CAISE YEAR EIGHT EVALUATION REPORT
May 2015
Inverness Research

The Center for Advancement of Informal Science Education (CAISE) is currently operating through a cooperative agreement with the National Science Foundation (NSF) on year eight of a year six-through-eight cooperative agreement to continue to serve as a resource center for the informal STEM education (ISE) field, and the Advancing Informal STEM Learning (AISL) program within NSF. In years 6-8, CAISE -- through focusing on work with AISL PIs, potential PIs, STEM PIs and their Education and Outreach staffs; with the ISE program and its program officers, as well as program officers from other directorates within NSF; and with ISE evaluators and learning researchers -- is focusing its efforts on enabling a "dynamic interplay" between the NSF and the ISE field. Key roles for CAISE in years 6-8 include 1) helping to characterize the state-of-the-field; 2) communicating about the ISE field; 3) serving as a convener for the field; 4) and serving as a connector for the field (both the field to itself, and the field to others). These key roles are central to focusing the Inverness evaluation as it seeks to document the overall productivity and efficacy of CAISE as a funded NSF resource network.

Inverness Research is the external evaluator for CAISE. Year 8 tasks have included the following:

- documenting the year 8 initiatives and work --
    - the 2014 AISL PI meeting) --
        - monitoring the meeting; developing, administering and analyzing a post-meeting survey
    - Broader Impacts and Informal Science Education;
        - monitoring convening planning and convening; developing, administering and analyzing a post-convening survey
    - Research, Evaluation and Practice --
        - monitoring ISE Evidence wiki edit-a-thon; conducting follow-up telephone interviews with sample of participants
        - monitoring Shareable Measures Forum; conducting follow-up telephone interviews with sample of participants
    - web infrastructure improvements --
        - web analytics
        - telephone interviews with Shareable Measures forum and ISE Evidence Wiki edit-a-thon participants
        - survey of the field about informalscience.org
- writing a history of CAISE;
- surveying the field to get an updated picture of the landscape of the ISE; field and its knowledge and perceptions of CAISE; and
- preparing this annual report.

Findings for Year Eight Initiatives

Through its work in year 8, CAISE impacted its core audiences (AISL PIs, STEM professionals, evaluators and learning researchers) through its core roles (convening, connecting, characterizing, and communicating) through several key activities: the 2014 AISL PI Meeting; a Broader Impacts and Informal Science Education convening; an online forum about shared measures across informal science education projects; improved web infrastructure work; and a meeting of learning researchers and evaluators to strengthen the ISE Evidence Wiki through the editing of existing articles, and addition of new articles.

The 2014 AISL PI Meeting

Inverness Research administered a post-meeting survey to attendees of the 2014 AISL PI Meeting. The survey was returned by 122 people (of the 225 who were invited to complete it), a response rate of 54%. (Previous PI meeting survey response rates were very similar - 52% for the 2012 meeting, and 57% for the 2010 ISE Summit.) The majority of respondents (81%) were PIs, co-PIs or project staff on current NSF AISL grants; the remaining respondents were evaluators, grant writers, or advisors on current projects. Nearly half of the respondents (46%) have worked in the ISE field for ten years or more; 25% have worked in ISE for five to ten years, and the remainder have been in the field for five years or less.

The 2014 AISL PI Meeting was the highest rated PI meeting CAISE has facilitated to date, with 81% of respondents rating it as high or very high quality, and 84% rating it as high or very high value (compared with 64% and 70% ratings of high or very high for quality and value for the 2012 meeting; and 62% ratings of high or very high quality and value for the 2010 meeting). The vast majority of respondents (90%) gave the 2014 meeting a grade of "A" or "B", compared with 82% in 2012.

The 2014 AISL PI Meeting contributed to PIs in the following ways:

- 84% rated[1] the 2014 meeting as having helped them create connections and collaborations.
- 81% rated the 2014 meeting as having engaged them in meaningful discussions and activities
- 78% rated the 2014 meeting as having informed them about the opportunities, work and issues at the National Science Foundation
- 73% rated the 2014 meeting has helping to orient new PIs to the broader field of informal science education.
- 69% rated the meeting as helping them to better understand critical issues in the ISE field.

[1] For all of these items, the number is the percentage of respondents who rated these items as a 4 or a 5 (to a large extent, to a great extent) on a five-point scale.

The following quote from one attendee is illustrative of the majority of respondents' comments about what was most valuable from the PI meeting:

> *Network opportunities are always the most important part of the PI meeting. The open space sessions provided a lot of opportunity for discussing some really important issues.*

And two relatively new PIs (in the field for less than five years) noted:

> *This was the best three days I spent on anything in the last 10 years....and I have had some great field and meeting experiences. I got a "lay of the ISE land" in just three days. Wow. What a very efficient use of my time!*

> *Because I am a newbie to the ISE field, the NSF PI conference is the main way that I have exposure to this community. It's invaluable to have a chance to get to know the people and projects that are advancing this field -- and to understand how I can make my own project relevant and helpful. I found everything about the conference to be extremely thoughtfully done and well organized. A great mix of panels, open sessions, posters, and mingling time. Excellent venue and accommodations. Also great engagement online -- lots of emails on the conference list serve, and I have used the CAISE website to get more background on projects and follow-up with a few people. Thank you!*

PIs who had attended previous meetings also noted that CAISE had been attentive to previous feedback in planning the 2014 PI meeting, as the following comment highlights:

> *I learned a great deal. It was very well organized, taking into account what was learned from previous meetings (which is rare!). I will make great effort to come again.*

The only negative comments about the meeting were that the poster session could have used organization by topic to facilitate networking; there was too much information presented in too short an amount of time (and in particular, many participants wanted to attend more than one of the "Diving Deep" and "Open Space" sessions); and the overall goals of the meeting were not as clear as they could have been to participants ahead of the meeting. The following survey comments illustrate respondents' suggestions for improvement:

> *Maybe grouping posters/projects by topic or focus?*

> *I needed a cloning device -- too many interesting sessions happening at once. Even though we could move between sessions, we could still only be in one place at a time so still missed out on what was happening in the other sessions.*

Broader Impacts and Informal Science Education

In addition to forming an advisory board and crafting an outline for a white paper about the landscape of broader impacts and informal science education efforts, the main activity of this initiative was the Broader Impacts and Informal Science Education convening, held in early April. The convening brought together education and public outreach directors from NSF-funded centers and large facilities, along with representatives from informal science education and the National Association for Broader Impacts for a two-day discussion of current and potential connections between those engaged in doing broader impacts work, and those working in informal science education.

Inverness Research invited 48 of the participants to respond to a post-convening survey and received 32 responses, a response rate of 67%. The majority of respondents (88%) were education and public outreach directors, program managers, public information officers or STEM professionals, with the rest being evaluators or learning researchers. The majority (84%) of respondents were familiar with informal STEM education prior to the meeting, and just over half (53%) of the respondents noted that a lot or a great deal of their education and public outreach work took place in informal settings. Just under half (41%) were familiar with CAISE prior to the convening, and 34% were familiar with InformalScience.org.

Results from the post-convening survey showed that the convening was valuable in providing opportunities to network, connections between and among education and public outreach directors, and among those directors and informal STEM educators, and in stimulating ideas, connections, and activity for strengthening broader impacts work going forward. Highlights from the post-convening survey include:

- 81% of respondents rated it very or extremely likely that they would visit InformalScience.org in the future.
- 80% of respondents noted that participating in the convening had stimulated ideas for furthering their broader impacts work.
- 79% of respondents said that the specific plans they made for furthering their broader impacts work as a result of the convening included reinforcing or making new connections with informal STEM educators.
- 55% of respondents said they learned a lot or a great deal about the range and types of informal STEM education resources available.
- 48% of respondents said that the convening helped them to make connections with others who do similar work.
- 42% of respondents said the convening helped to facilitate connections with others in the informal STEM education field.
- 34% of respondents said they would be following up with others after the meeting to collaborate on future work.

The following survey comments highlight several of the specific connections participants had made, and the specific action items respondents mentioned they would be taking following the convening:

> *I met a colleague who works one building down from me. We weren't aware of each other before the meeting, but now plan to collaborate.*
>
> *I found that others in my position often had similar needs in terms of support with faculty/graduate student effort and with evaluation. I think working together is possible and likely to tackle some of our struggles.*
>
> *I met someone who offered help with a workshop on training my grad student volunteers to communicate better. I didn't even think about doing such a training before, but knowing there are people with that expertise who can help me was very encouraging.*
>
> *We want to be more active in an intentional way with our ISE organizations.*

Respondents noted a few areas where they thought the convening could have been improved: more clarity about the goals and participants ahead of the meeting; a desire for more ISE professionals participating; and a desire for more structured (as opposed to unstructured) discussion time. Several participants noted a desire to spend more time discussing evaluation of broader impacts activities. And while the White Paper was discussed, it is a product that is in the future to some extent, and some participants felt like they weren't working enough toward a "concrete product." The following survey comments highlight some of the suggested areas for improvement:

> *I would have liked to hear from different ISE speakers representing the museum and evaluation community. The key representatives have already saturated the materials community through their work with the Nanoscale Informal Science Education (NISE) Network & Materials Research Science and Engineering Centers. It would have been nice to hear from additional unique AISL grantees (like Besley) who have novel ideas, and some evidence to back it up.*
>
> *It was a really tough agenda; too much unstructured discussion time, a lack of clear attainable outcomes...*
>
> *The topics were too broad and while it was great to discuss said topics, no new ideas were generated nor was an action plan implemented.*
>
> *I think there wasn't enough time to go into details about many aspects, especially those that touch on evaluation of broader impacts.*

Outside of the convening, one field survey respondent who is a STEM professional noted the importance of CAISE and InformalScience.org to his own development in doing outreach work related to his science research:

> *I had no knowledge of the potential for physical scientists to participate in this field. My work with community groups and citizen scientists made me aware of the need for more active outreach on my part. The struggle to inform the public about climate change (and obstacles to that outreach) made me aware of the limits of existing communication strategies. About the time I was developing a plan of action for outreach of my own science, ISE and AISL transformations occurred, CAISE evolved and InformalScience.org really bloomed. I now feel that there is a tool for scientists to use to become involved with the usual practitioners of ISE.*

Research, Evaluation and Practice -- Shareable Measures Forum and ISE Evidence Wiki Edit-a-thon

In addition to continuing to track research agendas in the ISE field, and continuing to refine the research and evaluation landing pages on InformalScience.org, the Research, Evaluation and Practice initiative focused on two major efforts. First, in late February, CAISE hosted an ***online forum about shareable measures*** in informal science education; this forum was a continuation of discussion around a theme identified in previous years' work with the field as an area of interest. The forum, slated to run for one week but extended because of interest and participation, generated discussions about the challenges, and areas of need and opportunity for utilizing shared measures in the informal STEM education projects, and allowed evaluators and learning researchers to share projects and materials they had been working on. The group participating in the forum consists of over 130 members. Twenty-four individuals posted to the forum. Four separate but related threads were followed in the forum:

- Shareable Measures Forum (32 replies and 867 views)
- Defining Shareable Measures (11 replies and 432 views)
- Measurements Ready to Share (11 replies and 337 views)
- What do Practitioners Want to Measure? (4 replies and 214 views)

After the forum, we conducted in-depth telephone interviews with eight active participants in the forum to get their assessments of the quality and value of the forum, and their ideas for continuing the conversation and extending it beyond the group to the broader field. Participants we interviewed felt the shareable measures forum was useful, high quality, and of high value to the field. Of particular value was getting a "snapshot" of where the field is at this time in relation to this topic, and also seeing specific instruments that either had been developed or were in development, as the following quotes illustrate:

It was helpful to get a broader perspective on the topics of interest to people in this area, and particularly, to know more about some of the theoretical considerations and conundrums. It was helpful to get a much broader picture of what people are doing and pondering. And probably the most helpful for me was the variety of different resources that were shared. Even being well connected to the field as I am, there were things shared that I have never heard of, that were new to me. That in and of itself proves the value of that conversation and the CAISE website.

A lot of the instruments that people posted about were new to me or had more work done than I realized, so it was great snapshot to see where the field is at that exact moment.

Those we interviewed suggested that, given the depth of the topic, a "threaded conversation" might have helped people keep track of the various strands of conversation, or perhaps more moderation/facilitation. As several people we interviewed noted:

Perhaps more of a threaded conversation might have been helpful, with sub-categories, and perhaps breaking up the discussion more proactively.

There's a lot of richness in it and when I got behind, I had a hard time jumping back and forth and trying to follow the different threads.

Interviewees also had thoughts about taking this discussion out to the broader field:

I'm interested in how these casual conversations have the way to lead into more formal efforts. What can be done about this? It might be good to circle back and share the document and then if there was some way to feel out if there is interest in diving in deeper to the issues and questions presented here. You could put that out there and ask for people to respond and this could be a little bit of match making. This just scratched the surface.

The critical question for me is whether shareable measures are possible or not. Why do I think they are not possible? Because every time I try to use someone else's I find that the measure isn't fairly evaluating the project. I understand the interest in trying to collect data from one measure used across settings but it's very difficult to do. The next step is defining what a shareable measure is and how it plays out in practice. Do a landscape study of what it is and what the status is whether in formal or informal science.

Second, the ***ISE Evidence Wiki Edit-a-Thon*** meeting in Seattle brought together evaluators, learning researchers, and graduate students in informal STEM education to edit existing articles on the ISE Evidence Wiki, and to write new articles. During the meeting, 22 existing articles were edited, and 23 new ones were added. In

addition, the group discussed the current and potential value of the wiki, tensions related to contributing to the wiki, and mechanisms by which the field could be engaged more to use and contribute to the wiki. After the meeting, Inverness interviewed eight participants about the quality and value of the meeting, and ideas for furthering the reach and usability of the wiki. The participants we interviewed all rated the meeting as very high quality, highly useful, and highly valuable to themselves. The following quotes from three participants highlight the value to the participants:

> *It was extremely valuable networking and finding out about each other... we got to pick a topic and I had a chance to synthesize thinking around early childhood learning. Seeing the wiki as a place to engage the community and disseminate was valuable.*

> *The bigger picture for me: I got a better understanding of the wiki and now I understand the challenge of what they are trying to do. Secondarily, coming out of my comfort zone and doing more writing and getting the spirit and context of it was meaningful.*

> *It was great to have such a diverse group of participants. They put a lot of care into finding people who had complimentary skill sets, and really good coverage across the areas of the wiki. Having time to work, plus time to think and discuss the wiki as a whole was really valuable, and I loved how open they were to people's feedback and ideas about how to incentivize and sustain participation. I felt the conversations that were had about what needs to go into a good wiki and issues surrounding long-term participation and sustainability were really powerful.*

Suggestions participants had for increasing the usage and contribution to the wiki included improving its visibility on the website; perhaps moving it out of research and into community on the website; and including the evidence wiki in more CAISE communications so that people are constantly reminded to use it and update it. Structured interview participants had the following suggestions:

> *Getting students involved was mentioned at the meeting but also if there was a way for projects to know more about this resource and how they could use it to help disseminate information and to make sure that their work is on the wiki.*

> *If you could contribute in smaller ways so more people so it's not grand and final. We as practitioners are willing to share our own experiences, but I have a hard time making grand pronouncements.*

> *Making it more central and finding ways to better link it to what people are choosing to share on the website. Having the ability for people to author or show their workmanship in writing different elements of the wiki pages. Incorporate as a future dissemination for projects.*

Having authorship would give some incentive especially when working with graduate groups. And increasing people's awareness that it exists.

Web Infrastructure

Inverness Research through its PI meeting survey, surveys of the CAISE newsletter members[2] and structured telephone interviews has collected data about the use and value of InformalScience.org to key audiences.

InformalScience.org has about 2,800 members. The site had over 114,000 sessions (visits) during year 8, with an average of 9,400 sessions each month. Visits tend to spike with key events, such as the AISL PI meeting, the ASTC Annual Conference, the NSF AISL and Science Learning+ proposal deadlines, and CAISE activities such as the Shareable Measures forum and the BI ISE convening.

We asked CAISE/InformalScience.org newsletter survey respondents and 2014 AISL PI meeting survey respondents to rate InformalScience.org on several dimensions (overall design, ease of use, content); ratings from both surveys were similar. Highlights from the CAISE/InformalScience.org newsletter surveys include:

- 85% of the respondents rated the quality of the content on InformalScience.org as good or very good
- 84% of the respondents rated the uniqueness of the content as good or very good
- 76% of the respondents rated the quality of the website's overall design as good or very good
- 75% of the respondents rated the comprehensiveness of the content as good or very good
- 62% of the rated the navigability/ease of use of InformalScience.org as good or very good

Highlights from the 2014 AISL PI meeting survey include:

- 86% of the 117 respondents to the 2014 AISL PI meeting survey rated the content of InformalScience.org as good or very good

[2] In early April, Inverness administered two surveys to the CAISE newsletter list (comprised of 6,223 invitees). One survey asked questions about the current status of the ISE field; the second survey asked questions about the familiarity with, quality, and value of CAISE and InformalScience.org. The newsletter list was split in half, randomly, with 3,115 people invited to respond to the survey about the ISE field, and 3,108 invited to respond to the CAISE/InformalScience.org survey. 465 people responded to the field survey, a response rate of 15%; 414 people responded to the CAISE/InformalScience.org survey, a response rate of 13%.

- 74% of the survey respondents rated the quality of its overall design as good or very good
- 61% of the respondents rated the navigability/ease of use as good or very good

Survey respondents' comments and structured interview participants highlighted the value of InformalScience.org:

> *[The most valuable thing about InformalScience.org is] having it be one-stop shopping for finding information or connecting to information related to ISE. So, rather than searching a lot of websites, I go there. It is my first stop. They've done so much work to consolidate information in one place.*
>
> *It's like a foundation for our work in this field.*
>
> *I like the fact that it's so specific to my field, so I can find exactly what I'm looking for.*

The primary issue or concern raised with InformalScience.org across all our surveys is that there is so much information on the site, it can be difficult to navigate and find what one is looking for, particularly if one is searching for a specific resource, as these field survey comments illustrate:

> *I think it takes some initial orienting to the site... I'm not sure if there's a way to make things easier to access... as it stands now it seems like there are so many different areas and initiatives included on the site, I'm never exactly sure what's there or where I should go for specific resources*
>
> *I think it is a good website. My biggest problem is just finding the time to use it. There is so much there that I want to look at that it tends to overwhelm me.*
>
> *For some reason I don't find the general design very friendly to me. I find it hard to navigate around the site and I can't find things that I know are there. Try to have multiple pathways into the same information so people who think about things in different ways can find stuff.*

Importantly, recent efforts to re-design landing pages to make it easier to locate things have been fruitful -- several survey comments noted the re-design to the research and evaluation pages as being useful:

> *I love it that I can find evaluation reports on the site. That is the main thing I use it for. I appreciate its redesign; it is easier to use now.*
>
> *I really do like the evaluation page. I like that you go there and see the evaluation resources.*

We asked on the CAISE/InformalScience.org newsletter survey what people use InformalScience.org for. The main use is as a place to learn about other people and projects in the informal science education field (62% of respondents chose this); as a place to find research reports and access journal articles (58% chose this); as a place to find evaluation reports (50% chose this); and a place to find up-to-date information on what is happening in the ISE field (47% chose this). Survey respondents and structured interview participants singled out the value of having evaluation reports available as there is no other single place to find these:

> *I have accessed evaluation studies that don't end up anywhere else. For someone like me at a university who has access, the evaluation one is really helpful and the research one -- I don't need it because I have that access through my university. I do work with organizations who don't have the access I have to general articles, and I think they find it very useful.*

Just under 40% of the CAISE/InformalScience.org newsletter survey respondents rated the value of InformalScience.org to themselves as high or very high, while 68% of the respondents rated the value of InformalScience.org to the field as high or very high. Several of our structured interview participants spoke of the importance and value of InformalScience.org to the field.

> *Just having the central clearinghouse of InformalScience.org amplifies the outcomes of all the other projects being funded within the ISE realm.*

And survey comments from the CAISE/InformalScience.org newsletter survey respondents echoed these sentiments:

> *CAISE and InformalScience.org are valuable projects that extend and enhance the impact of NSF's investments in informal science education. They are worthy of continued support.*

CAISE's Recognition Over Time and Impact on the ISE Field

For PIs and for the field writ large, the familiarity with CAISE has grown over time, as has the perception of the quality and value of CAISE and its offerings. In addition, the work of CAISE has helped to strengthen the ISE field -- through creating community and common identity, sharing knowledge that informs the field, and gatherings that help individual members of the field better understand the breadth and depth of the field writ large.

Familiarity with CAISE has continued to grow over time. We compared responses among the CAISE newsletter survey respondents from 2010 and 2015; their overall familiarity with and knowledge of CAISE and its resources has grown over the past five years. In 2015, 32% said of the CAISE newsletter survey respondents said they were familiar to a large or very great extent with CAISE; in 2010, 25% of the survey

respondents said they were generally or very knowledgeable about CAISE.

In addition, the perception of CAISE as valuable to individual professionals and to the ISE field has also grown over time -- among AISL PIs and among members of the field. In 2010, 2012, and 2014, we asked AISL PIs about the current and potential value of CAISE, both to themselves as ISE professionals, and to the ISE field. We asked the same question of CAISE newsletter subscribers in 2010 and 2015. For both audiences, the current value of CAISE to both themselves and the ISE field has grown steadily over time, as the table below illustrates:

	AISL PIs			**ISE FIELD**	
Percentage of respondents who said the **CURRENT value of CAISE to them as ISE professionals** is high or very high	2010 40%	2012 43%	2014 51%	2010 24%	2015 34%
Percentage of respondents who said the **CURRENT value of CAISE to the ISE field** is high or very high	49%	54%	70%	34%	59%

The percentage of AISL PIs and newsletter survey respondents has grown over the years in terms of its view of CAISE's potential value as well:

	AISL PIs			**ISE FIELD**	
Percentage of respondents who said the **POTENTIAL value of CAISE to them as ISE professionals** is high or very high	2010 85%	2012 86%	2014 90%	2010 71%	2015 78%
Percentage of respondents who said the **POTENTIAL value of CAISE to the ISE field** is high or very high	92%	95%	92%	80%	88%

In particular, survey comments and comments from structured interviews highlight that PIs, evaluators, learning researchers, and STEM professionals view CAISE as a unique and much-needed resource for the field. Through the online repository of project information and evaluation and research reports, through PI meetings and small convenings that gather members of this broad and diverse field, CAISE is helping to coalesce the field.

> *CAISE has their finger on the pulse of what is happening and what people doing work in this area need to be aware of. There are so many benefits that stem just from the fact that they exist. They are pulling all this together. And in the absence of this, a lot of the money that goes into ISE grant programs would be less well promoted and disseminated within the field.*
>
> *I really do think CAISE is doing a good job. Over the years, I feel like CAISE has done a great job of inserting themselves in the conversation in the right places, bringing together diverse groups of people. CAISE makes me realize that my*

work is ISE related in a much broader sense than I experience in my day-to-day work life. Thumbs up all around.

CAISE has done a tremendous job of pulling together professionals and resources, especially in the last 2-3 years. ISE professionals are tucked away in so many different types of organizations and roles, I can only imagine how difficult it is to pull everyone from everywhere together.

The PI meetings and convenings have been particularly valuable to members of the ISE field. As several people noted in field survey comments and in our structured interviews, there are few opportunities within the field where members from across the ISE field can connect and learn from one another.

I participated in several different CAISE convenings I found were helpful for networking and getting the field more coordinated on how it proceeds with something. There just aren't that many opportunities to convene across the broader field.

The first CAISE convening I went to helped me understand something that I have since come to understand -- it seeded the question, "Who are you in this field and what do you contribute?" It helped me think about that and it has helped me understand my identity in the field.

InformalScience.org is also seen as a crucial resource for the ISE field. In particular, survey respondents and structured interview participants noted the importance of having access to project information, evaluation reports and research all in once place, which helps the field more easily build on work that has gone before.

I think the evaluation synthesis piece and database of evaluation reports is super useful. That is not something that is easy to access if you have to contact each individual PI, and there is nothing else in the field that has done that for us. So that is extremely helpful.

I think overall, CAISE has helped the field become a field. That systematic building on each other's ideas in a field that doesn't have so many great venues for publication has been really important. Otherwise, we would have to wait to know what someone is doing until something is published and there are so few slots for publication on informal science -- this has been really helpful.

Five years ago, there was terrible access to ISE information unless you had a personal connection to a project. CAISE is the only reliable and open resource for project information and evaluation data.

CAISE has helped bring together diverse resources and people into a single venue, promoting coordination and communication.

Five years ago the only resource I used was the Citizen Science Toolkit. There are now several sites that aggregate ISE projects and InformalScience.org does a good job of aggregating resources for project leaders. It is much easier to keep informed about other projects and developments in the field in general. Although it is still hard to find the time outside of implementing our own project to learn from and share with others, it has never been easier to do so.

Five years ago, we had only a couple book publications to provide a foundation for the field. Now, CAISE provides a dynamic platform for organizing, connecting, and sharing resources with the community.

The respondents for the survey about the ISE field were asked to what extent they feel there exists a professional field of informal STEM education. Almost half (41%) responded that they felt there was to a large or very great extent; another 43% rated that they felt there was to some extent. Only 2% rated this item "not at all." We also asked respondents to this survey to rate the extent to which they felt they were part of and connected to the professional field of informal STEM education: 36% of the 2015 field survey respondents rated they felt connected to a large or very great extent, compared with 0% of the field survey respondents in 2010.

We also asked field survey respondents about the extent to which they feel the ISE field has become stronger over the past decade. The vast majority (82%) of respondents felt the field was stronger to a large or very great extent. Survey comments highlight the differences in the ISE field between five-ten[3] years ago and today:

The field seems much more organized now, and better at sharing resources.

It is more diverse, it has welcomed people on the edges of the field or who are doing informal STEM part time. There is a growing awareness of the need for research and the availability of information. Many practitioners are better connected outside their organization and use these connections when starting new projects. There are a growing number of new innovative initiatives and small creative organizations, while at the same time some of the legacy organizations are focusing on less relevant work. There still is a lack of ISE organizations' thinking about their larger role in and connection to the community.

It has grown in strength so much so that many people are now identifying as informal science educators, which was not the case 5-10 years ago.

[3] On the 2014 AISL PI Meeting survey, we asked respondents to comment on the differences they saw in the ISE field five years ago compared to today; on the 2015 ISE Field survey, we asked respondents to comment on the differences they see in the field comparing a decade ago to today.

Survey comments to this question also highlighted the role members of the ISE field see CAISE as having played in the overall development of the ISE Field over the past five-ten years:

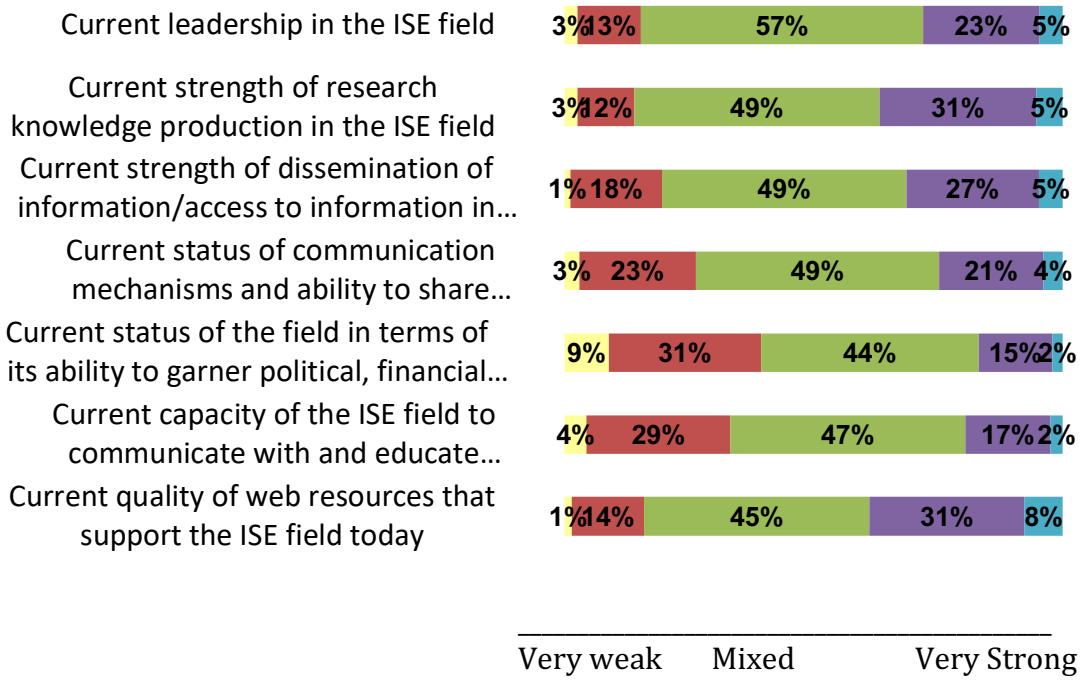
> *CAISE does a good job of making sure there's a national voice and place to keep informal (STEM education) on the radar and moving forward.*
>
> *The biggest benefit of CAISE is the work they've done to legitimizing the field of informal science as a valuable medium and it's a central unit that communicates that.*
>
> *As for differences in informal education over the past 10 years, there appear to be several new trends in the field: citizen science, maker spaces, communicating science to the public, OST programs and early learning offerings. ISE organizations seem to moving away from reaching family visitors to focusing more on reaching specific audience segments, through targeted programs. From a grant writer's perspective, I feel that access to research and evaluation reports and what is taking place in the field has greatly increased. This is thanks to websites such as InformalScience.org, Relating Research to Practice, and others.*
>
> *The field has grown substantially and new organizations such as CAISE have emerged to help to consolidate activities of the informal STEM field.*
>
> *I feel that there is much more awareness about the field. In fact, I was delighted to find CAISE and its website and communications about 6 years ago when I first came on board at the Museum. This resource is one of the most important resources I have for keeping up with what the other ISE constituents are doing. Innovations, approaches, ideas for making our case for support -- all of these are addressed in by ASTC, CAISE, etc.*

The ISE field survey data shows there is still much work to do in continuing to coalesce and strengthen the field of informal STEM education. Some respondents commented that they see the field as stable, but not strengthening:

> *2005 may have been a peak of influence for the field, but the last 10 years have seen that influence stabilize. It doesn't seem to be growing much any more.*

We asked the 2015 ISE field survey respondents to rate the strength of specific characteristics of the ISE field, as highlighted in the table below:

Perceptions of the strength of specific characteristics of the informal STEM field



ISE field survey respondents felt that the ISE field was stronger in some areas than others. Survey comments highlight that one reason for this rating may be the lack of "high-profile" leaders in the field:

> *High profile leaders, like Frank Oppenheimer, aren't around today.*

And some respondents felt like while the field has grown, funding support for the field has not, or has shifted; and the need for better mechanisms to communicate the value of ISE to external audiences remains high. Still others feel that the advent of new types of ISE work in new sectors has meant less funding for other sectors.

> *There seems to be a great deal in public awareness of STEM and ISE in general. The quality of programs, participation from professional scientists, and overall effectiveness has also grown steadily. All of that being said, I believe funding is shifting away from ISE to formal learning in recent years, so I wonder if that growth will continue over the next decade.*

> *Although I feel the field has grown significantly in strength over the past decade, I think that growth has been more of an internal recognition of ISE as a*

rigorous and research-based profession. We've made great strides, but we still have a ways to go in elevating the stature of ISE outside our own circles.

Steep declines in NSF funding have really hurt development of new ISE materials. Funding was slashed, and emphasis was shifted to only those programs that can be successfully empirically evaluated, which means that more innovative, experimental ISE strategies have largely disappeared.

If I define 'field' as the professionals practicing in informal STEM and growing in their relationships and communication, I would say 'grown in strength.' The establishment of informalscience.org makes access to resources much easier than a decade ago. CAISE's various conferences and web discussions have brought people together from different sectors. However, because NSF/AISL has decreased funding and changed their direction toward more academic work, the informal STEM education field has lost over the decade and continues to lose the interest of and representatives in mass media STEM (radio, tv, film); so this sector of the informal STEM education field has "declined a lot in strength."

Quite frankly, I feel it's been progress by inches. There has been forward motion but most of the ISE is still about supporting the formal sector rather than understanding the value on its own.

Summary

In year 8, CAISE continued its initiatives -- Broader Impacts and Informal Science Education; Research, Evaluation and Practice; and Web Infrastructure -- in high-quality ways that have added value to the core audiences and to the broader field. In addition, over time, CAISE has proved to offer a unique and valuable service to the ISE field. InformalScience.org and CAISE's facilitation of small convenings and meetings, in particular, have helped to characterize the ISE field for the field, and connect its diverse members. CAISE has helped "the field become a field." While the ISE field has strengthened over time, there is still work to do to continue to develop the field.

Center for the Advancement of Informal Science Education (CAISE) -- Executive Summary of Year 8 External Evaluation Report

Inverness Research

October 2015

> *CAISE and InformalScience.org are valuable projects that extend and enhance the impact of NSF's investments in informal science education. They are worthy of continued support. - science journalist, 2015 survey comment*

Inverness Research has been the external evaluator for CAISE for the past eight years. This brief executive summary highlights findings from the year eight external evaluation of CAISE along with comparison data gathered from the previous years' evaluation efforts.[1] Our evaluation findings show that CAISE is important infrastructure for the ISE field, addressing important needs in the field through resources that are well known, high-quality, widely used, well-designed, accessible, valued and trustworthy.

- **CAISE is viewed as a unique and valued asset for the field of informal STEM education.**

CAISE's plays a unique and important role in helping to characterize and connect the ISE field, through the online repository of project information and evaluation and research reports on InformalScience.org, and through PI meetings and small convenings that gather members of this broad and diverse field.

> *I really do think CAISE is doing a good job. CAISE makes me realize that my work is ISE related in a much broader sense than I experience in my day-to-day work life. -- evaluator, 2015 telephone interview*

- **The work of CAISE is consistently rated as high quality and value.**

For example, the 2014 AISL PI Meeting was the highest rated PI meeting CAISE has facilitated to date, with 81% of respondents rating it as high or very high quality, and 84% rating it as high or very high value. CAISE's small convenings over the eight years have been similarly rated as high in usefulness to participants (with an average of 75% of participants responding to post-convening surveys rating the convenings as highly useful to them), particularly for facilitating connections and networking across the diverse members of the ISE field.

- **Informalscience.org is seen as a crucial resource for the field.**

We asked CAISE/InformalScience.org newsletter survey respondents and 2014 AISL PI

[1] Evaluation activities in year eight include: the 2014 AISL PI Meeting survey; N = 122; response rate of 54%; newsletter subscriber survey about CAISE and InformalScience.org; N = 414; response rate of 13%; newsletter subscriber survey about the ISE field; N = 465; response rate of 15%; a survey of Broader Impacts+ISE convening participants, N=32, response rate of 67%); structured interviews with eight Shareable Measures Online Forum participants and 8=eight ISE Evidence Wiki Edit-a-thon participants. Comments in this summary come from interviews and survey comments.

meeting survey respondents to rate InformalScience.org on several dimensions (overall design, ease of use, content); ratings from both surveys were similar. Highlights from the CAISE/ InformalScience.org newsletter surveys include: 85% of the respondents rated the quality of the content on InformalScience.org as good or very good, while 84% of the respondents rated the uniqueness of the content as good or very good. Similarly, 86% of the respondents to the 2014 AISL PI meeting survey rated the content of InformalScience.org as good or very good.

> *InformalScience.org is an invaluable resource to me. I check the website every day to see the new posts on the home page and the Perspectives blog. I also use it as an important part of an internship program that I coordinate. We often use sections from the website as topics for informal seminars we have as a way to introduce interns to the field of ISE and as a way to allow veteran staff members to learn about best practices in the field. -- aquarium education director, 2015 survey comment*

- **Members of the ISE field view the field as stronger now than it was ten years ago. In particular, members of the ISE field feel more connected to and part of the ISE field now compared to five years ago. CAISE has played an important role in strengthening the ISE field over the past eight years.**

> *I think overall, CAISE has helped the field become a field. That systematic building on each other's ideas in a field that doesn't have so many great venues for publication has been really important. -- informal STEM learning researcher, 2015 telephone interview*

> *CAISE provides a platform to share, inform, and inspire work in informal STEM education. CAISE provides a bridge between academic research, social science research, and practical implementation of informal science education. The professional development opportunities and community connections through CAISE are the most valuable. - science center director, 2015 survey comment*

- **Over the last five years, CAISE has been rapidly closing the gap between is potential and actual value to ISE professionals.**

In 2010, 2012, and 2014, we asked AISL PIs about the current and potential value of CAISE to the ISE field. We asked the same question of CAISE newsletter subscribers in 2010 and 2015, some of whom are PIs but many of whom are not. Thus, these data track CAISE's value to ISE as seen through the eyes of the primary audience of AISL PIs and a secondary audience of the field writ large. In both cases, the value of CAISE to ISE has increased over time, and the gap between the actual and potential value is closing.

	AISL PIs			**ISE FIELD**	
	2010	2012	2014	2010	2015
Percentage of respondents who said the **CURRENT value of CAISE to the ISE field** is high or very high	49%	54%	70%	34%	59%
Percentage of respondents who said the **POTENTIAL value of CAISE to the ISE field** is high or very high	92%	95%	92%	80%	88%

CAISE YEAR NINE EVALUATION REPORT
Inverness Research
October 2016

INTRODUCTION

Inverness Research is the external evaluator for the Center for the Advancement of Informal Science Education (CAISE). Year nine evaluation tasks have included the following:

- Attending and documenting the PI meeting, and developing and administering a post-PI meeting survey[1] (which covered aspects of the PI meeting, but also perceptions/use of CAISE and its resources writ large).
- Monitoring continuing initiative efforts, including the development and distribution of the *Informal STEM Education: Resources for Outreach, Engagement and Broader Impacts* report, and efforts to overhaul the research pages of InformalScience.org.
- Convening an External Review Board (see below).

Our original year nine scope of work included tracking the dissemination and impact of the *Informal STEM Education: Resources for Outreach, Engagement and Broader Impacts* report and tracking audience reach and knowledge-building efforts through a survey of InformalScience.org users. These efforts were not undertaken by the evaluation as the report's completion was delayed, and because of re-prioritization of evaluation efforts toward facilitating and documenting an external review board to develop evaluation plans for a potential next phase of funding for the Center from the National Science Foundation (NSF).

In April of 2016, we prepared an interim evaluation report that shared the findings from the PI meeting survey (that progress report is attached as an appendix to this report). In July of 2016, we facilitated a meeting of the External Review Board for the next phase of funding. The board met for two days with CAISE PIs and staff to review and discuss plans for the next five years of work, and to brainstorm ideas for

[1] Inverness Research administered the survey to 206 attendees, of which 118 returned surveys, representing a return rate of 57%. Previous PI meeting surveys have had return rates ranging from 52%-57%. Respondents represented all sectors of informal science education work. Roughly one-quarter of respondents indicated that they worked in at least three different sectors, while another 21% noted they worked in at least two. Over half of the respondents (55%) have worked in the ISE field for 10 years or more, while 24% have worked in the field for 5-10 years, and the remainder have worked in the field for less than five years. The majority of respondents were PIs (48%), with another 27% representing co-PIs, 14% representing project staff, and 5% evaluators.

evaluation and data gathering. In August of 2016, we prepared a memo that shared the findings from the External Review Board meeting with CAISE leadership.

In this brief annual report, we share findings overall of CAISE's impact on the informal STEM education (ISE) field over time.

THE LONG-TERM INVESTMENT IN CAISE: CAISE'S IMPACT ON THE ISE FIELD

The mission of CAISE is to strengthen and advance informal STEM education. Over the past nine years, CAISE has become a strong center for the informal STEM education field. Through its online resources, convenings, PI meetings and connectivity to the broader world of STEM education, CAISE serves not only those in the Advancing Informal STEM Learning (AISL) program within NSF, but also those in that broader world of informal STEM education.

In the bullets below, we examine the key ways in which CAISE has added value to NSF investments in the informal STEM education field, and to increase the capacity of the field, through facilitating convenings and connections, characterizing the field, and communicating about informal STEM education within and across the field and to other stakeholders and audiences.

- **CAISE has helped to characterize the ISE field for the field, the AISL program, and for the broader STEM learning ecosystem**

Because the informal STEM education field is so diverse, an important role for CAISE is helping the broader field better understand the nature of the ISE field, as well as the nature of the investments of the NSF AISL program within that broader field. Prior to CAISE, there were few opportunities for AISL grantees to know and understand the breadth and depth of the portfolio of funded projects, and even fewer opportunities (beyond annual museum conferences) for the broader field.

CAISE has helped to characterize the field in several important ways. One is through the CAISE website, InformalScience.org. The website contains descriptions of NSF AISL funded projects, a curated knowledge-base of evidence of ISE impact and contributions, project posters from the biennial PI meetings, key research papers, and evaluation findings. The work in the field is highlighted and shared though monthly CAISE newsletters. The biennial PI meetings have provided opportunities for both PIs and NSF Program Officers to better understand the nature of the entire AISL portfolio of projects. And small convenings focused on key themes (networks, professional development, sustainability, research agendas, broader impacts, and research and practice, for example) have provided opportunities for PIs, evaluators, and Program Officers to dive deeply into the portfolio.

- **CAISE has helped members of the ISE field connect and network**

CAISE plays a unique and important role in helping to characterize and connect the ISE field, through the online repository of project information and evaluation and research reports on InformalScience.org, and through PI meetings and small convenings that gather members of this broad and diverse field.

CAISE's role as a connector and facilitator of networking has been an important one for the field. Again, because the ISE field is so diverse, CAISE's work facilitating both within-sector and cross-sector connections has been valuable to the field. CAISE has fostered this networking through several mechanisms -- through the small convenings which bring together representatives of many different sectors of work, through the AISL PI meetings it has held every two years since 2008, through the groups and forums functions on InformalScience.org, and through direct connection between members of the field and the CAISE PI and staff, who help direct people to resources and other people in the field on a daily basis. As one AISL PI meeting survey respondent noted:

> *I really do think CAISE is doing a good job. CAISE makes me realize that my work is ISE related in a much broader sense than I experience in my day-to-day work life.*

- **CAISE has helped to share knowledge within and across the field, and has helped the ISE field connect with other fields**

One of CAISE's main contributions to the field has been to share the work of the ISE field, and to share knowledge, within and across the field. In addition, CAISE has helped to connect the ISE field with other fields and domains, such as the larger body of work in broadening participation in STEM, and the broader impacts work of universities and scientific researchers in sharing research with the public.

This knowledge sharing has happened through multiple mechanisms: through the CAISE newsletter, which has increased its membership over the years; through InformalScience.org and the wealth of resources in the repository and blog posts that highlight projects, resources, or areas of key interest; through small convenings and the PI meetings; through a presence and presentations at other conferences (such as AAAS, VSA, and numerous scientific professional societies, to name a few); and through strategic connections with key organizations, such as the National Alliance for Broader Impacts (NABI), where CAISE has been an active participant in annual meetings, helping to ensure that informal science education is represented and at the table.

As two PIs commented in their responses to the 2016 AISL PI Meeting Survey:

I think CAISE is a very useful organization... I think continued efforts to bring people from different sectors (researchers, educators, designers, program leaders) together is crucial.

I believe that CAISE is invaluable to the field of ISE as a vehicle for sharing resources and networking with like-minded professionals.

The recent report on broader impacts is a key example of CAISE's work in this arena. Through a large convening, as well as an advisory committee that helped guide the work and assist with research and writing, CAISE prepared the *Informal STEM Education: Resources for Outreach, Engagement and Broader Impacts* report which highlights examples of resources and infrastructure and the potential for informal STEM education, science communication and STEM research to work together in the service of public engagement and outreach goals. In addition to being disseminated through InformalScience.org and collaborator organizations and networks, the report, released in May 2016, has been picked up and shared through the Noyce Foundation-funded STEM Next website at the University of San Diego; through the Journal of Science Communication, and the Network of STEM Educators Centers.

This information sharing is also critical within the NSF AISL program, where potential and existing PIs can find information about existing projects and resources, as well as helpful tools such as the PI Guide for Managing Evaluation and blog posts about the Institutional Review Board (IRB) process. In addition to the resources on InformalScience.org, CAISE also helps the NSF AISL program by engaging NSF AISL Program Officers in its convenings and PI meetings, and through ongoing conversation with the AISL cluster of Program Officers. And more broadly within the National Science Foundation, CAISE has been an important contributor to NSF-wide efforts -- most notably, through facilitating a conference for NSF on broadening participation in STEM ahead of the Inclusion Across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science (INCLUDES) solicitation.

- **CAISE is viewed as a high-quality and high-value resource to the ISE field**

CAISE is viewed as a unique and high-quality resource. The individual resources that CAISE provides are rated as being of high quality and value by AISL PIs and members of the field writ large. For example, 86% of AISL PI meeting respondents rated the CAISE newsletter as high or very high quality, while 61% rated it as high or very high value. In addition, the percentage of respondents to the AISL PI Meeting survey rating the PI meeting as high or very high quality and value have risen steadily with each meeting, with the 2016 meeting receiving the highest quality and value ratings to date -- 87% of survey respondents rated the 2016 meeting as high or very high quality, and 87% rated it as high or very high value (compared with 81% and 84% of respondents who rated the 2014 meeting as high

or very high for quality and value). Please see the attached interim evaluation report for more survey findings related to the 2016 PI meeting.

In addition, CAISE has made continual efforts to improve its resources. For example, the CAISE newsletter has been revised and improved over time, and InformalScience.org has been through multiple improvement and refinement processes, including a recent user study. All of these improvements have been favorably received by the field.

In particular, InformalScience.org is seen as a crucial resource for the field. AISL PI meeting survey respondents were also asked to rate InformalScience.org on a number of dimensions. About 90% of survey respondents were familiar enough with InformalScience.org to rate it as to its quality, ease of use, and content. For example,

- 91% of those responding to the questions about InformalScience.org rated the website's uniqueness of resource offered and quality of content as high or very high;
- 87% rated the website as high or very high for its usefulness to the PIs and their work;
- 86% rated the website as high or very high for the comprehensiveness of its content;
- 80% rated the website as high or very high for the quality of its overall design; and
- 69% rated the website as high or very high for its navigability/ease of use.

Ratings from respondents to our broader CAISE newsletter survey[2] in 2015 about the quality of InformalScience.org were similar:

- 85% rated the website as high or very high for the quality of its content;
- 78% rated the website as high or very high for the quality of its overall design; and
- 62% rated it as high or very high for its navigability/ease of use.

Some three-quarters (78%) of those returning the 2016 AISL PI Meeting survey familiar enough with InformalScience.org to rate it rated the overall quality of the website as high or very high, while 68% rated the value as high or very high. In survey comments, PIs praised the redesign and usefulness of the site:

I really love the redesign.

[2] In the spring of 2015, Inverness Research implemented a newsletter subscriber survey about CAISE and InformalScience.org; N = 414 (response rate of 13%); and a newsletter subscriber survey about the ISE field; N = 465 (response rate of 15%).

Our staff uses it and would give it high marks.

When I want to find out about other projects in my field, I start with InformalScience.org.

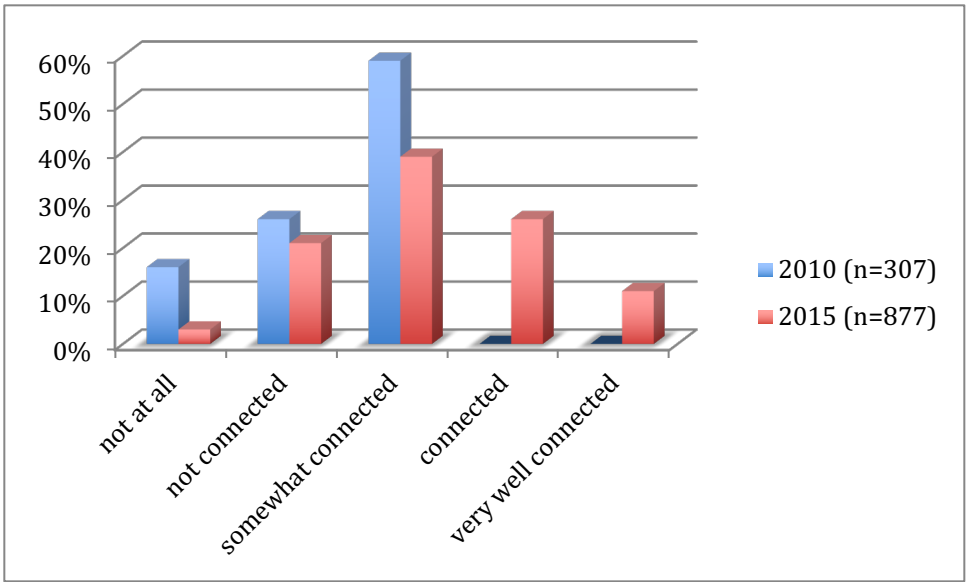
Importantly, the perception of CAISE's current and potential value to NSF AISL PIs and the ISE field has grown over time, and the gap between CAISE's current and potential value has shrunk over time. In 2010, 2012, 2014, and 2016, we asked AISL PIs about the current and potential value of CAISE, both to themselves as ISE professionals, and to the ISE field. We asked the same question of CAISE newsletter subscribers in 2010 and 2015. For both audiences, the current value of CAISE to both themselves and the ISE field has grown steadily over time; perhaps most importantly, there was a significant increase from the 2014 AISL PI meeting respondents to the 2016 AISL PI meeting respondents of the number of PIs rating the current value of CAISE as high or very high to them (from 51% in 2014, to 64% in 2016). Also significantly, the percentage of AISL PIs rating the potential value of CAISE to the ISE Field in 2016 was 97%. Please see the tables below for additional details.

	AISL PIs				**ISE FIELD**	
Percentage of respondents who said the **CURRENT value of CAISE to them as ISE professionals** is high or very high	2010 40%	2012 43%	2014 51%	**2016** **64%**	2010 24%	2015 34%
Percentage of respondents who said the **CURRENT value of CAISE to the ISE field** is high or very high	49%	54%	70%	**77%**	34%	59%

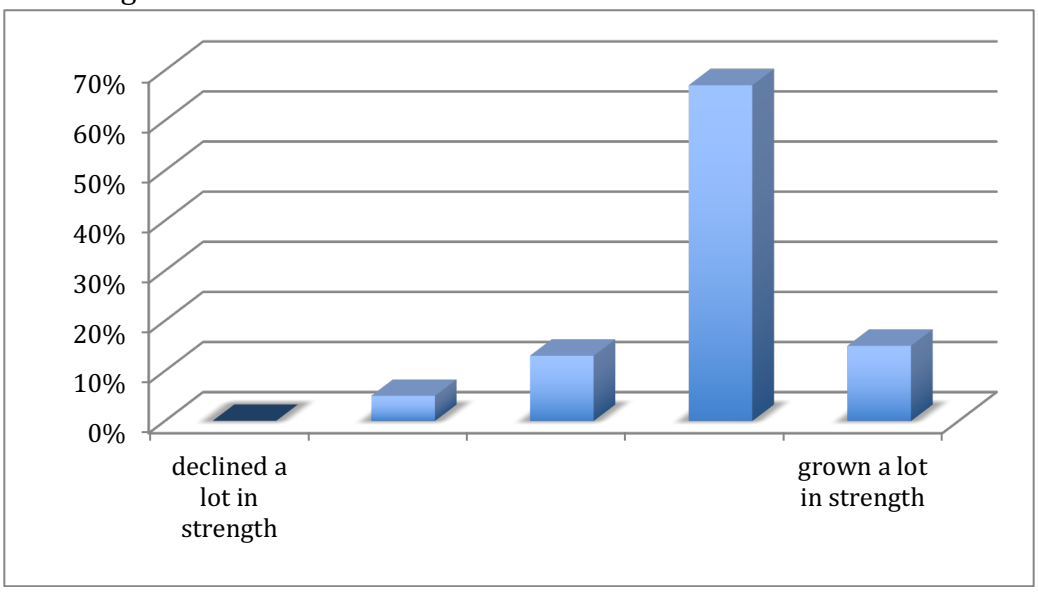
Percentage of respondents who said the **POTENTIAL value of CAISE to them as ISE professionals** is high or very high	85%	86%	90%	**90%**	71%	78%
Percentage of respondents who said the **POTENTIAL value of CAISE to the ISE field** is high or very high	92%	95%	92%	**97%**	80%	88%

- **CAISE has strengthened the ISE field**

CAISE has played an important role in strengthening the ISE field over the past nine years. Members of the ISE field view the field as stronger now than it was ten years ago. In particular, members of the ISE field feel more connected to and part of the ISE field now compared to five years ago.



2015 CAISE newsletter survey data also show that the informal STEM education field has grown over the last decade.



Survey comments from the CAISE newsletter survey highlight CAISE's role in strengthening the field:

> *I think overall, CAISE has helped the field become a field. That systematic building on each other's ideas in a field that doesn't have so many great venues for publication has been really important.*

Five years ago, there was terrible access to ISE information unless you had a personal connection to a project. CAISE is the only reliable and open resource for project information and evaluation data.

Now, CAISE provides a dynamic platform for organizing, connecting, and sharing resources with the community.

SUMMARY

In year nine, CAISE developed and facilitated a high-quality AISL PI meeting, improved its key resource InformalScience.org, and developed an important report about broader impacts and informal science education for both the informal STEM education field and those engaged in public engagement and outreach work. CAISE also engaged with the External Review Board in preparation for its next phase of work, gaining feedback on its plans and guidance on the overall strategy for evaluation and data gathering for the next five years.

Investments in centers are by their very nature different than investments in projects -- they are designed to add value, increase capacity, build infrastructure, and result in multiple, divers downstream returns for both targeted and broad audiences. CAISE has sought to both support and enhance the AISL Program within NSF, and support and advance the broader informal STEM education field. Over the course of nine years, CAISE has had to be nimble and flexible to respond to new opportunities and strategic directions in the field.

The work of CAISE over the last nine years has indeed helped to strengthen the ISE field -- through creating community and common identity, sharing knowledge that informs the field, and gatherings that help individual members of the field better understand the breadth and depth of the field writ large. Over time, CAISE has proved to offer a unique and valuable service to the ISE field. InformalScience.org and CAISE's facilitation of small convenings and meetings, in particular, have helped to characterize the ISE field for the field, and connect its diverse members. CAISE has helped "the field become a field."