings and online discussion groups, which are not static resources but other support and technical assistance strategies.
3. We drafted a summary for each Resource Center that provided information about the program, evaluation requirements, evaluation resources, audience(s) of focus, and community of practice or other interactive activities (see Appendix B).
4. For the Resource Centers with the largest collections of evaluation materials, we conducted an interview with the Resource Center PI/Project Directors and knowledgeable staff. This member check provided us with an opportunity to learn if what we found through our online research accurately reflected their work. Summaries and resources were updated based on these conversations.

Table 1: Scope of landscape study

	Number Reviewed
NSF Programs	44
NSF Solicitations	139
NSF Program Resource Centers	12

Over the course of this endeavor, the team met regularly to share work, discuss what we found, revisit and revise categories, and expand and deepen our review. We continually confronted a number of challenges or questions, and at this time, these remain somewhat unresolved. When reading this landscape study, we offer the following caveats and cautions.

- **Resource Centers are almost exclusively a function within the Directorate for Education and Human Resources (EHR).** And, Resource Centers are the primary vehicle for the dissemination of evaluation resources in our scan so far. We have yet to find evaluation resources that are targeted toward or distributed to programs and projects in other Directorates, outside of those provided or referenced in solicitations. A next step for this project may be to interview NSF Program Officers from those programs outside of EHR that have evaluation requirements in their solicitations.
- **What should be considered a resource, and how do we count them?** This is a question we returned to regularly in our review. We considered resources to be discrete ‘things’; that is, we looked for products that were publicly accessible via the internet. However, in many instances, we found Resource Centers directing users to other repositories, databases, and websites that in turn offered a large number of other ‘things’ that could be categorized as resources. We did our best to catalog the individual resources provided by Resource Centers, and also to note the other hubs of additional resources that were linked.
- Very few resources are readily offered via the NSF website – on Program pages and information – but we are aware that **other resources are buried on the NSF website.** For example, if you search the NSF website for “engineering evaluation,” results include evaluation articles and reports that are not obviously linked, shared, or otherwise found on the Program pages or references in solicitations. As of this time, we have not done a comprehensive review of those potential resources.

## 2. Study Highlights

**Evaluation expectations and requirements are set forth by individual Programs at NSF, and these vary significantly.** While most of the Programs reviewed in this study do require an evaluation component of awarded projects, a much smaller proportion (23%) require an external evaluator. A number of NSF Programs (particularly in EHR) have moved from requiring external evaluators to evaluation advisory boards or external review boards. And, while some Programs emphasize the role of evaluation in program improvement, many focus on evaluation's function with respect to project monitoring and accountability.

Taken together, **Resource Centers provide an incredible number of resources that support evaluation.** One Resource Center, EvaluATE, specifically focuses on evaluation capacity building for ATE projects. Other Resource Centers with significant evaluation content include STELAR (serving the ITEST Program) and CAISE (serving the AISL Program). The most common types of resources included Program or project reports, webinars, presentations, and guides. Despite the large number of resources, only a handful of resources were cited across Resource Centers.

**Resources target different audiences, and are tailored accordingly.** Some resources are designed to help Principal Investigators understand evaluation and work with evaluators. These resources tend to include more introductory evaluation content. Other resources focus on those writing proposals (either PIs or evaluators), and offer guidance on evaluation design and methods. And, there are resources that are geared toward project evaluators, providing both project-specific evaluation guidelines and general information and strategies to support evaluation of STEM education and outreach efforts. These resources include evaluation checklists, collections of instruments, and reporting guidelines.

While the review found resources that addressed the lifespan of evaluation as well as a variety of evaluation issues, it appears that **the majority of resources focus on the early stages of evaluation**—planning and methods choice, and earlier aspects of evaluation implementation such as data collection. Fewer resources are available to help evaluators through the “Messy Middle,” addressing issues such as adapting to programmatic changes and analyzing and interpreting data. There are also fewer resources that support evaluation use and dissemination.

In addition to providing static resources, **Resource Centers often provide opportunities for interaction among projects and evaluators and support community of practice efforts.** (See individual Resource Center Summaries in Appendix B.) Beyond Resource Centers, **NSF has made a number of other investments in evaluation capacity building**, supporting research and convenings that are designed to contribute to the evaluation of STEM education and outreach. The PRIME program included many of these projects, and any individual contracts are not publicly listed. It is not clear how these projects are disseminated and incorporated as resources across NSF programs. A search of the NSF website quickly reveals that many resources are embedded and buried, and there is no central repository.<sup>1</sup>

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<sup>1</sup> Funded projects disseminate the results of their work, and evaluation resources generated by projects funded by PRIME may be disseminated in that manner. There is no central place for PRIME awardees to share their publications and other products and resources that result from their work.

### 3. STEM Education Solicitations and Evaluation Requirements

EDC reviewed NSF program solicitations in order to understand different programs' evaluation requirements. EDC looked at the latest solicitation for each program (as of June 2017), and in some cases, reviewed solicitations going back up to 10 years in order to understand how requirements, recommendations, and language related to program evaluation have evolved.

EDC reviewed 139 solicitations across 44 programs. Based on the most recent solicitations, 73% (32) of the programs indicated that an evaluation was required. However, only 23% (10) required an external evaluator; 12% (5) mentioned an evaluation advisory board in the most recent solicitation. In some cases, the external advisory board may serve the function of an external evaluator. See Appendix A for details.

#### Evaluation Requirements

The specific language used to describe evaluation, along with the requirements for evaluation plans to be included in proposals, vary greatly across programs and also have evolved over the years within programs. The requirements and expectations set forth in solicitations directly shape the design of evaluations, with projects aligning priorities and methods, as well as funding and staff allocations, with a program's specifications. A review of the solicitations highlights some of the different approaches and goals expected in project evaluations:

- Many programs emphasize accountability as a primary goal of an evaluation. Evaluations or external reviews often are expected to track milestones and progress toward objectives.
- Some programs indicate that evaluations should be formative or summative, or both. The extent to which evaluation is viewed as ongoing feedback or documentation of project successes and challenges varies.
- A small number of programs identify specific outputs and outcomes that should be included in the evaluation. Some programs also expect evaluations to attend to a project's broader impacts.
- Overall, there appears to be a trend toward less specific (and less rigorous) evaluation requirements.

A summary of solicitation evaluation requirements and expectations is included in Appendix A.

#### Resources Referenced in Solicitations

Program solicitations often cite or reference publications or resources when described evaluation requirements. As solicitations have evolved, and the references and research publications available have changed, so have the citations. Below, we include the references and resources included in the past ten years of solicitations. We have documented these in order to further understand the landscape of program evaluation, as these references serve as the starting point for projects in understanding and planning for program evaluation.

#### Guides and resources:

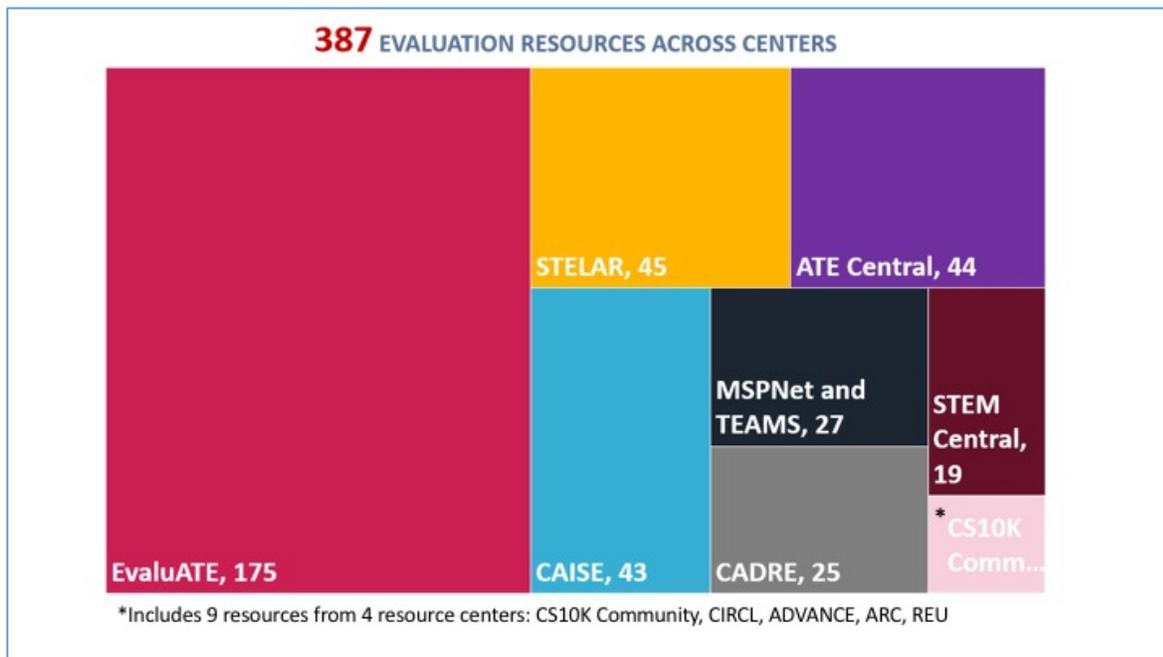
- The 2002 User-Friendly Handbook for Project Evaluation (ITEST, STEP-CP, ADVANCE)
- The 2010 User Friendly Handbook for Project Evaluation (ATE, ITEST, STEM+C, PIRE)
- Common Guidelines for Education Research and Development (STEP-CP, STEM+C)

- Evaluation Tools for Undergraduate Research: Undergraduate Research Student Self-Assessment (URSSA) (REU)
- The Field Tested Learning Assessment Guide (FLAG) for Science, Math, Engineering, and Technology Instructors (ATE)
- The Online Evaluation Resource Library (OERL) (AISL, ATE)

#### 4. Evaluation Resources Provided by Resource Centers

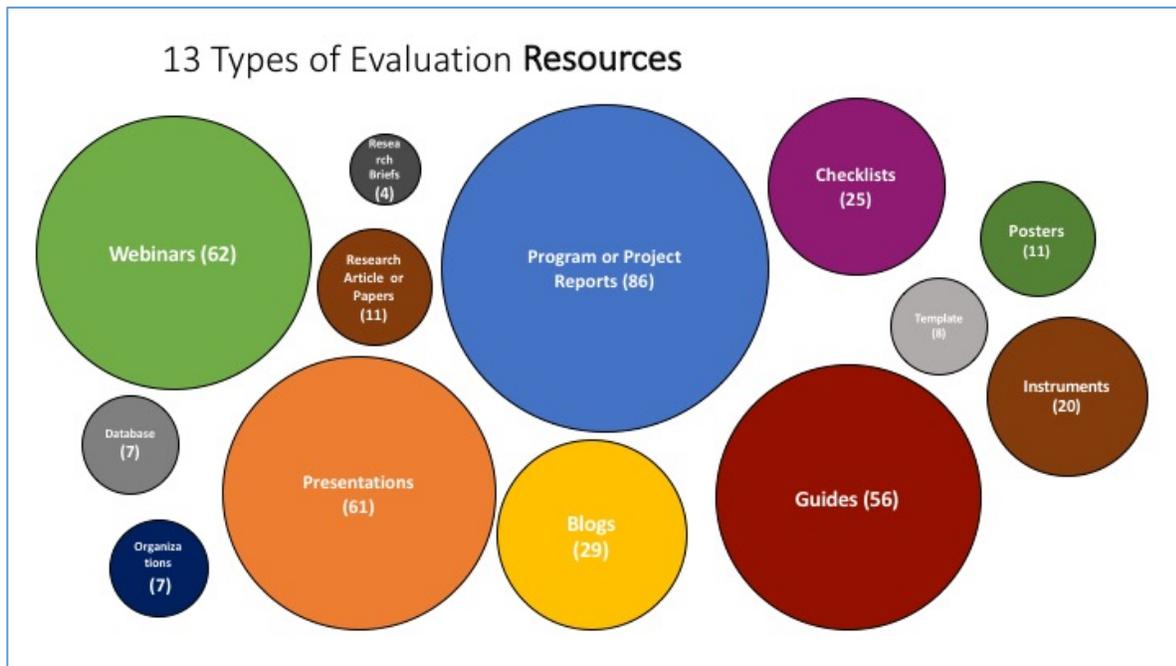
Across 12 Resource Centers we included in our study, we found a total of 387 resources related to evaluation. EvaluATE, a resource center for the Advanced Technological Education (ATE) program, had the highest number (175) of evaluation and evaluation capacity-building resources readily available on its website ([www.evaluate.org](http://www.evaluate.org)). EvaluATE is the only NSF Resource Center that specifically focuses on program evaluation and evaluation capacity building for projects. Other resource centers with a large number of evaluation resources include: STELAR (45), ATE Central (44), CAISE (43), MSPNet (27), CADRE (25), and STEM Central (19).

Figure 1: Evaluation resources by resource center



Each of the reviewed resources were coded into high-level categories including describing the type of resource that it was, that is the format or medium of the resource (as opposed to the content or subject of the resource). The category with the largest number of resources was program or project reports (86) followed by webinars (62) and presentations (61). A few Resource Centers have resource databases. Databases generally include a large number of resources within them, but also serve the function of organizing those resources with tags and search functions. We counted databases as a single resource, but are also aware that the number resources within those databases is significant. For example, the STELAR instrument database includes 100+ instruments.

Figure 2: Types of evaluation resources



The table below offers an overview of the resources by Resource Center and category. Note that the resources included below reflect individual resources provided on a Center’s website.

Table 2: Resources found by Resource Center and Resource Type

Resource Center	Instruments	Webinars	Presentations	Blogs	Reports (Program/Project)	Reports (Research Brief)	Checklists	Posters	Guides	Research Article or Papers	Templates	Organizations	Databases	Center Total
ADVANCE Portal			1					1						2
CAISE (AISL)	3			5	1	3	3	1	18	1	1	4	3	43
ATE Central (ATE)	5	7	4		4	1	10		5	7	1			44
EvaluATE (ATE)	1	42	34	18	44		7	10	13	1	4		1	175
CS10K Community (CSforAll/CS10K)					1									1
CIRCL (Cyberlearning)	1													1
CADRE (DRK-12)	2	2		3	7		3		6		2			25
STELAR (ITEST)		8	13		15		1		5	2			1	45
MSPNet (MSP & TEAMS)	7	1	1		9				5			3	1	27
ARC (REAL & REESE)			1		1		1						1	4
Research Experiences for Undergraduates (REU)	1													1
STEM Central (STEP/DUE)		2	7	3	4				3					19
<b>Total</b>	<b>20</b>	<b>62</b>	<b>61</b>	<b>29</b>	<b>86</b>	<b>4</b>	<b>25</b>	<b>11</b>	<b>56</b>	<b>11</b>	<b>8</b>	<b>7</b>	<b>7</b>	<b>387</b>

## Commonly Cited Resources

Despite the large number of resources, only six resources were repeated across Resource Centers, indicating that Resource Centers may be investing in developing and providing targeted resources for their programs.

Table 3: Commonly cited evaluation resources

	Resource Name	Description	Resource Centers
1	Institute of Education Sciences, U.S. Department of Education and the National Science Foundation. 2013. <a href="#">Common Guidelines for Education Research and Development.</a>	This document describes NSF and ED’s shared understandings of the roles of various types or “genres” of research in generating evidence about strategies and interventions for increasing student learning. These research types range from studies that generate the most fundamental understandings related to education and learning (for example, about brain activity), to research that examines associations between variables, iteratively designs and tests components of a strategy or intervention, or is designed to assess impact of a fully-developed intervention on an education-related outcome. More specifically, the document describes the agencies’ expectations for the purpose of each type of research, the empirical and/or theoretical justifications for different types of studies, types of project outcomes, and quality of evidence.	CAISE CADRE MSPNet STELAR
2	Frechtling, J. for the National Science Foundation. 2010. <a href="#">The 2010 User-Friendly Handbook for Project Evaluation.</a>	This Guide is designed to help principal investigators and other leaders of informal STEM education projects integrate evaluation into all phases of project design, development, and implementation. Such projects include exhibits, media projects, websites, community science projects, afterschool programs, festivals, family activities, online games, citizen science projects, and other efforts to help people learn about science in the course of their everyday lives.	CAISE EvaluATE STEM Central
3	EvaluATE, 2015. <a href="#">Checklists for the Common Guidelines for Education Research and Development.</a>	This document includes a series of six checklists—one for each of the six types of research outlined in the Common Guidelines for Education Research and Development. The Guidelines, developed by the Institute of Education Sciences at the U.S. Department of Education and the National Science Foundation, explains those agencies’ shared expectations for education research and development. The checklists, created by EvaluATE, are distillations of key points from the Guidelines.	ATE Central CADRE STELAR
4	Bonney, R., Ellenbogen, K., Goodyear, L., Hellenga, R., Eds. (2011). <a href="#">Principal Investigator’s Guide: Managing Evaluation in Informal STEM Education Projects.</a>	This Guide is designed to help principal investigators and other leaders of informal STEM (Science, Technology, Engineering, and Math) education projects integrate evaluation into all phases of project design, development, and implementation. Such projects include exhibits, media projects, websites, community science projects, afterschool programs, festivals, family activities, online games, citizen science projects, and other efforts to help people learn about science in the course of their everyday lives.	CAISE STELAR

	Resource Name	Description	Resource Centers
5	Evergreen, S. <a href="#">Data Visualization Checklist</a> . (2014).	This checklist is a guide for the development of “high impact” data visualizations. The checklist is informed by a set of best practices based on extensive research, tested against the practical day-to-day realities of evaluation practice and the pragmatic needs of our stakeholders.	CAISE CADRE
6	SRI International for National Science Foundation, Directorate for Education and Human Resources. <a href="#">Online Evaluation Resource Library (OERL)</a> . <sup>2</sup>	This online resource library was developed for professionals seeking to design, conduct, document, or review project evaluations. The purpose of this system is to collect and make available evaluation plans, instruments, and reports for NSF projects that can be used as examples by Principal Investigators, project evaluators, and others outside the NSF community as they design proposals and projects.	CAISE EvaluATE

### Resource Areas of Focus

In considering areas of focus, we found that resources could be classified by content as well as by audience, and that these two categories were often related. A large number of resources are geared towards how to design an evaluation, and many of these seem more targeted for PIs and offer a general understanding of evaluation that seasoned evaluators would likely not find as useful or informative. Other resources, such as those that support data collection and reporting, often appeared geared specifically for evaluators. In addition, some resources are focused on the content of their Program, such as evaluation in informal science evaluation.

There are a **number of resources designed to help PIs understand evaluation**. Many resources provide “Evaluation 101” information that could be beneficial to PIs not as familiar with evaluation, and may be relevant to evaluation professionals who are new to the field or are new to working with NSF projects. For example, on the CAISE website, you can find resources describing the difference between evaluation and research, and along with their “Principal Investigator’s Guide: Managing Evaluation in Informal STEM Education Projects.” Resource Centers provide a number of resources on Working with an Evaluator that aim to help PIs build a successful partnership between a project team and their evaluator. Resource Centers may provide information to help guide this partnership, as well as links to sites where PIs can locate evaluators.

Some resources offer guidance specific to **writing about evaluation in proposals**. For example, on the CADRE website, most of the evaluation-related resources gathered came from the two toolkits, *NSF Proposal Writing* and *Dissemination*. The proposal writing toolkit featured some common ECB resources such as the Common Guidelines for Education Research and Development, collections of STEM research instruments, and summary reports of DRK-12 projects. The Dissemination Toolkit resources that would be most useful for evaluation mainly focused on data visualization including a webinar and other tips and tools.

There are also many **resources geared towards evaluators**. These resources address the lifecycle of an evaluation:

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<sup>2</sup> We have been unable to locate a citation date for this resource.

- Resources support evaluators in evaluation design and developing an evaluation plan. Resources range from handbooks, guides, and checklists about developing an evaluation plan, to blog posts to help with the IRB process. In addition, there are resources related to cultural competence and conducting culturally responsive evaluations.
- There are many resources to help evaluators with evaluation methods and instruments. There are collections of tools and instruments relevant to the various program areas (informal science, STEM interest, computer science, etc.) that evaluators can use or modify based on needs. STELAR alone includes over 100 instruments in the database on their website. In addition, resource centers provide some support around what to consider when using or adapting an evaluation tools or instrument that others have created.
- Resources address the issue of reporting. Some resource centers provide guidelines for their specific programs. Guidance ranges from the particular—how to format your report—to the conceptual, such as deciding what to include in a report. Resource centers provide tools and templates for data visualizations and presentation.
- There are also resources that address the issue of dissemination of program findings and results. The intended audience for these resources is not clear, and they may be relevant to both PIs and evaluators.

We found that a number of resource centers also provide information and links to connect evaluators with the broader field of evaluation. These include links to professional associations (e.g., AEA, AERA, VSA), evaluation journals, and research on evaluation.

Resource Centers also share and showcase project evaluations. CAISE provides access to over 800 project evaluation reports through the BISE database, which was an effort to synthesize and learn from the body of evaluation reports available. STELAR has showcased evaluations via webinars; for example, “The New Face of Research and Evaluation in ITEST Projects” webinar featured both PIs and Evaluators describing “how they are meeting the challenge of incorporating rigorous research designs and evaluations that provide useful measures of project success, all while developing dynamic activities within the ITEST framework.”

### Resource Center Webinars

Resource Centers commonly use webinars as a strategy to support projects in a variety of areas. We found many webinars that address issues in evaluation and evaluation capacity building. Webinars are a resource of interest for a number of reasons: 1) In their initial delivery, they provide an opportunity for interaction with projects and evaluators, and in that way can serve as a strategy for community building; 2) Webinars often result in multiple resources or products—the recording, presentation slides, handouts, and links to other resources are often available after a webinar is completed; 3) Webinars are fairly time and labor intensive, and can require quite a bit of effort from those designing and delivering them. Because of this interest, we reviewed the 62 webinars<sup>3</sup> we found to provide a snapshot of how Resource Centers are employing them to support program evaluation.

Webinars are both program-specific (that is, tailored to the evaluation requirements of one NSF program) and general in their evaluation content—they were split nearly 50/50 when considering this variable. When we looked at phases of evaluation, more than half of the webinars addressed evaluation

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<sup>3</sup> We “reviewed” be looking at the webinar description and materials; we did not actually view each webinar.

planning. In addition, a large number of webinars (31%) addressed what we called “Evaluation 101,” where fundamentals or a broad overview of evaluation were shared.

Table 4: Resource Center webinars, by topics and areas of focus (N=62)

	Description	Number	Percent
<b>Program specific vs general</b>			
Program-specific	Resources related to specific NSF programs (ITEST, for example)	33	53%
General	Resources that are intended for general use	29	47%
<b>Evaluation phase</b>			
Planning	Resources that focus on the initial stages of an evaluation, particularly around developing an evaluation plan and/or approach.	35	56%
Implementing	Resources that focus on the middle stages of an evaluation, when the plan is being implemented and data are being collected.	17	27%
Analysis	Resources that focus on analysis of data collected for an evaluation.	11	18%
Reporting	Resources that focus on how to report findings from an evaluation and develop useful reports.	8	13%
Use	Resources that focus on enhancing use of evaluation reports.	7	11%
<b>Additional topics in evaluation</b>			
Evaluation 101	Resources that focus on evaluation basics and/or cover topics that range from the beginning to the end of an evaluation cycle.	19	31%
Evaluation Methods	Resources that focus on developing particular methods, such as sampling, building surveys, focus groups protocols, logic models, and theories of action.	17	27%
Dissemination	Resources that focus on sharing of evaluation reports.	9	15%
Evaluation Approaches	Resources that focus on specific ways of thinking about an evaluation (culturally responsive, for example).	8	13%
Lessons Learned	Resources that focus on lessons learned from other evaluators.	1	2%

## 5. Other NSF Investments in STEM Education Evaluation

NSF has made a number of investments in program evaluation, funding meetings, resource development, and research to contribute to understanding within the field of STEM education and evaluation. Grants, contracts, workshops, presentations that engage in evaluation capacity building have been funded or offered through various program and mechanisms. For example, the PRIME program funded projects designed to support and contribute to research and evaluation of STEM education. And, we are aware of projects within other program areas that have served this function.

EDC did not thoroughly review all of these projects and resulting resources. While funded projects can be found on NSF's website, contracts are not listed. As a starting point for including these resources in the landscape, we reviewed projects funded through PRIME. We found 26 projects<sup>4</sup> that addressed program evaluation or resulted in tools and resources that could be used in evaluation. Based on project descriptions, PRIME projects result (or will result) in things such as:

- A new assessment instrument to measure teamwork and collaboration;
- A mobile app with a virtual scientist to gather real-time information for museums;
- Open source R code to help school districts access and structure their data; and
- A framework of indicators to document STEM students' progress in higher education.

Further investigation of these projects is needed to learn about how these project results are being shared, promoted, and possibly used by other NSF projects.

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<sup>4</sup> A number of PRIME grants are collaborative, meaning that multiple grants were awarded to different organizations as part of a single project. The number 26 reflects the number of projects, not grants.

## 6. Discussion

This landscape study may raise more questions than answers with respect to the state of STEM education evaluation resources and supports available to projects across NSF. Considerations of these questions can help inform and direct the next steps in the development of the STEM Evaluation Community. Some topics and issues to investigate that emerged over the course of this review are offered below.

**Areas of focus among existing resources:** Where are resource centers focusing? What audiences are targeted by various resources? Our search turned up resources that addressed the life of an evaluation, and also addressed issues related to managing evaluations.

- Many resources focus on the front end of the evaluation—planning and design, as well as resources for writing a proposal.
- There are several resources around presenting evaluation findings. Increased attention to data visualization in the evaluation field has resulted in more resources in this area.
- Resource Centers provide resources designed and relevant for project PIs and those for evaluators. In addition, there are resources that address the needs of PIs in managing and working with evaluators.

**Gaps in the landscape:** What are the gaps in the resources? What elements of program evaluation lack attention? Are certain audiences short on resources? To what extent are resources aligned with programs' evaluation requirements?

- While there are resources that address all phases of evaluation, not all phases get equal attention. There appear to be more resources dedicated to planning and proposal writing, and reporting. These are the phases that bring in the work, and then meet requirements and compliance. There appear to be fewer resources that help projects navigate the “Messy Middle”—challenges with data collection and analysis, adjusting to program changes, and problem solving when things do not go as planned.
- NSF program evaluation requirements vary, as noted in the review of program solicitations. Language included in the solicitations often emphasizes accountability, and places less emphasis on evaluation use. The resource review identified a lack of resources that supported evaluation use. It may be that this is in part due to the nature of projects—evaluations are often completed at the end of the project, and use may be something that happens once initial project funding is over. Further, the emphasis (or lack thereof) placed by NSF may also be shaping the development and availability of resources.
- While there are a large number of instruments being shared, we have not done a review of the types of instruments. There may be gaps with regard to both methods and construct domains.
- What are the needs of programs that do not have Resource Centers? As found in our solicitation review, there are many programs that have evaluation requirements and do not have Resource Centers. What are their needs at this time? And how do PIs and evaluators funded by those programs find the information they need to produce and deliver high quality evaluations?

**Duplicate and complementary efforts:** In considering the landscape across NSF, one important question is: to what extent are Resource Centers duplicating efforts, and in what ways are they complementary in how they support STEM education evaluation? Resource Centers do link to one another's resources to some extent, yet we were surprised to find that only 6 resources were offered across the Resource Centers. Resource Centers work to be responsive to the needs of their project community, and tailor

resources accordingly. One question may be: what resources need to be program specific, and where do program goals and outcomes overlap, allowing for more shared or common resources?

- As noted above, many resources focus on how to design an evaluation. To some extent, the Resource Centers address the particulars of their programs with these resources. But, it does appear that there is some duplication of effort in developing supports in this area.
- Resource Centers might be regarded as have areas of 'expertise' with respect to evaluation capacity building. For example, STELAR has a large repository of instruments, while CAISE has a repository of program evaluation reports. EvaluATE has a large library of webinars that address a range of evaluation issues.

**Dissemination and distribution of resources:** How do resources become available and get disseminated to a target audience? And, how do Resource Centers make the wealth of their resources easily accessible (and findable) on their websites?

- Are Resource Centers the primary vehicle for sharing resources? As noted above, most programs across NSF do not have Resource Centers.
- Resources and other evaluation capacity building activities are happening across NSF, in isolated pockets, some via contracts, and through individual projects within various programs. How do those efforts become part of the landscape?

## Appendix A: Summary of NSF Solicitation Evaluation Requirements

Table 5: Evaluation requirements in most recent program solicitations (as of June 2017).

Program	Solicitation Number	Evaluation Required	External Evaluator	Evaluation Advisory Board
<b>Directorate of Education and Human Resources (EHR)</b>				
Advanced Technological Education (ATE)	NSF 14-577	✓	✓	
Advancing Informal STEM Learning (AISL)	NSF 15-593	✓	✓	
Computer Science for All (CS for All: RPP) Researcher Practitioner Partnerships	NSF 17-525	✓		
Cyberlearning and Future Learning Technologies (Cyberlearning)	NSF 17-520	✓		
Discovery Research PreK-12 (DRK-12)	NSF 15-592	✓	(✓) <sup>5</sup>	(✓)
EHR Core Research (ECR)	NSF 15-509	✓		
Innovative Technology Experiences for Students and Teachers (ITEST)	NSF 15-599	✓		✓
Math and Science Partnership (MSP)	NSF 14-522	✓	✓	✓ <sup>6</sup>
Promoting Research and Innovation in Methodologies for Evaluation (PRIME)	NSF 15-540	✓	✓	
Research and Evaluation on Education in Science and Engineering (REESE)	NSF 10-586	✓	✓	✓ <sup>6</sup>
Research on Education and Learning (REAL)	NSF 13-604	✓		
Science Learning+Partnership Grants	NSF 16-548	✓	✓	✓ <sup>6</sup>
Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP)	NSF 11-550	✓		
STEM + Computing Partnerships (STEM+C)	NSF 17-535	✓	(✓)	(✓)
STEM-CP: CE21	NSF 14-523	✓	✓	
The Tribal Colleges and Universities Program (TCUP)	NSF 16-531	✓		
<b>Directorate for Engineering</b>				
Engineering Research Centers	NSF 15-589	✓		
Engineering Workforce Development- Research Experiences for Undergraduates	NSF 13-542	✓		
Innovations in Engineering Education, Curriculum, and Infrastructure (IEECI)	NSF 10-502	✓		
IUSE/Professional Formation of Engineers: REvolutionizing engineering and computer science Departments (IUSE/PFE: RED)	NSF 17-501	✓		
Network for Computational Nanotechnology (NCN) Supporting the Next Phase of NCN Nodes Programs	NSF 16-593			
PFE: Research Initiation in Engineering Formation (PFE: RIEF)	NSF 17-514	✓		

<sup>5</sup> (✓) indicates that external evaluator and/or evaluation advisory board was recommended, but not required.

<sup>6</sup> Solicitation does not require both an external evaluator and advisory board. An external advisory board may serve the function of an external evaluator.

Program	Solicitation Number	Evaluation Required	External Evaluator	Evaluation Advisory Board
Research Experiences for Teachers (RET) in Engineering and Computer Science	NSF 15-536	✓		
Research Initiation Grants in Engineering Education (RIGEE)	NSF 11-507			
<b>Directorate for Mathematical &amp; Physical Sciences</b>				
Centers for Chemical Innovation (CCI)	NSF 17-564	✓		
Materials Research Science and Engineering Center (MRSEC)	NSF 16-545			
<b>NSF-Wide and Cross-Cutting</b>				
ADVANCE: Increasing the Participation and Advancement of Women in Academic Science and Engineering Careers (ADVANCE)	NSF 16-594	✓	✓	✓ <sup>6</sup>
Cyberinfrastructure Training, Education, Advancement, and Mentoring for Our 21st Century Workforce (CI-TEAM) (CI-TEAM)	NSF 11-515	✓	✓	
Facilitating Research at Primarily Undergraduate Institutions: Research in Undergraduate Institutions (RUI) and Research Opportunity Awards (ROA)	NSF 14-579			
Faculty Early Career Development Program (CAREER)	NSF 17-537			
Innovation Corps - National Innovation Network Teams Program (I-Corps <sup>TM</sup> Teams)	NSF 17-559			
Major Research Instrumentation Program (MRI)	NSF 15-507	✓		
National Nanotechnology Coordinated Infrastructure (NNCI)	NSF 15-519			
National Science Foundation Research Traineeship (NRT) Program	NSF 16-503	✓	✓	
NSF Graduate Research Fellowship Program (GRFP)	NSF 16-588			
Partnerships for International Research and Education (PIRE)	NSF 16-571	✓		
Research Experiences for Undergraduates (REU)	NSF 13-542	✓		
Science and Technology Centers: Integrative Partnerships (STC)	NSF 14-600	✓		
SEES - Coastal SEES: Science, Engineering and Education for Sustainability	NSF 14-502			
SEES - Cyber-Innovation for Sustainability Science and Engineering (CyberSEES)	NSF 14-531	✓		
SEES - Dimensions of Biodiversity	NSF 15-533			
SEES - Dynamics of Coupled Natural and Human Systems (CNH)	NSF 10-612			
SEES - Interdisciplinary Research in Hazards and Disasters (Hazards SEES)	NSF 14-581			
Software Infrastructure for Sustained Innovation (SSE, SSI, S2I2): Software Elements, Frameworks and Institute Conceptualizations	NSF17-526	✓		

Below, requirements for a subset of programs are included to illustrate the ways that NSF programs have communicated expectations and requirements with respect to program evaluation.

The **Advanced Technological Education (ATE)** program had 10 solicitations between 2000 and 2014; 7 of these solicitations have a requirement for evaluation. The most recent solicitation (2014; 14-577) language includes, "All projects and centers carry out evaluative activities. The funds to support an evaluator independent of the project or center must be requested, and the requested funds must match the scope of the proposed evaluative activities. Planning grant proposals need not present elaborate plans for evaluation and dissemination." There are additional guidelines that specify which elements the evaluation plan should measure with regard to professional development for educators, teacher preparation, ATE centers and National centers.

The **Advancing Informal STEM Learning (AISL)** program had 17 solicitations from 1997 – 2015. The most recent (2015; 15-593) solicitation states, "The evaluation processes are required components to achieve the following goals: 1. Ensure that project gets appropriate, rigorous, external input throughout the life of the project. 2. Ensure accountability. Proposals are encouraged to illustrate the coherence among the proposal goals or hypotheses of the project, the evaluation methods, and the knowledge the projects seek to build for the field. The evaluation plan may include front end, formative, remedial or iterative, and summative evaluation, as appropriate to achieving the project's goals." Requirements for an external evaluator have changed over the years. Until 2012, solicitations stated the need for an external evaluator, and from 2012 to 2015, they described requirements such as linking the expertise of the evaluators to the goals/objectives of the project. Solicitations from 2011 onwards state that methods "may" include an advisory board or an external panel. These advisory boards do not have specific requirements and could be interpreted as an alternative to conducting a full evaluation.

The **Innovative Technology Experiences for Students and Teachers (ITEST) Program** had ten ITEST solicitations from 2002 to 2015. The eight solicitations from 2002-2012 all contained clear sections (titled "Evaluation" and/or "Evaluation Plans") that provided specific guidelines for evaluation plans (e.g. indicators to be measured, data collection and analysis methods, timeline, etc.) as well as more specific considerations based on the type of project being proposed (e.g. for Comprehensive Projects for Students and Teachers: "In addition to determining the immediate results of the in-service activity or student workshops, the evaluation should determine if teaching practice in the school or informal institution has changed in ways that are promoted by the project."). In the 2015 solicitation (15-599), the heading was "Project Evaluation Through Independent Review." This change in heading language was accompanied by a decrease in specific instructions related to evaluation elements necessary for proposal submission. Although formative and summative evaluations were still expected, detailed evaluation plans were not required for the proposal.

The **Cyberlearning and Future Learning Technologies** program had 3 solicitations from 2011-2016. All three solicitations require evaluations, but only the first one required an external evaluator. The most recent solicitation (17-520) does not provide as much detail as previous solicitation. It specifies, "The plan for iterative refinement should be described, including the data that will be collected and analyzed in support of formative evaluation. The methodology for assessing effectiveness of the innovation (design, measures, data collection and analysis) should be described and justified. Measurement may be qualitative or quantitative, as appropriate to the targeted outcome goals and maturity of the

innovation.” The 2013 solicitation requires a summative evaluation for certain kinds of Cyberlearning projects.

The **Discovery Research Pre K-12 (DRK 12)** program had eight solicitations from 2006 to 2015. While all of the solicitations required evaluations, the two most recent solicitations (2013 and 2015 (15-592)), did not explicitly require an evaluation plan. Instead, they required a description of “appropriate project-specific external review and feedback processes” that “might include an external review panel or advisory board proposed by the project or a third-party evaluator.” Projects were expected to describe the expertise of the external reviewer as it relates to the goals and objectives of the project, and how the results of the critical review will be reported. The 2013 and 2015 solicitations only suggest a third-party evaluator as one method of external feedback and monitoring of success.

The **Promoting Research and Innovation in Methodologies for Evaluation (PRIME)** program had 5 solicitations between 2010 and 2015. There was no evaluation requirement for the first solicitation in 2010, however there were evaluation requirements in the subsequent solicitations. The most recent solicitation (15-540) states, “All projects must have an evaluation plan that is appropriate to the goals of the project and explicitly describes the approach that the project team intends to use in assessing its successes and failures and meeting its milestones and objectives. Project evaluations should be sufficiently distant from the project to be objective but should be designed to be of most help to the project team pursuant to its responsibilities to the field.” The most recent one states: “All projects must have a substantive external expert review mechanism that provides regular critical review on the project's methods and progress, analysis procedures, interpretation of data into findings, and dissemination activities. In some cases, the expert review mechanism may not be sufficient given the nature of the project and an independent evaluator may be required.”

There have been three **STEM + Computing Partnerships (STEM+C)** solicitations from 2015-2016. All three solicitations require that proposals include a strategy for objective independent review of the project. The most recent solicitation (17-535), states that, “An external review panel, advisory board, or a third-party evaluator may be proposed (see NSF proposal preparation guidelines). The external critical review should be sufficiently independent and rigorous to influence the project's activities and improve the quality of its findings. Competitive proposals will (1) describe the expertise of the external reviewer(s); (2) explain how that expertise relates to the goals and objectives of the proposal; and (3) specify how the PI will report and use results of the project's external critical review process. The Advisory Board and/or external evaluator should have sufficient methodological expertise to provide an independent review of the integrity of proposed education research activity and review of designs and activities (including theoretical frameworks, data collection plans, analysis plans, and reporting plans). Proposers should identify ways to determine levels of technical quality as needed.”

The most recent solicitation (17-564) for the **Centers for Chemical Innovation (CCI)** includes guidelines for evaluation of CCI activities, particularly those related to broader impacts and broadening participation. Proposal criteria include consideration of “careful evaluation of the research and broader impacts.” CCIs are expected to pilot or implement (depending on the phase of the project) activities that broaden the participation of underrepresented groups, and proposals should address CCI goals for increasing engagement by underrepresented groups, plans for reaching those goals, and an evaluation strategy. Finally, the solicitation indicates that awardees will be required to participate in program-level evaluation activities, which may include “responding to inquiries, interviews and other methods of common data collection and/or aggregation across individual grants. In addition, PIs and project-level

evaluators will be asked to assist in developing a program evaluation that will mutually benefit the agency and program participants.”

**Additional references included in solicitations:**

- Bohan-Baker, M. (Ed.) (2003). *Evaluating Community-based Initiatives*. The Evaluation Exchange, 9(3). Cambridge, MA: Harvard Family Research Project [ITEST]
- Caspe, M., Traub, F., & Little, P. (2002). *Beyond the head count: Evaluating family involvement in out-of school time*. Cambridge, MA: Harvard Family Research Project - is referenced in solicitations for [ITEST]
- Frechtling, J., Mark, M., Rog, D., Thomas, V., Frierson, H., Hood, S., Hughes, G., Johnson, E. (2010) *The 2010 User-Friendly Handbook for Project Evaluation* [DRK-12]
- Friedman, A. (Ed.). (2008). *Framework for Evaluating Informal Science Education Projects*. Retrieved March 27, 2009, from [http://informalscience.org/documents/Eval\\_Framework.pdf](http://informalscience.org/documents/Eval_Framework.pdf). [AISL]
- Lawrenz, F. & Huffman, D. (2003). How Can Multi-Site Evaluations be Participatory? *American Journal of Evaluation*, 24(4), 471-482 [ITEST]
- National Research Council (2004). *On evaluating curricular effectiveness: Judging the quality of K-12 mathematics evaluations*. Washington, DC: National Academy Press. [DRK-12, STEP-CP]
- Schneider, B., Carnoy, M., Kilpatrick, J., Schmidt, W. H., & Shavelson, R. J. (2007). *Estimating causal effects using experimental and observational designs (report Washington, DC: American Educational Research Association from the Governing Board of the American Educational Research Association Grants Program)* [DRK-12, STEP-CP]
- Shadish, W., Cook, T., and Campbell, D. (2002). *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*. Boston: Houghton-Mifflin Company [DRK-12]

## Appendix B: Resource Center Summaries

We reviewed Resource Centers supporting programs in the EHR Directorate of NSF. The summaries below reflect the program information, resources, and activities at the time of our review (June-October 2017).

### [AISL: The Center for Advancement of Informal Science Education \(CAISE\)](#)

The Center for Advancement of Informal Science Education (CAISE) is an NSF-funded resource center for the **Advancing Informal STEM Learning** (AISL) program. Their website, “[InformalScience.org](#)” is a collection of project, research, and evaluation resources designed to support the informal STEM education community in a variety of learning environments.

#### **Resource Overview**

The CAISE website includes a main section heading called “Design Evaluation.” The landing page *What is Evaluation* gives a short overview of the different kinds of evaluation in informal science, the difference between evaluation and research, and a brief description of the various evaluation resources that’s available on the website including chapters from CAISE’s *Principal Investigator’s Guide: Managing Evaluation in Informal STEM Education Projects*. The evaluation resources under “Design Evaluation” are further categorized as follows:

- Working with an Evaluator
- Developing an Evaluation Plan
- Evaluation Tools and Instruments
- Evaluation Reporting and Dissemination
- Learn More about Evaluation

**Working with an Evaluator** includes resources that help build a successful partnership between a project team and their evaluator. There are resources to help guide this partnership along with links to sites where you can locate a wide variety of evaluators.

**Developing an Evaluation Plan** includes resources such as handbooks, guides, and checklists about developing an evaluation plan. It also includes blog posts to help with the IRB process, and resources related to cultural competence and conducting culturally responsive evaluations.

**Evaluation Tools and Instruments** details what to consider when using or adapting an evaluation tool or instrument that others have created. There are links to collections or databases of tools and instruments relevant to informal evaluation projects that can be used or modified based on needs, including links to STELAR’s instrument database and a link to the Building Informal Science Education (BISE) website. BISE was a separately funding project that resulted in a database of program evaluation reports. However, the BISE project funding is over and currently there are no plans to add additional information to the database.<sup>7</sup>

**Evaluation Reporting and Dissemination** focuses on resources which could help an evaluator or PI decide what to include in an evaluation report, how to format it and figure out dissemination options. It

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<sup>7</sup> During an interview, CAISE staff commented that synthesizing and analyzing the evaluation reports in BISE proved to be challenging and of limited use, as program evaluation reports varied so much with respect to data and quality.

also focuses on the use of data visualizations to assist evaluators to reframe and think about data presentation.

**Learn More About Evaluation** includes links to external resources such as professional associations and evaluation journals. You can also access resources on current research on evaluation in the informal science education, lessons learned and events around informal science evaluation.

Many of the listed resources are materials and guidelines for designing an evaluation or writing an evaluation report, including tools for data presentation. Resources also include several evaluation instruments; blog posts and presentations (including a blog post that specifically addresses the topic of how to use [informal.science.org](http://informal.science.org) for evaluation); and checklists. There are several program and project evaluation reports available on the website.

While CAISE has developed a number of resources for evaluation, they also direct people to external resources and websites. There are links to professional organizations such as American Evaluation Association and to websites with evaluation tools and resources such as Eval Fest, DEVISE, OERL to name a few.

The CAISE website employs a comprehensive tagging system, thus if you type “evaluation” into the search bar or use the “evaluation” filter in the “search the collection” section, it pulls up all the resources tagged as “evaluation.” As of this review, it shows 1062 resources which include 962 project/program reports (BISE database). An initial search for other resources (not program reports) that focus on evaluation resulted in the resources outlined in the table below.

Table 6: CAISE resources by resource type

Resource Type	Number	Description
<b>Evaluation design resources</b>	34	Evaluation handbooks or guidebooks, chapters from books, worksheets and frameworks to guide evaluation planning, reporting and even evaluation capacity building
<b>Evaluation instruments and/or checklists</b>	8	Checklists, links to external websites with additional tools/instruments, and a compilation of NSF-funded evaluation reports/projects with links to tools used for their evaluations
<b>Blog posts/posters</b>	5	Discussions with evaluators on culturally responsive education, building partnerships with evaluators, and writing evaluation reports.
<b>External evaluation resources</b>	32	Includes links to evaluation journals, professional organizations, online collection of tools by Universities

### Audience

The intended audiences for the resources are both PI’s and Evaluators. A number of blogs and references highlight the importance of PI’s and evaluators developing a partnership while working on a project.

### Community of practice and interactions

CAISE has hosted a number of convenings. These convenings have brought together informal STEM education (ISE) practitioners, researchers, evaluators, funders, and other stakeholders to discuss content topics connected with CAISE initiatives as well as to explore current learning approaches and trends in the ISE field. There have been convenings on: ISE Organizational Networks, Practice-and-Research, ISE Professional Development, Sustainability Science and ISE, Evaluation Capacity Building,

and Broader Impact and ISE. The convening on Evaluation Capacity Building included a group of 40 experts from fields across informal science education. The initiative was launched through teleconferences with working groups and an online forum. It led to the identification of trends and critical needs in the practice of ISE evaluation and created new directions for resources, training and such. All resources from the convening are available in the website.

The CAISE website includes a section called “Community.” Participants can “Join our community” and list their expertise (where “evaluation” is an option). Within the community:

- Groups & Forums provide a space to have discussions, share ideas, and interact with potential collaborators around evaluation.
- The “Member Directory” is publicly available and can be filtered by evaluation. Member information includes affiliations/associations and associated resources.
- The “Knowledge Base” is a collection of articles that are evidence-supported claims that can be reference when developing proposals and such. You can search for articles around evaluation.
- CAISE places an emphasis on submitting resources to make available to others.

CAISE includes a section called “News and Views.” News can be filtered by topic, included “evaluation.” A quick look at items that appeared when filtering by the evaluation included upcoming events, call for proposals, recent articles and research papers on evaluation related to informal science.

In reviewing CAISE, we also noted the EvalFest project, an individual AISL project that addresses evaluation and evaluation capacity building for science festivals. The project includes some community of practice work, along with collaborative efforts to develop, test and share evaluation approaches that will help science festivals understand and explain their impact.

## ATE: EvaluATE

EvaluATE is the evaluation support center for the National Science Foundation’s Advanced Technological Education program. They provide webinars, resource materials, newsletters, workshops, and opportunities for ATE community members to engage around issues related to evaluation in the pursuit of excellence in technical education.

### Resource Overview

The EvaluATE homepage has a navigation bar at the top with a page named “Library” that houses resources for evaluation in five main categories:

1. *Evaluation 101*: Especially relevant to principal investigators (PIs) who are new to evaluation, this section contains resources related to general evaluation start-up and management issues.
2. *Proposal Development*: Evaluation is a critical part of your ATE proposal. Check out these resources to learn how to integrate evaluation into your proposal and locate an evaluator.
3. *Evaluation Design*: Evaluation design is about focusing your evaluation, identifying the evidence you will need to determine your projects’ quality and impact, and developing a plan for data collection. A good design will support using evaluation results for ongoing project improvement as well as accountability to funders and other stakeholders. Check out these resources to help you plan your evaluation.
4. *Data Collection and Analysis*: At the heart of the evaluation process are the tasks of collecting information, organizing and describing it systematically, and deriving meaning from it to reach evaluative conclusions. These resources will help you strengthen your data collection and analysis activities.

5. *Reporting and Use*: The ATE program has requirements about where and how to report your evaluation results and other project data. Beyond meeting reporting requirements, an effective evaluation will support continuous project improvement, future project planning, and informing stakeholders about your progress and accomplishments. These resources will help you make the most of your evaluation results.

Within each of the 5 main categories of evaluation resources above, there are sections including:

- Overview
- Tools: EvaluATE’s checklists, templates, and worksheets are designed to help you apply recommended evaluation practices to your project.
- Webinars: These are recordings of our live 60-to 90-minute webinars.
- Blogs: Authors from the ATE and evaluation communities to share their insights, lessons learned, and ideas about evaluation.
- Newsletters: Articles from our quarterly newsletter offer concise guidance of specific topics, often with links to additional helpful resources.
- Additional Resources

Other links on the Library page or in the Resources section:

- Conference Resources: Lists some conference resources and allows for a search of resources by resource type, file type, and author.
- [ATE Annual Survey](#): The WMU Evaluation Center has conducted a survey of ATE PIs annually since 2000. Survey fact sheets, snapshots, and other reports based on survey data are presented here.
- [ATE Research and Evaluation](#): This section contains reports, white papers, and other publications related to evaluation and research conducted within the ATE context. Archived information related to the ATE program evaluation conducted by the WMU Evaluation Center (2000-08) is also included here.
- Finding an evaluator: Links to ATE’ Central’s evaluator map and the AEA evaluator directory.

Other sections on the website include “Webinars,” “Newsletter,” and “Blog.” These sections are organized by topic area, and provide resources that also appear within the Library pages. The Newsletter section also has a subcategory for “Resources” which takes you to an index of newsletter articles that reference evaluation resources.

### Types of Resources

Resources address the entire life cycle of evaluation: planning an evaluation, designing an evaluation, and reporting evaluation results. Most resources have tags associated with them. There is also a Search feature at the bottom of the page that allows users to browse resources by resource type, file type, and author.

The majority of resources are links to Webinars or Presentations. Many of these have video files as well as downloadable slide decks and handouts. These are created by EvaluATE. In addition, there are general design resources, such as a logic model workbook and a primer on evaluation. Many of these are created externally (outside of EvaluATE). Blogs and Newsletters are also common resources, created internally for EvaluATE but feature practitioners that are also associated with other organizations.

Table 7: EvaluaATE Resources by Type

Resource Type	Number
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Instruments	1
Webinars	42
Presentations	34
Blogs	18
Reports (Program/Project)	44
Checklists	7
Posters	10
Guides	13
Research Article or Papers	1
Templates	4
Database	1

## Audience

Some of the resources seem geared to PIs looking for support around reporting evaluation findings to NSF. Many resources provide “Evaluation 101” information that could be beneficial to PIs not as familiar with evaluation and evaluation professionals who are relatively new to the field.

## Community of practice and interactions

EvaluATE has social media accounts (Facebook, Pinterest, Twitter, and LinkedIn) where members can interact, and does not appear to host any discussions directly on its website. EvaluATE clearly invests time and energy in offering webinars, which facilitate interaction and community-building. In addition, they publish a newsletter to disseminate information about evaluation topics.

## ATE: ATE Central Resource Center

ATE Central is the program resource center for the National Science Foundation’s Advanced Technological Education program.

## Resource Overview

ATE Central includes a number of resources under the “Resources” menu on the web site. These resources are not specific to evaluation. They include:

- ATE Central Handbook
- ATE Outreach Kit
- Archiving Service: A digital archiving service designed to provide access to project-created resources and materials beyond the lives of the projects and centers that created them.
- Data Management: Information and resources on data management planning, designed to help projects think through the various provisions of their required data management plan—such as the storage, management, and distribution of data—and offers [sustainability training](#) and [archiving services](#) to all ATE projects and centers, free of charge.
- Reports: Program-level reports by ATE Central.
- Student Success Stories: Videos that document success stories of individual students in community college settings.
- Sustainability: Resources that specifically address the issue of sustainability, including training opportunities (webinars and workshops) along with resources, videos, and other materials to address some of the most pressing concerns of the ATE community regarding the long-term success and sustainability of ATE projects and centers.
- Resource Collection: One can browse resources by categories: ATE area, education level, format, GEM subject, and resource type.

Evaluation-related resources include instruments (assessments) and design resources. Almost all of the resources are links to resources created by and hosted at the EvaluATE center.

## Cyberlearning: CIRCL

The purpose of the Cyberlearning and Future Learning Technologies program is to integrate opportunities offered by emerging technologies with advances in what is known about how people learn to advance three interconnected thrusts: Cyber innovation; Learning innovation; and Advancing understanding of how people learn in technology-rich learning environments. The Center for Innovative Research in Cyberlearning (CIRCL) builds capacity and shares the results of projects to expand the impact of the program.

### Resource Overview

The CIRCL homepage has a search bar on the top right-hand corner of the page. If you type in the word “Evaluation”, it pulls up two resources linked to evaluation.

- One is a study they are conducting for which you can sign up to participate in the “Summit Evaluation Interview.”
- The second is a software called “CyWrite” which is a system for automated writing evaluation. The software provides product- and process-based feedback to learners of writing on their drafts. It is the first AWE system to incorporate combined keystroke logging and eye tracking technology. It is built at IOWA State University. The software is opensource and free. It can be built into any website or management system.

## DRK-12: CADRE

The Discovery Research PreK-12 (DRK-12) program aims to “catalyze research and development of science, technology, engineering and mathematics (STEM) education innovations or approaches that can serve as models for use by the nation’s formal STEM education infrastructure (e.g., schools, districts, states, teachers).” Through exploration of new approaches to teaching, learning, and assessment; the development of 21st century STEM skills; or the study of the learning process itself, DRK-12 projects reflect the needs of a diverse population and contribute to both theory and practice. CADRE connects STEM education researchers funded by the DRK-12 program through “in-person meetings, a web site, common interest groups, newsletters, and more” and helps them to “share their methods, findings, results, and products inside the research and development community and with the greater public.”

### Resource Overview

The CADRE homepage has a "resources" tab in the top menu bar. This lands you on a page with the following components:

1. A row of icons linking you to:
  - NSF Proposal Writing Toolkit: resources, tools, guidelines, and helpful links for proposal development
  - CADRE Library: reports and briefs created by CADRE to showcase DRK-12 work
  - Dissemination Toolkit: Resources for disseminating your work effectively
2. Research Highlights which explore important themes in K-12 STEM education research and development by highlighting DR K-12 project contributions, grantee perspectives, and important resources. Examples include English Language Learners, Broadening Participation in STEM, and Mentoring.
3. A section to filter resources by:

- Resource Type: Presentation, Publication, or Tool
- Discipline: e.g. Algebra, Biology, Geometry, etc.
- Topic: e.g. Assessment, 21st Century Skills, Equity, etc.

The proposal writing toolkit featured some common ECB resources such as:

- the Common Guidelines for Education Research and Development
- two collections of STEM research instruments
- summary reports of DRK-12 projects in addition to other resources.

The Dissemination Toolkit resources focused on data visualization including a webinar and other tips and tools.

The CADRE Library also had some ECB-related resources. However, there are 23 resources on the page without any classification or filter/search mechanism. You can also access these resources via the toolkits. There is no filter to distinguish the ECB resources and a search for "evaluation" results in 1,460 resources. The only resource clearly labeled as Evaluation is the "Evaluation in DRK-12 Projects: Options" publication, which is listed under the Evaluation sub-heading in the NSF Proposal Writing Toolkit.

### **Audience**

In terms of audience, the data visualization resources would be most useful to evaluators. Some of the design resources are geared more towards evaluators and other towards PIs, although the audience is not clearly stated for the various resources.

### **Communities of practice and interactions**

- Working groups (a search for "working group" showed that a number of groups have formed around various topics)
- CADRE Fellows: "The CADRE Fellows program provides a small number of emerging researchers and developers working with PIs on DRK12 projects with the opportunity to attend the 2009 DRK12 PI meeting and engage in ongoing professional support."
- CADRE Twitter and Facebook
- Newsletter including archives
  - There is no way to search the archived newsletters. A word search for "eval" on the archived newsletter page, which has short descriptions for each newsletter, did not return any results.
- An option to add your own Resource

### **ITEST: STELAR**

The Innovative Technology Experiences for Students and Teachers (ITEST) program aims to support the development and implementation of innovative strategies and experiences that increase students' awareness of STEM and ICT careers, motivate them towards these educational and career paths, and/or develop their knowledge of related content and skills. According to the STELAR website ([stelar.edc.org](http://stelar.edc.org)), "the mission of STELAR is to build capacity and magnify the results of ITEST projects to deepen the impact of the ITEST program" through technical support, synthesis and dissemination of ITEST projects' findings nationally, and outreach efforts to attract new organizations and communities to the ITEST portfolio.

## STELAR Resources

1. ITEST Proposal Development: The “Create an effective evaluation strategy” section links to five resources: 3 Project/program evaluation “guides;” 1 webinar; 1 link to an extensive database of instruments used in ITEST projects.
2. STELAR Materials: Thematic Highlights Archive. While there are many ECB resources in the STELAR Materials section, the Thematic Highlights section about ‘Evaluation in the Context of ITEST Projects’ directly links to a set of evaluation resources.
3. Resources: Resources can be filtered by the topic “Evaluation.” Filtering just by ‘Topic: evaluation’ results in 114 resources. Resources are categorized by resource type, discipline, and topic, and tagging aligns with the search/filter function on the Resources page. This search/filter combination allows users to find specific types resources and filter by content area. A large proportion of STELAR’s evaluation resources are evaluation instruments used in ITEST projects; STELAR serves as a central repository for these. The second most prominent category is publications, which include ITEST evaluation reports and data briefs (both project level and program wide), research articles, guides, and checklists. The majority are design-focused or evaluation reports. The majority of the evaluation resources are developed internally, including project/program reports, STELAR webinars, and PowerPoints or videos from ITEST summits.

Filtering resources by ‘Topic: Evaluation’ provides the following breakdown of resources:

Table 8: STELAR evaluation resources by resource type

Resource Type	Number of resources	Description
Curricular materials	1	How to make an infographic
Events	11	Program Summits, forums, webinars, working group conversations,
Instruments	81	Validated instruments from ITEST projects
News	6	News reports/ITEST in the news
Opportunities	16	Solicitations/call for papers, external events such as webinars and dialogues
Publications	30	Data briefs, evaluation reports, research articles, guides, checklists

## Audience

The intended audience of resources appears to be evaluators and PIs, with a number of resources serving both audiences. While categories such as instruments would be more applicable to evaluators, and basic guides serve PIs better, there is often a coming together of the two audiences. For example, the STELAR webinar “The New Face of Research and Evaluation in ITEST Projects” featured both PIs and Evaluators describing “how they are meeting the challenge of incorporating rigorous research designs and evaluations that provide useful measures of project success, all while developing dynamic activities within the ITEST framework.” This suggests that integration of evaluation into the project is valued by ITEST.

## Community of practice and interactions

The communities of practice/interactions include:

- Evaluation working group (evidence: publications of discussions)

- STELAR Twitter, Facebook, and Blog
- Newsletter, including archives: Although it is not immediately clear from the titles in the archives whether there are evaluation-related topics, a review of some newsletters suggests that they link to many of the resources that would also be found by searching the website.

## STEP: STEM Central

The Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP) seeks to increase the number of students (U.S. citizens or permanent residents) receiving associate or baccalaureate degrees in established or emerging fields within science, technology, engineering, and mathematics (STEM). Type 1 proposals are solicited that provide for full implementation efforts at academic institutions. Type 2 proposals are solicited that support educational research projects on associate or baccalaureate degree attainment in STEM. (2011)

STEM Central began as the resource center for the National Science Foundation’s STEP program, and has evolved to broaden its audience. It now provides a forum for STEM faculty and administrators nationwide to connect with others and learn, share ideas, share resources, and work collaboratively on initiatives.

### Resource Overview

STEM Central includes a range of resources, including journal articles, blog posts, and webinars. The website is designed to be interaction, with a function for registered users (member) to create their own dashboards. Evaluation resources and supports (found via search) include guides, articles, discussions, blog posts, project descriptions, and webinars. Many of the resources are shared by community members in the form of blog posts, messages from working groups, or online discussion groups.

Most of the resources are around designing program evaluations – tips and tools, best practice and how-to’s. Some are more formal presentations, such as webinars, and others are more informal and written as lessons learned from those in the field.

### Audience

The intended audience according to their own materials, is STEP grantees along with STEM faculty and administrators, more broadly. Resources available appear to be relevant to both PIs and evaluators.

### Community of practice and interactions

STEM Central places an emphasis on interactivity on their web site. There are several working groups, and the community is encourage to contribute to discussions as well as contribute resources (an “Add Resource” button features prominently on their Resource page).

They have multiple working groups with discussion boards. Most of these groups appear to grow out of project director meetings or other convenings. Working groups that address evaluation include: Project Evaluator Network group (2012 STEP grantees); Program Evaluation group; and a Collecting, Organizing, and Making Use of Data group.