

Center for Advancement of Informal Science Education

Final Evaluation Report

Inverness Research, Oregon State University, CAISE
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INTRODUCTION

Inverness Research, Oregon State University and CAISE have been working in partnership to evaluate CAISE. The focus for the evaluation this year has been the following:

- To gather data to inform the continuous improvement of CAISE resources, activities and strategies,
- To help CAISE improve its work, and
- To generate lessons learned about CAISE activities in this phase of grant funding.

Evaluation work this year included the following tasks:

- Observing the virtual 2021 AISL Awardee Meeting, developing and administering a post-event survey, and analyzing data collected through both the survey and Pathable, the virtual platform.
- Developing and implementing a survey of the broader community CAISE serves to better understand the overall engagement with CAISE and InformalScience.org and gather input on the needs and interest in equity-oriented resources.

Overall evaluation efforts for the past six years have been focused on addressing the following key questions:

- What have been the key strategies CAISE has utilized for convening, characterizing, communicating and connecting in this grant phase?
- What are the key strengths of these strategies, activities, resources?
- If CAISE were to continue using these strategies, activities, resources going forward, what could be improved/refined?
- What resources are being used, by whom, in what ways?
- What dissemination strategies seem to be the most effective and why?
- What are the key lessons learned from this grant phase?

In this report, we summarize the findings from this year of work, as well as summarizing the main findings relative to the key strategies CAISE has employed in this grant funding period (2016-2022), and summative reflections on CAISE on its lifetime of work.

FINDINGS FROM 2021-2022

This section of the report briefly summarizes the two major pieces of evaluation work from this year: the evaluation of the 2021 AISL Awardee Meeting, and a summative evaluation survey administered in the spring of 2022. For more detailed findings on both of these evaluation studies, please see the full reports in the appendix.

Summary of Findings from the 2021 AISL Awardee Meeting

Inverness Research and Oregon State University, with support and input from CAISE, conducted an evaluation of the 2021 NSF AISL Awardee Meeting which was held virtually October 19-21, 2021. The evaluation effort included observing the meeting, participating in debriefing the meeting with CAISE co-PIs, the CAISE equity audit committee, and NSF Program Officers; developing and administering a post-event survey;¹ and analyzing data collected through both the survey² and Pathable, the virtual platform.

The meeting specifically focused on inviting and including community partners, and on creating equitable partnerships as the major theme. Thus, our analysis and reporting is primarily focused on the difference in experience and ratings between community partner and AISL PIs/Co-PIs/staff, between those who see themselves as part of the AISL community and those who do not, and those who see themselves as researchers and those who see themselves as practitioners.

We briefly summarize the key high-level findings and lessons learned below. Please see the full AISL Awardee Meeting report in the appendix to this report.

The 2021 NSF AISL Awardee Meeting had the following key features that differentiate it from previous meetings. Our summary of key findings will focus on these three main features:

- 1) The inclusion of community partners (those organizations that are key partners in or primary target audiences of AISL project work) versus an awardee meeting that involves primarily just the PIs, co-PIs, and staff from AISL projects
- 2) A virtual meeting versus an in-person meeting

¹ We received 168 surveys; most questions were answered by 140-150 of respondents. The survey was sent out to 438 registered participants, which gives us a response rate of 38%. With removing registered participants who told us they had registered but were unable to attend, or whose surveys bounced back, and those with no start/stop time in Pathable data, the number is reduced to 369, which puts our response rate at 45%.

² Post-event survey was disaggregated by the following subgroups: AISL PIs, CoPIs, project staff/community partners; respondents whose primary professional focus was ISE/SciComm/those that were not; researchers/practitioners; years in the field (less than five years, five to ten years, greater than ten years); gender; race/ethnicity (the majority of participants were white, and the remaining participants were grouped into a non-white category for sub-analysis purposes). Co-analysis of post-survey data and behavioral data from Pathable was not possible since the two data sources could not be linked.

- 3) A focus on equity, diversity, inclusion and access that was central throughout the entire meeting

In addition, we'll briefly summarize the overall summary ratings on quality, value, strengths and areas for improvement.

Including Community Partners

The 2021 AISL Awardee Meeting successfully incorporated the involvement of community partners. The participation of community partners in the meeting was viewed as important and valuable by respondents. Meeting attendees responding to the survey noted that the community partners added an important perspective to the discussions at the Awardee meeting, and reinforced the equity themes, as more perspectives and practices from people historically excluded from field-leading conversations were heard. The percentage of community partners rating their satisfaction with specific elements of the meeting was higher than the percentage of AISL PIs, which would indicate that community partners were somewhat more satisfied with the meeting than AISL PIs were.

The inclusion of community partners also presented design challenges for CAISE in how to create a satisfying professional meeting for two connected but different audiences. There was consensus among respondents that the participation of the community partners could have been more optimal with some additional supports. These supports included the following:

- more information beforehand on the presentations so PIs and community partners could work together to decide what was most important and beneficial for the PIs and community partners to attend,
- more community partner representation in the plenary sessions,
- at least one session that was just for community partners to be able to talk together (this was considered by CAISE as they were planning the meeting and the decision was made not to have separate sessions for equity reasons), and
- arranging the smaller breakout groups such that individual community partners would not find themselves the sole person representing community groups and thereby carrying the weight of representing them in those discussions.

Focusing on Equity

The 2021 NSF AISL Awardee Meeting's focus on equity was viewed as useful, thought provoking and valuable, and was highly appreciated by participants. The sessions most explicitly focused on equity were some of the most highly rated. Survey respondents appreciated that the equity theme carried throughout the entire meeting, and that the meeting gave them the opportunity to gain new insights into current equity and diversity work in ISE and SciComm.

Specifically, participants reported important outcomes of the meeting related to the following points:

- having their ideas around equity and social justice practices reinforced,
- gaining a better understanding of the importance the NSF AISL program is placing on equity and social justice work,
- being challenged in their thinking about addressing equity issues in research and practice work, and
- being committed to applying equity ideas from the meeting in their own work.

Meeting Virtually

The 2021 NSF AISL Awardee Meeting was the first-ever virtual AISL PI meeting. Importantly, the majority of participants responding to the post-event survey had attended a virtual meeting before. For the most part, the virtual meeting was successful – survey respondents were generally satisfied with the meeting, and said it met their expectations. Open-ended comments from survey respondents indicated that this was “better than most virtual meetings” and even “the most productive and interactive online workshop I’ve attended.” The virtual platform was fairly easy for participants to navigate, and the poster sessions were more highly rated for this meeting than for past in-person meetings.

However, technical issues were a challenge. A few sessions started late, the breakout sessions ended abruptly, there were persistent sound issues where presenters’ sound was cutting out, and some facilitators were unable to get into breakout rooms. In addition, some of the networking, connecting and finding of future collaborators, which are outcomes that have generally been highly rated in past in-person meetings, were more challenging and less successful in the virtual format.

We found the virtual meeting presented interesting trade-offs. The virtual meeting allowed for the participation of community partners and more participants beyond the PIs and co-PIs who are normally the sole attendees, where the costs of travel, housing and additional participants would be prohibitive. In addition, community partners working in organizations that have few staff, who likely could not find staff people to cover all their time to attend an in-person meeting, were able to pop in and take advantage of as much of the meeting as their schedules allowed for.

We also think the plenary sessions were inviting in the virtual format, in that presenters seemed to be talking with each other, as theirs were the only faces on the screen, versus broadcasting to a ballroom full of people. We also wondered if the chat function facilitated questions being raised during the plenary sessions; for example, we wondered if people felt more comfortable asking questions; they did not have to stand in line, worry about the session time expiring before they asked their questions, and perhaps felt less vulnerable when asking more challenging questions.

On the other hand, the virtual meeting was less successful in fostering connections and networking, which have been important features and outcomes of past in-person meetings, even with affordances built into the platform to facilitate networking. Having many opportunities to engage in small group conversations with people you choose to was less successful in the virtual format, and the technical challenges (many of which were a result of problems on the participants' end vs. the meeting platform's) were problematic.

Overall Quality, Value, Strengths and Areas for Improvement

Sixty-three percent of all respondents rated the meeting as high or very high quality; 67% of all respondents rated the meeting as high or very high value. While it is difficult to compare the quality and value ratings for this meeting with past meetings, because this was a virtual meeting, we note that these ratings were slightly lower than the two most recent meetings, but are similar and slightly higher than those for the 2010 ISE Summit which also included more participants beyond AISL PIs and co-PIs. When we examine the disaggregated findings, we noted the following:

- More community partners rated the overall value of the meeting high or very high than AISL PIs.
- More ISE/SciComm professionals rated the overall value of the meeting high or very high than non-ISE/SciComm professionals.
- More non-white respondents rated the overall value of the meeting high or very high than white professionals.
- Open-ended comments indicated technical challenges as a primary factor that impacted the perception of the meeting's quality.

The *Plenary Sessions* on day one and day two were the most well-attended and were among the most highly rated sessions of the meeting. Ratings for the *Critical Conversations* sessions slightly improved from day one to day two, but overall were rated lower than other sessions. There was considerable spread in ratings among the *Concurrent Sessions*; as has been the case over the past years' PI meetings, the specific composition of presenters, attendees, and facilitators, and the degree to which there is ample time for small-group discussions, impacted the perceived quality and value of individual sessions.

The most valuable aspect of the meeting across all post-event survey respondents was learning about the diversity of work funded by AISL. For AISL PIs, the most valuable aspects were the focus on equity and inclusion, and the inclusion of community partners in the meeting. For community partners, the most valuable aspect of the meeting was the opportunity to participate in small group sessions.

In terms of suggested areas for improvement, the following were the primary areas mentioned:

- minimizing the technical issues,
- limiting or better defining/contextualizing academic jargon, and

- encouraging even more small group conversation and engagement.

In addition, some AISL PIs mentioned in the open-ended comments that the poster session was “challenging”, the Concurrent Sessions needed more time, and more facilitation was needed in the smaller breakout sessions.

For community partners, there were two suggestions related to power dynamics:

- Community partners felt there were challenging power dynamics when there was only one community partner in small breakout groups.
- They felt the broader power dynamics that sometimes make it difficult for community partners to even apply for AISL awards themselves (rather than partnering with another agency that is taking the lead) went unaddressed.

They also wanted more context and background information on the meeting prior to the meeting.

Summary of Findings from the Summative Evaluation Survey

The summative evaluation survey was designed to understand overall engagement with CAISE and InformalScience.org (ISDO) and gather input on needs and interest in equity-oriented resources³. The survey was distributed through Qualtrics via an initial survey invitation to a list compiled from the CAISE newsletter registration list and registered InformalScience.org (ISDO) users. Both lists were compiled and cleaned to remove CAISE staff, project leadership, NSF program officers and duplicate contact information (e.g., cases where an individual was registered for both the newsletter and as an ISDO user). In total, the survey was shared with 8,446 emails of which 1,113 bounced or were returned resulting in 7,333 possible responses. The survey remained open for three weeks with two additional reminder emails going out to users who had not yet submitted responses. A total of 846 respondents completed the survey for a response rate of 11.5%. Note that the sample frame and the response rate likely yielded a “best case” scenario of individuals in terms of their familiarity with, and use of CAISE resources. Note also that respondents were free to skip questions, resulting in response rates that were generally lower than the final sample overall.

We briefly summarize the key takeaways from the summative survey data below. We will highlight additional findings from this survey in the next two major sections of this report. For more detailed findings, please see the full summative survey report in the appendix.

³ The data reported here are from an analysis of the descriptive statistics as well as sharing illustrative quotes from the open-ended survey items. As appropriate, we also ran analyses (e.g., independent sample t-test, ANOVA) to compare findings by different types of users (e.g., researcher versus practitioner, tenure in the field, NSF funding).

Key Takeaways

- The sample for this survey included respondents who varied across factors such as: professional identity (Informal STEM Learning & Science Communication), role (researchers & practitioners), years of experience in the field, organization type, geographic location, funding, employment status and demographics. While different perspectives are represented in the data and high proportions of certain characteristics (e.g., Informal STEM professionals) were expected, the findings still predominately reflect the responses of white women (60% of respondents) from the Informal STEM Learning (ISL) field.
- As would be expected from the sample frame, survey participants were generally knowledgeable of and reported accessing and reading CAISE/InformalScience.org (ISDO) activities, resources and communications.
- When further prompted, survey respondents generally reported average ratings with regard to their familiarity and engagement with CAISE/ISDO activities, resources and communications. Respondents were most familiar with the ISDO website and the CAISE newsletter.
- The sample who responded to this survey generally had not attended an AISL PI/Awardee meeting in the past.
- Overall, survey participants agreed that CAISE/ISDO was valuable to their work, other professionals in their field as well as the broader community of ISE and SciComm.
- Participants described using CAISE resources in the following ways: in conducting research and benchmarking, informing new projects and proposals, providing grounding in the field/staying up-to-date on the field, grant writing and literature reviews, a place to share work with others, and sharing resources with colleagues (informally or formally through workshops and professional development).
- When prompted to identify what resources are still needed in the ISE & SciComm field, the following emerged: ideas related to the informalscience.org website (improving navigation and accessibility, creating an evaluators' group, creating a clearinghouse for research synthesis), ideas related to CAISE-sponsored convenings (holding more for practitioners, fostering more peer-to-peer interaction), and new topics to cover, and making the CAISE culture less academic and more inclusive.
- Lack of representation, field-wide culture and norms, inclusive practices, resources/tools, professional learning and growth, and culturally response research and evaluation were identified by participants as the most salient issues regarding diversity, equity, access and inclusion (DEAI) for the ISE, SciComm and connected fields.
- The following were also recognized as resources or opportunities as related to centering equity and social justice in ISE and SciComm work: more dialogue and conversations; specific resource topics; types of resources; engagement strategies; time and funding; and leadership.

FINDINGS ON KEY CAISE STRATEGIES 2016-2022

In this section of the report, we briefly summarize the key findings related to the specific strategies CAISE employed in this phase of grant funding to connect, characterize, communicate and convene. We'll be discussing these in the fuller context of all of CAISE's work in the next section as well.

Task Forces

Task Forces have been a productive strategy for convening and connecting members of the ISE and SciComm fields, researchers and practitioners, and also for creating resources. Task Forces for the most part fulfilled the goals CAISE set out for them in the proposal. The Task Forces engaged diverse members of the ISE and SciComm fields representing both research and practice. They produced resources that drew from the expertise of the members and are being used and disseminated by the members as well as by professionals in the broader fields. In addition, the resources are seen as valuable by members of the CAISE core community. Task Force members benefited from their participation in the Task Forces. The Task Force work also strengthened connections between ISE and SciComm members, and the Task Force work led to spin-offs that will continue on. CAISE also engaged in disseminating these resources in new and different ways and learned from those efforts.

Task force members reported in a survey and in in-depth interviews that participating in the task force meetings over time led to strengthened connections and support for professional work. For example, overall, Task Force members generally agreed that they benefited from participating (4.14 on a scale from 1 to 5). In particular, it *strengthened connections* and *supported participants' professional work*. Task Force members interviewed noted that a major benefit of the Task Force work was the professional connections they made – personal connections as well as connections to a broader array of networks and organizations in other fields. Task Force members also mentioned benefitting from learning more about the focal topic of the Task Force work, the intersections between ISE and SciComm, and the perspectives of practitioners and researchers from different disciplines.

With regard to connections, participants described meeting new colleagues as a result of the work, pursuing project work together (e.g., serving on a project advisory board after meeting another Task Force member), invitations for meetings and symposia (e.g., one Task Force member inviting another to present at a meeting) and new collaborative work (e.g., Task Force members collaborating to design a conference).

Perhaps most importantly, the Task Force work and resources have led to spin-offs that are positioned to further the contribution of the Task Force work in the ISE and SciComm fields. We highlight three specific examples related to each of the three Task Forces that have emerged, where Task Force members have drawn on their participation to create new projects and conferences that will benefit the broader fields of ISE and SciComm. One is from a member of the Evaluation and Measurement Task Force who reported about a newly funded NSF research project on identity, interest and engagement; these topics were chosen specifically

because of being part of the Task Force. Another one is the development of the Inclusive SciComm conference which was created by one of the Broadening Participation Task Force members, in part because of her participation in that Task Force. Inclusive SciComm is a conference on inclusive science communication. This conference has been well-attended over the past several years and will now take place every other year. A third example comes from a participant in the Practice and Research Task Force. She recently received funding from the Association for Education in Journalism and Mass Communication (AEJMC) to support a small cohort of SciComm professionals in the early career stages to attend the AEJMC and Inclusive SciComm conferences who can serve as boundary spanners between ISE and SciComm. This idea was generated from the COHORT model conceptualized during the Practice and Research Task Force work.

Early challenges for Task Forces included less representation of SciComm. The interviews with Task Force members also highlighted a challenge in how to best maximize the distribution of Task Force resources, and what CAISE's role might be in addressing the longer-term needs of nascent communities of practice that emerge from dissemination efforts. The recommendations emerging from the interviews included having more clarity of purpose and goals up front, continuing to invite people to be members or informants who are at different stages of their careers, invite more people of color, ensuring the problem is well identified in a way that matters to both ISE and SciComm fields, continue to offer a stipend.

The resources created through the Task Forces are being used and are seen as useful by AISL PIs; this is particularly true of the Broadening Participation Toolkit and Identity, Interest and Engagement Interviews which have been out the longest of the three Task Force products. CAISE reported the following analytics in its annual report for each of the three Task Force products:

- Broadening Participation Toolkit: one of the top pages on the site with 2,132 pageviews and more than 7 minutes on average spent on the page (58.6% bounce rate)
- Project Planner and Funding Quiz: 891 and 786 pageviews respectively which is likely low due to difficulty navigating the site prior to the redesign
- STEM Identity, Interest and Engagement interviews:
 - Identity 1,384 pageviews and average of 2 minutes spent on the page
 - Project page had 483 pageviews
 - Engagement 348 pageviews
 - Interest 223 pageviews (did not rank in top 100 pages)

For PIs, in the 2019 six-month post follow-up survey administered to attendees of the 2019 AISL PI Meeting, 71% of the 70 respondents said they had used the Identity, Interest and Engagement Videos, while 74% said they had used the Broadening Participation Toolkit. (The Project Planner had not been released at the time of this survey).

To a lesser extent than for AISL PIs, the Task Force resources are also being used and seen as useful by the broader field. For example, the Summative Survey asked about familiarity and usefulness of resources:

- 19% of the field survey respondents said they were familiar or very familiar with the Broadening Participation Toolkit, while 22% of those familiar with this resource rated it as useful or very useful. The field was more familiar with the Broadening Participation Toolkit than other resources, such as the PI Guide for Managing Evaluation and the Public Participation in Scientific Research Report that have been available on the website for many years.
- 11% said they were familiar or very familiar with the Identity, Interest and Engagement Video, while 14% of those familiar with this resource rated it as useful or very useful.
- 6% of respondents said they were familiar or very familiar with the Project Planner resource, and 9% of those familiar rated this resource as useful or very useful.

In addition, in response to an open-ended question about their usage of CAISE resources, the following examples were provided related to the Videos and Toolkit.

- Respondents reported using the Identity, Interest and Engagement Videos for their own enlightenment and professional development, to inform current project work, in professional development work, and in articles and grant proposals. Examples include the following:

I was probably writing something about interest development and identity and found the interview with Nicole Pinkard enlightening. I am sure I revisited the interview more than once and then I remember quoting Pinkard in a proposal or an article or both. (ISE & SciComm, Both practitioner & researcher, more than 10 years in the field)

I also used the site on "What is STEM identity?" to consider how to approach measuring this in my research projects. (Both ISE & SciComm but more ISE, practitioner, 5-10 years in the field)

- Respondents reported using the Broadening Participation Toolkit for their own professional development, in work with colleagues at their own institution, in proposal development, and sharing it with other colleagues. Examples include the following:

I have used the Broadening Participation toolkit when having conversations with practitioner partners. Particularly the line about not telling families how to be in the museum space from one of those resources has really sat with me and informed my work since the toolkit came out. (ISE, researcher, 5-10 years in the field)

I have recently re-discovered the broadening participation resource. I have used it for a number of projects. For one project, we used it as part of conversations to discuss

broadening participation and what this means to us / definitions for the project. I also found the reflection questions helpful in thinking about the interview questions we wanted to ask participants about broadening participation. For another project, we used this document to reflect on broadening participation within the project and our group. We also used it to think about guiding team questions we want to use to reflect on our broadening participation questions. (Both ISE & SciComm but more ISE, researcher, more than 10 years in the field)

I used the Broadening Perspectives on Broadening Participation in STEM toolkit to facilitate discussions for colleagues at two institutions where I have worked. I also used it as a resource for a graduate school project that involved designing a community of practice around designing and facilitating inclusive STEM programs in the informal science education field. (ISE, practitioner, more than 10 years in the field)

Website/Communications

Over the past six years, the InformalScience.org website has remained a focal point of CAISE's work; one member of the External Review Board characterized the website as "CAISE's superpower." The repository now includes over 8,600 resources, and at least 346 new projects have been catalogued on the site during this grant phase. In addition, during this grant phase, CAISE began to provide free access to peer-reviewed journals via InformalScience.org. This has been important access for the field, particularly for practitioners that don't have university access to journals that are paywalled. In the last year, the website also underwent an update to improve navigation, landing pages and search functions (we were unable to collect evaluation data on the updates due to timing, but informal anecdotes indicate that the changes are being well-received by users.) AISL PIs routinely rate the quality and value of the website highly. For example, on the 2019 AISL PI Meeting follow-up survey, 77% of respondents rated the quality of InformalScience.org as high or very high, while 75% rated the value as high or very high.

In addition, data from the Summative Survey shows that InformalScience.org was among the highest rated resources in terms of familiarity for the field, with 54% of Summative Survey respondents rating themselves as familiar or very familiar with ISDO. Just over half of respondents (52%) rated the website as useful or very useful.

- When asked specifically about the ISDO website, a majority of respondents (59%) visited ISDO at least several times a year with a small proportion (16%) visiting at least once per month (Figure 15).
- There were differences when we made comparison by groups: those with prior or current AISL funding visited more frequently than those who without AISL funding, those with more than 10 years in the field visited more frequently as compared to those with less than 5 years or 5-10 years of experience, and those who identify as "researcher" or as "both researcher and practitioner but more as a researcher" visit more frequently than those who do not identify as "either a researcher or practitioner."

- When this was compared against the earlier question related to overall engagement, higher frequencies of visiting the ISDO website were significantly positively correlated with higher levels of overall CAISE engagement and the strength of the relationship is large ($r = .70$).

In response to an open-ended question about the usage of resources, ISDO was the resource respondents shared the most examples of usage for. Respondents shared examples of searching the website when they are preparing proposals and literature reviews, writing articles, and when they are beginning new projects. Categories of open-ended responses related to usage of InformalScience.org included the following ways respondents identified using the website:

- informing their work
- staying up-to-date on current work in the field
- sharing the website and resources on the website with colleagues and clients,
- using it in their teaching
- sharing their work with others, through posting their projects and reports, and encouraging others to do so.
- accessing EBSCO
- using “tools” found on InformalScience.org in professional development they are leading
- finding specific expertise in the field
- finding evaluation tools and instruments
- finding out about funding

Other important updates to the website and communications strategy that emerged in this grant phase include the commitment to use the website strategically to uplift equity through an anti-racism response that includes a statement in response to systemic racism-related events, the identification of anti-racist resources that were identified and vetted by CAISE staff and co-PIs, and the identification and amplification of BIPOC voices, through interviews with BIPOC leaders that became blogs, sharing BIPOC STEM events and resources through social media, and following BIPOC events and trends on social media.

The CAISE Newsletter has been a key mechanism for communicating with the broader field and was the highest rated resource in terms of familiarity among field survey respondents, with 55% of Summative Survey respondents rating themselves as familiar or very familiar with this resource. Respondents used the CAISE newsletter/blogs primarily for staying up-to-date on the informal STEM education field. Examples of usage include the following:

I review CAISE blog and newsletter resources to learn how ISE is described nationally, and to capture the latest around the country and with particular focus on NSF-funded work. (ISE, researcher, more than 10 years in the field)

The CAISE newsletter has been a lifeline for me in transition between organizations. It has kept me connected with the most important developments and connected current world events to the work in my museum. (Both ISE & SciComm but more ISE, practitioner, more than 10 years in the field)

Many articles in the newsletter often provide the catalyst for us to initiate a discussion on a topic that when refined will become the basis for either our public or school programming and from time to time direct us to additional information and support material. (Both ISE & SciComm, practitioner, more than 10 years in the field)

The newsletter and blogs are very helpful in keeping abreast of AISL projects and looking for synergies. The newsletter also is a great place to publish findings from my own work through blogs to inform the field. I have had people get in touch with me after reading the blogs in the newsletter to learn more about the work that we are doing. The CAISE team has been very collaborative and supportive in facilitating and discussing topics of interest for the field. (Both ISE & SciComm, Both researcher & practitioner, more than 10 years in the field)

CAISE has also increased its social media presence throughout this grant period, primarily through Twitter.

Year in ISE

The Year in ISE was a strategy CAISE implemented in this grant phase to share current trends, events and publications for the year for specific sectors and categories of the ISE field (such as citizen science, media, public science events, etc.). To create this resource, CAISE reached out to community informants in each of these specific areas to create a slideshow (to allow users to be able to pull slides and use them) that included data, trends and geographic locations of key work, select publications, resources and other notable moments, and DEIA efforts.

Of the Summative Survey data respondents, only 10% indicated they were familiar or very familiar with this resource. Examples of usage of this resource provided by Summative Survey respondents included the following:

I've used the year end informal science slide presentation and shown this to my staff. (ISE practitioner, more than 10 years in the field)

As a PhD student interested in informal science learning, I use the "year in informal STEM education" slides to figure out what/who is relevant in the field, to understand how people are communicating their work, and to gather inspiration for the research work that I do (ISE, both a researcher & practitioner, 5-10 years in the field)

This has not been a highly-utilized resource over the years, and the work that goes into preparing it was a heavy lift for CAISE staff. It did, however, represent an important opportunity

for CAISE to reach out to people throughout the ISE field to get a sense of current trends and activities, and in that sense, it was helpful to CAISE. CAISE staff also tended to work with a known set of informants and could have probably benefitted from developing specific criteria for connecting with people to move beyond the known informants.

AISL PI Meetings

The AISL PI Meetings CAISE offered in this grant phase featured innovation and equity. Over this grant phase, they have re-tooled the poster session to help build connections among and between projects and have also worked diligently to diversify the speakers and presenters. They also incorporated more activities into the whole group settings (instead of just panels and presenters) to encourage not only digging into the tools and resources created by CAISE in this award period but also to encourage more connections among participants. And they invited community partners to attend the 2021 meeting alongside project PIs, and held their first-ever virtual meeting. Attendees have reported they value learning about the ISE field, the diversity in the AISL portfolio, making connections with other PIs that lead to future collaborations (on new proposals, advisory boards, and papers and articles), and connecting with their NSF Program Officer and other federal funder representatives. The meetings in 2016 and 2019 were the highest rated meetings in terms of quality and value by attendees.

Equity Audit

In the last two years of this grant funding period, CAISE has engaged in an internal equity audit. The audit has involved utilizing the Equity in the Center framework, a review of historical documents and processes, involvement of an Equity Audit Advisory Committee, and a focus on the 2021 Awardee Meeting to review CAISE's equity lens and practices, and identify strengths, weaknesses, opportunities for growth, and make recommendations for CAISE on deepening its equity lens and practices. The report from the audit is being completed now, and one key finding is a need for greater transparency, particularly with regard to documenting and sharing CAISE's decision making and work processes. This audit may serve as an important model for other resource centers in reflecting on their own equity lens and practices.

External Review Board

The External Review Board (ERB) as a mechanism for evaluation was proposed for this phase of grant funding as a way to meld the functions of an advisory board and bring outside expertise to the external evaluation functions. Specifically, the ERB brought perspectives and expertise to the complexity of how to evaluate a resource center, as well as expertise in improvement infrastructure, center-level evaluation, field-building, evidence-based policy, ISE and SciComm, and the three focal areas of work for this phase of funding: broadening participation, evaluation and measurement and research and practice.

The ERB was conceptualized as a kind of hybrid that bridges an advisor and evaluator function, helping to serve as an advisory board, an evaluation design group, and a reflective think tank for the center. The ERB over this grant funding period has provided valuable feedback, both about the work of the project, and the underlying rationales for the design, implementation and dissemination of the key work of CAISE in this round, and in helping the project to articulate critical claims and synthesize evaluation findings. We share their reflections on CAISE in the final section of this report.

In terms of lessons learned about this model for evaluation, it has been difficult to balance both functions of project and evaluation advisor. Early on, the ERB functioned more as a project advisor than evaluation advisor. The ERB is also comprised of a very busy group of people -- it would have been helpful to meet more frequently but scheduling was difficult. We also found that since each individual member brought different expertise to the table that was difficult to fully tap into in whole-group meetings, we found it helpful to restructure the work with small subsets of ERB members around specific aspects of the evaluation.

REFLECTIONS ON CAISE

In this section of the report, we present our final wholistic overall assessment of CAISE, based on 14 years of observations, interviews and surveys of PIs, participants in CAISE activities, and broader members of the field; input from the External Review Board in the last six years; and ongoing discussions with the PI, Co-PIs and staff over the years.

CAISE as a Center

In the 2009 RSV, in year two of CAISE's existence, Inverness Research outlined thoughts about CAISE as a center, based on years of evaluating centers and observing how they evolved overtime.

As we outline in the Value of CAISE Over Time section of this final evaluation report, CAISE advanced the field across all of the areas that were identified as the purposes of centers:

- A center is at the center of a domain or field
 - o The center and the field co-evolve
 - o They mutually define and strengthen each other
- A center supports multiple complementary strands of work that contribute to the mission of the center (and vice versa)
- A center seeks to advance the domain or field by
 - o Generating new work or research
 - o Adding value to existing work or research
 - o Building long-term capacity in the forms of enhanced leadership, knowledge, relationships, structures, resources and policies
 - o Creating a supportive context or environment for work or research

CAISE is a Center funded within the Division on Research and Learning. The investment NSF made in all of the Centers within DRL that support various program areas are different from investing in a project. These resource centers are a value-added proposition, intended to enhance and amplify the effectiveness and reach of NSF-funded projects. They are meant to serve the PIs of the funded projects, as well as the specific programs within the DRL, and in CAISE's instance (more so than with the other DRL Centers), it aimed to strengthen and connect the entire ISE field. Over its lifetime, the emphasis on serving the PIs and projects as the leading edge vs. field-building as the leading edge shifted (see below for more on this), but the work of CAISE always drew on the PIs and projects and shared the learnings from that work back out to the field. The structures and modes of work, such as small convenings and PI meetings, allowed NSF Program Officers to learn more about the funded projects, in more depth and in the context of the broader work happening in the portfolio.

In addition, in the 2009 RSV, we also shared thoughts about the identity and operation of centers, which included:

- A center has its own identity; it becomes its own entity
- A center has its own leadership and governance structures

- The interest of the center transcends interests of the members of the center
- A center is a dynamic, growing and evolving entity
- A center provides a long-term infrastructure for the improvement of the domain or field

In the early years of CAISE, leadership was focused appropriately on its vision for the identity and operation of the resource center. This included working to create a shared vision, how to structure its work among the PI, co-PIs, staff and the steering committee, and the structure and nature of the working relationship with NSF. CAISE was also focused on carrying out the early strands of work – a landscape study, inquiry groups, white papers that helped to characterize the field in specific areas, a framework for analyzing the portfolio of ISE projects, a new website, PI meetings, and a Fellows program. The lessons learned and evaluation findings from this early work, as well as findings from the landscape study and input from NSF, informed CAISE as it continued to strive for a shared vision for advancing the field that would provide better clarity of the relationship between CAISE, NSF and the field, and help CAISE refine and bound a manageable scope of its activities. The decision-making processes – among PIs, the steering committee and NSF – were also clarified. It was during this time that CAISE and the NSF ISE program established a cycle of interaction and iteration that helped CAISE develop an approach that leveraged the ISE and AISL program portfolio as lens on to the wider ISE field. The structure of CAISE’s relationship with NSF evolved over the years in response to both CAISE and the ISE/AISL program’s needs for input, information and support. This took the form of sometimes more and sometimes less direct involvement of NSF program officers on various aspects of CAISE work. Ultimately CAISE evolved to become an entity in collaboration with NSF, shaped by the cooperative agreement to provide long-term infrastructure and resources for advancing the field.

In the 2009 RSV, we also shared thoughts about the modes of work of centers, which included:

- A center can convene the field, better connect the field, create community and organize field-wide efforts
- A center can broker connections
- A center can generate, disseminate knowledge
- A center can import expertise, research, knowledge, and resources that serve the entire field
- A center can promote the field, educating public audiences and policymakers about the contributions of the field

As CAISE evolved as a center over time, these strands of work were solidified into a theory of action focused on four central roles/overlapping modes of work: convening, characterizing, connecting and communicating which were grounded in ISE work happening in the projects and in the field. For example, convenings helped to characterize the state of the field, and also led to stronger connections among and between participants and to future collaborations. The findings from convenings were shared with the broader field through CAISE’s communication functions in the newsletter and on the website. The learnings also contributed to the growing repository on informal.science.org, and strengthened the CAISE team’s knowledge of what work

was happening in the field, enabling them to make further connections. (We discuss each of these roles in more detail in the next section of this report). CAISE has played less of a role in influencing policymaking directly.

CAISE's Roles

CAISE's Theory of Action has evolved over the years, but has settled in this last grant phase on the following:

IF CAISE:

Convenes those working across informal STEM education sectors and settings; connects people and related work; characterizes the state of the field with regard to trends, topics and approaches through the collection and curation of project examples, scholarship and evaluation reports; and communicates what it learns and creates to the wider field

THEN CAISE:

Will advance practice, research and the development of knowledge in informal STEM education, science communication and engagement.

In this section of the report, we examine the four Cs -- connect, communicate, characterize and convene -- and highlight the ways in which these roles have helped to strengthen the field, and the lessons learned relative to these roles.

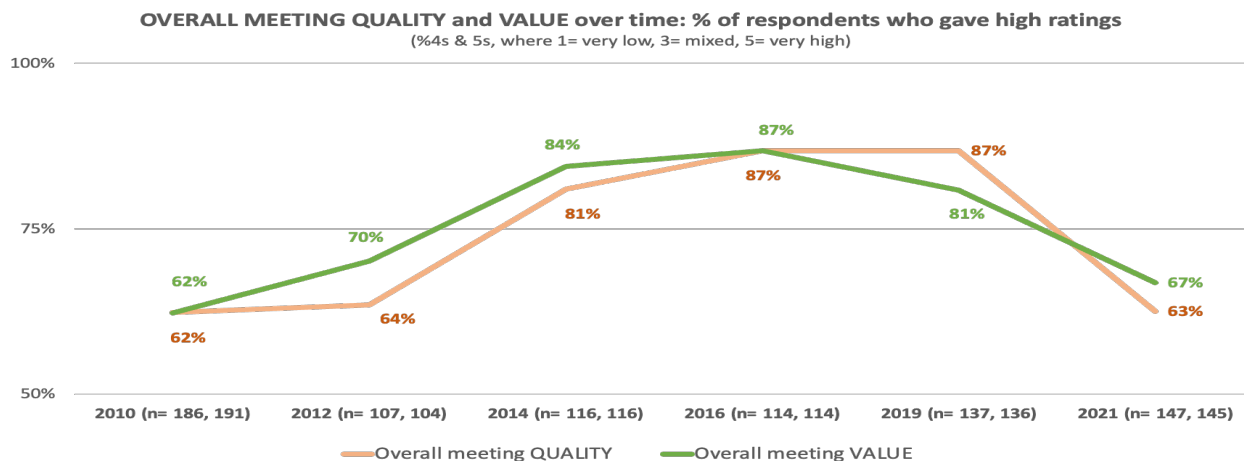
In CAISE's current theory of action, "**Connect**" is defined as linking individuals or institutions in and across ISE and SciComm and other associated or related fields, for the explicit purpose of creating novel or otherwise not likely-occurring connections. "**Communicate**" is defined as sharing learnings from individuals and institutions in the ISE and SciComm fields and sharing the resources CAISE creates with the wider field. "**Characterize**" is defined as describing, illustrating, highlighting the state of the ISE and SciComm fields with regard to trends, topics and approaches, through the collection and curation of project examples, scholarship and evaluation reports. And finally, "**Convene**" is defined as bringing together individuals or institutions in and across ISE and SciComm, and other associated or related fields, for the purpose of accomplishing particular goals.

CAISE has always played important **convening and connecting functions** for the field, through PI meetings, inquiry groups and task forces, and through small convenings around specific topics of interest to the field. It has also brokered connections over the years, between the formal and informal domain, between researchers and practitioners, between and across sectors of work in the ISE domain, and in the final phase of funding, between informal science education and science communication. In particular, CAISE leadership has played an important role in brokering connections between CAISE and the informal science education field with the

broader fields of STEM education and science communication, representing CAISE and the field at conferences and fostering connections through emails and phone calls every day. Also, CAISE’s presence at events, conferences, the website, etc., brought visibility and stature to CAISE work, informal.science.org, and the informal STEM education field. Other efforts to catalyze and sustain connections through forums on the website were not continued past the first two award periods, primarily because these functions were better served by others and because of the finite capacity of staff to monitor and foster productive conversations. This is one example of how CAISE has experimented and iterated with NSF over the years to identify and operationalize the most productive, value-added strategies for field-building.

We think CAISE has been particularly effective in its convening role. CAISE is uniquely positioned to gather people across the whole field in different configurations for different purposes, including practitioners and researchers, and ISE and SciComm professionals. It has held small convenings on focused themes (e.g., professional development, networks, media in ISE). The small convenings were all highly rated for their value to attendees, and gained value when they resulted in products or resources (like the Task Force resources in this round of funding) that could be used by the entire field. Task Force members from this last phase of grant funding spoke in interviews with us of the importance of CAISE convening Task Forces that allow diverse professionals to come together to explore important issues and find solutions. CAISE, through its convening and connecting functions, provides space and time for professionals to come together to address topics of high interest, importance and need that they do not have time to address in their daily jobs.

In addition, the PI meetings have been valuable to the field and we believe to the NSF AISL program. Data from post-PI meeting surveys since 2010 have highlighted the important role these meetings have played in helping PIs learn about the diverse portfolio of work among the AISL projects, and about NSF’s priorities and funding opportunities; have helped attendees make new connections that have led to future work (e.g., proposals, advisory boards, articles); and helped PIs connect with their Program Officers and other funders. As the chart on the following page indicates, the majority of PI meeting attendees have rated the PI meetings as high or very high quality and value.



CAISE has also been responsive to feedback from the post-meeting surveys and has used these meetings as opportunities to innovate. They held an ISE Summit in 2010 instead of a traditional PI-only meeting that invited a broader group of professionals to participate in response to comments from meeting attendees that more people could benefit from participating, and in 2021, invited community partners involved in AISL projects to participate in the meeting and held a virtual meeting. They have worked to diversify the speakers and presenters, “beyond the usual suspects” and to represent the breadth and diversity of the field. They have also tweaked the poster sessions to try to increase connection making and sharing time, and moved to include more interactive whole group sessions, beyond the standard presenters and panels.

CAISE, throughout its lifetime, through its **characterizing and communicating functions**, has focused much of its work on disseminating knowledge, initially through the CAISE newsletter which has been in place since the first round of funding. The newsletter list is currently in the 8000s, and the newsletter is one of the resources the field is most familiar with and finds most useful. Over time, CAISE has adapted and refined its newsletter.

Characterizing and communicating particularly ramped up once the consolidated informal.science.com website was launched, and with the access to the EBSCO database of research CAISE provided to the field through the website, which helped level the playing field, particularly for ISE professionals who work outside of universities. The spotlights and blogs highlighted AISL projects and activities, as well as conferences of interest for the field. The project pages, evaluation and research repositories have also been accessed and used by the field. The website has been a critical and important investment of CAISE. The website brought together multiple previous single investments into one website for the field, and now houses over 8,600 resources in its repository. CAISE has generated knowledge for the field through creation of products, including white papers, landscape studies, guides, and toolkits. And CAISE has promoted the work of the informal science education field, through participating in a variety of conferences every year and sharing the work of the field, and through the website which is linked on other websites.

The website is seen as high quality and high value -- by AISL PIs as well as the broader field. We have heard consistently over the years from survey respondents and interviewees about the value of having “one stop access” to resources pertaining to the entire ISE field. We also heard that it represents a place for ISE professionals to share their work with the broader field as well. Our surveys and interviews over the years have highlighted that the resources available on ISDO are used in many different ways -- for literature reviews, as projects are being planned to gain insight into what work and learning has come before, for evaluation and assessment tools and strategies, in college classrooms, in work with clients and in proposal writing.

From inquiry groups to initiatives to task forces, CAISE has employed different strategies for bringing diverse groups of professionals from the broad spectrum of the ISE and SciComm fields together to examine important strategies, questions, and themes of common interest. Most of these different types of groups have created tools or resources for the field -- e.g., papers, web-

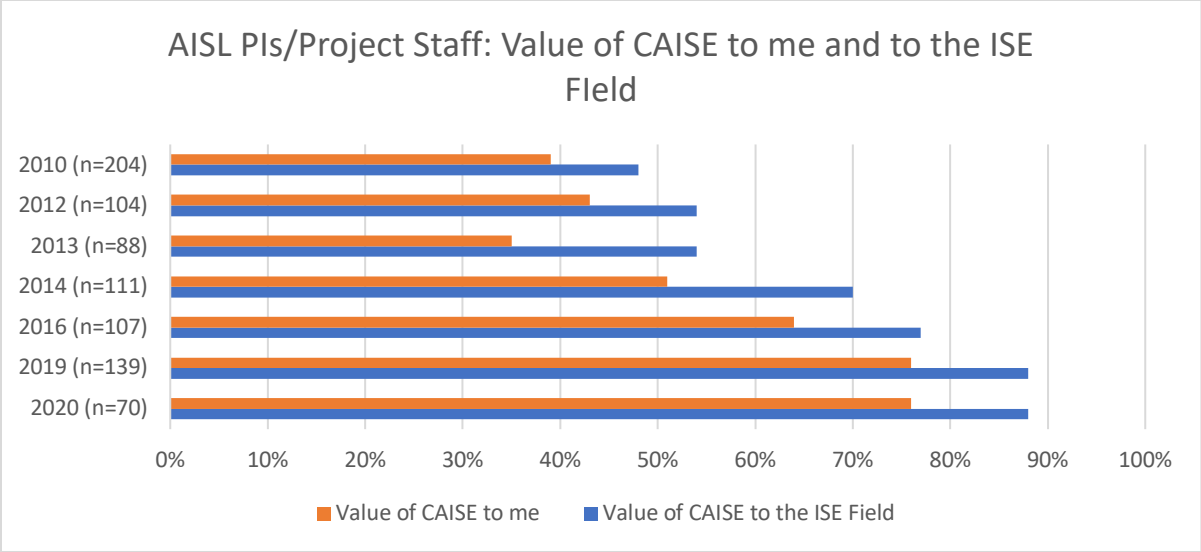
based documentation, video interviews, toolkits -- that are accessible for the field in perpetuity on ISDO. Importantly, in the last round of Task Force work, CAISE was more able to effectively share and amplify these products beyond the CAISE website and newsletter. For example, CAISE facilitated workshops to help ISE and SciComm professionals understand the Broadening Participation Toolkit and how they might utilize these tools, and these resources were also heavily featured in the NSF INCLUDES project forums. The Identity, Interest and Engagement videos were shared multiple times through the STEM for All Multiplex webinar series and were some of the most popular of the monthly themes. We think it is important that CAISE experimented with different strategies for getting word of these resources more widely spread throughout the field, and trying to ensure that these resources would be used. And we saw evidence of their take up in the findings from the post-workshop surveys for the Broadening Participation Toolkit, in the post-evaluations of the STEM for All Multiplex webinars, and in the findings from the AISL PI Meeting follow-up survey and Summative Survey of the field.

An important part of characterizing the field is keeping up with common trends, events, and what's happening in the field, and quickly capturing and synthesizing that for the field. From the Interactive Timeline of ISE to the YEAR in ISE, CAISE has tried various strategies for doing this in a robust and systematic way; there has not been evidence of great usage of these tools and keeping things fresh and up-to-date takes time and resources. However, we would argue for the array of resources on InformalScience.org that, beyond usage, there is value in the opportunity to draw on these resources, in having them available in one place.

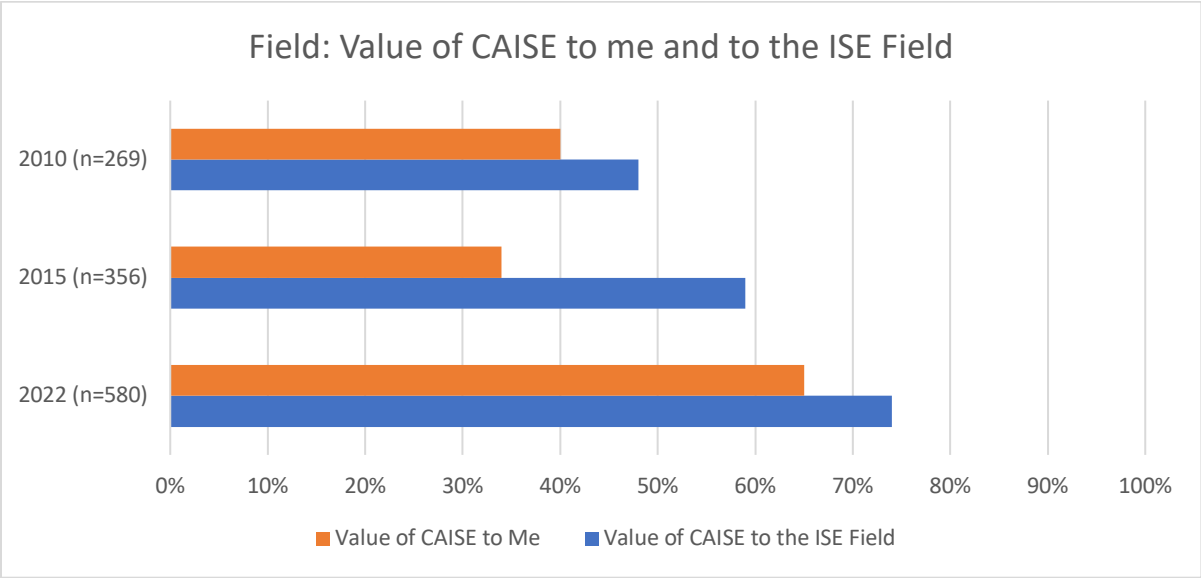
CAISE's Value and Role in Strengthening the ISE Field

The Value of CAISE Over Time

Importantly, longitudinal data collected from PIs and the field over the lifetime of CAISE highlight that the value of CAISE to PIs and the field has grown over time. As the graphs on the following page show, respondents to surveys over time from both PI and field groups see value in CAISE to themselves as professionals, as well as to the broader field of ISE, and see greater value to the field than to themselves.



Percentage of PIs who rated this question a 4 or 5 on a five-point Likert scale where 1 = very low, 2 = low, 3 = mixed, 4 = high and 5 = very high. All data from questions asked on post-AISL PI Meeting surveys except for 2013 and 2020 which were in non-PI meeting years.



Percentage of Summative Survey respondents who rated this question a 4 or 5 on a five-point Likert scale; in 2010/2015, the five-point scale was 1 = very low, 2 = low, 3 = mixed, 4 = high and 5 = very high; in 2022, the five-point scale was 1= strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree and 5 = strongly agree. As the scales indicate, the questions shifted slightly from the 2010/2015 surveys to the 2022 survey. The 2010/2015 surveys asked What is the overall value of CAISE to you? What is the overall value of CAISE to the ISE Field? The 2022 survey asked respondents the extent they agreed or disagreed with the following statements: CAISE/InformalScience.org adds value to my professional work, and CAISE/InformalScience.org is useful to other professionals in my field.

We posit that CAISE has successfully fulfilled its connecting, characterizing, communicating and convening roles, and we have some evidence that in doing so, CAISE has built capacity in the field and strengthened it. In year two of CAISE, we posited key dimensions of strengthening the ISE field. These dimensions included leadership development and support; knowledge generation, sharing and dissemination; internal relationships and connections, community and identity; and external relationships, education and communication.

In terms of leadership development, CAISE has helped to develop new leadership for the field -- through the Fellows program in the early days of CAISE, some of whom are active in leading strands of work in the field today, to the more recent Task Force work that has helped stimulate new work in the ISE field being led by Task Force members.

Knowledge generation, sharing and dissemination is perhaps the area where CAISE has had the greatest influence in strengthening the field. In addition to making accessible over 8,000 resources for the field, over its lifetime, CAISE has identified and inquired into important strategies, questions and work in the field (including public participation in research, broadening participation in ISE and STEM, formal and informal STEM education partnerships, research and practice, evaluation, common measures, etc.). CAISE has also elevated evaluation through sharing of resources, a PI Guide for Managing Evaluation, and the Identity, Interest and Engagement Videos. In doing so, it has also helped to synthesize and distill knowledge for the field. The two baseline studies in this grant funding period (the SNA study and the bibliometric study) also provided insight for CAISE as it began its work bridging ISE and SciComm, and for the field. And importantly, as we reviewed the data we have collected over the years, CAISE is consistently seen as a trusted resource and the resources it provides are viewed as high-quality.

Enhancing internal connections and relationships is another area where CAISE has strengthened the field. Data from years of post-PI meeting surveys and interviews with members of the field both highly involved in CAISE work and those farther out highlight the new connections and collaborations that come from being involved in CAISE activities and work. In this last round of funding, the connections between ISE and SciComm were strengthened and have continued in some cases (we'll discuss this more in the next section of this report). Task Force members we interviewed spoke of the value of CAISE and its work to the ISE and SciComm fields, because CAISE serves as an intersection point for so many different types of people, sectors, and roles in the fields.

And finally, in terms of external connections, we also believe that the resource center serving as a "one-stop" connection point not only benefits the people working in the ISE and SciComm fields, but also communicates the work of the field to a broader audience and helps to facilitate the ISE and SciComm's fields connections with the broader external world of STEM education. Having one website to connect with makes it easier for the broader STEM education field to connect with ISE and for ISE to be seen and recognized in the external STEM education world. For example, CAISE is linked on numerous others' sites (such as STEM education professional associations, university websites' lists of STEM education resources, and as an "influential science education group" on the Science Literacy Foundation site).

Two members of the External Review Board commented on the importance of CAISE and the key role it has played in supporting and strengthening the ISE field:

What you all have accomplished with CAISE over the last 10+ years has been groundbreaking and a model for public-private partnership on how to truly give structure to a field and its knowledge in a way that values both the practitioner and academic experience, AND collates the investments of federal funders... There are more agencies and funders that need this service and knowledge.

(CAISE has) gone from being a simple database of publications to a multi-faceted field-wide knowledge hub, and always committed to increasing its value by responding to and diversifying the field.

Because of CAISE

Another way to examine the role of CAISE in strengthening the field is to examine what exists now, what is different now, than when CAISE first started. For some of the items in the list, CAISE has played a key role and had more of a stronger influence; for others, CAISE has helped shape the conversation.

ISDO fulfills a central role in creating an ISE identity and a sense of there being a legitimate field:

- The platform preserves the history of ISE and serves as archive for the field. It also serves as a connector, featuring professionals in the field and in this way characterizes the community. It is also the only institution for many practitioners and projects to present themselves and their work to a larger community.
- Practitioners come in contact and can find research: as repository ISDO serves as a translational hub for research/practice interactions.
- ISE professionals use CAISE to share their work with the entire field; CAISE is a unique outlet that is not rooted in traditional practice or research fields.

The **leadership structure of CAISE** signaled the importance of, and appreciation for practitioners' perspectives and wisdom of practice that is central to ISE. The CAISE PI has always been a practitioner and the leadership has always had practitioners as part of it.

The **integration of ISE and SciComm** progressed:

- AAAS SciComm sessions include ISE representatives on their panels.
- Inclusive SciComm was triggered by a CAISE Task Force.
- New AISL PIs and Co-PIs were recruited from SciComm.

Through its PI/awardee meetings, task force and working group convenings and webinars, CAISE provided the field of ISE/SciComm a **unique opportunity to come together across subdisciplines. Citizen Science** became elevated and embedded within ISE through early CAISE efforts.

Three **Inclusive SciComm** Symposia were hosted by the Metcalf institute of the University of Rhode Island, in 2019, 2020 and 2021. The symposium was at least partially generated as a result of CAISE Task Force work.

CAISE likely played a role in **creating awareness** around ISE as profession across the directorates at NSF (e.g., around Broader Impacts). As a long-standing resource center, CAISE may have served as a model, advisor, and inspiration for emerging NSF initiatives centers such as ARIS, INCLUDES, etc.

A broad discussion in ISE around **common measures and a joint research agenda** was guided and document by CAISE, which led to more realistic expectations around shared measures and research directions.

CAISE, through facilitating the Infrastructure Coordination Roundtable, served as **a catalyst for ISE-wide coordination and connecting around critical infrastructure**.

CONCLUSION

CAISE is valuable infrastructure for the ISE field. CAISE is a trusted resource that has added greatly to the ISE and SciComm fields by providing a platform for the field to share resources, providing access to research, evaluation and project reports and articles, fostering connections and collaborations within the field, creating new resources and tools for the field, creating opportunities for the field to examine critical issues and strategies, and sharing the work of the ISE field to the external world. CAISE PI, Co-PIs and staff have worked diligently to continuously improve their work, through evaluation, ERB meetings, NSF and RSV panel guidance and feedback, internal processes, such as the recent Equity Audit, and interactions with and direct feedback from the field.

APPENDIX A

2022 CAISE Summative Evaluation Survey Report

2022 CAISE Summative Evaluation Survey Findings

August 2022

The survey was designed to understand overall engagement with CAISE and ISDO and gather input on needs and interest in equity-oriented resources. The data reported here are from an analysis of the descriptive statistics as well as sharing illustrative quotes from the open-ended survey items. As appropriate, we also ran analyses (e.g., independent sample t-test, ANOVA) to compare findings by different types of users (e.g., researcher versus practitioner, tenure in the field, NSF funding).

The survey was distributed through Qualtrics via an initial survey invitation to a list compiled from the CAISE newsletter registration list and registered InformalScience.org (ISDO) users. Both lists were compiled and cleaned to remove CAISE staff, project leadership, NSF program officers and duplicate contact information (e.g., cases where an individual was registered for both the newsletter and as an ISDO user). In total, the survey was shared with 8,446 emails of which 1,113 bounced or were returned resulting in 7,333 possible responses. The survey remained open for three weeks with two additional reminder emails going out to users who had not yet submitted responses. A total of 846 respondents completed the survey for a response rate of 11.5%. Note that the sample frame and the response rate likely yielded a “best case” scenario of individuals in terms of their familiarity with, and use of CAISE resources. Note also that respondents were free to skip questions, resulting in response rates that were generally lower than the final sample overall.

Key takeaways:

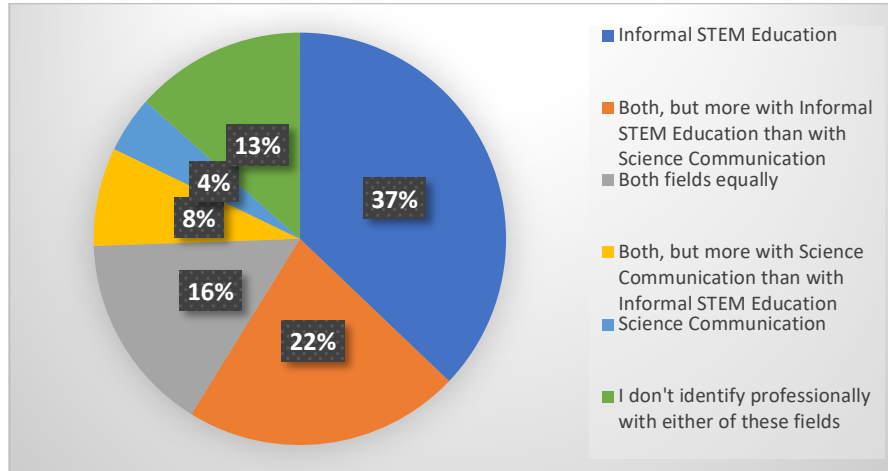
- The sample for this survey included respondents who varied across factors such as: professional identity (Informal STEM Learning & Science Communication), role (researchers & practitioners), years of experience in the field, organization type, geographic location, funding, employment status and demographics. While different perspectives are represented in the data and high proportions of certain characteristics (e.g., Informal STEM professionals) were expected, the findings still predominately reflect the responses of white women (60% of respondents) from the Informal STEM Learning (ISL) field.
- As would be expected from the sample frame, survey participants were generally knowledgeable of and reported accessing and reading CAISE/InformalScience.org (ISDO) activities, resources and communications.
- When further prompted, survey respondents generally reported average ratings with regard to their familiarity and engagement with CAISE/ISDO activities, resources and communications. Respondents were most familiar with the ISDO website and the CAISE newsletter.
- The sample who responded to this survey generally had not attended an AISL PI/Awardee meeting in the past.
- Overall, survey participants agreed that CAISE/ISDO was valuable to their work, other professionals in their field as well as the broader community of ISE and SciComm.
- Participants described using CAISE resources in the following ways: in conducting research and benchmarking, informing new projects and proposals, providing grounding in the field/staying up-to-date on the field, grant writing and literature reviews, a place to share work with others, and sharing resources with colleagues (informally or formally through workshops and professional development).

- When prompted to identify what resources are still needed in the ISE & SciComm field, the following emerged: ideas related to the informal.science.org website (improving navigation and accessibility, creating an evaluators' group, creating a clearinghouse for research synthesis), ideas related to CAISE-sponsored convenings (holding more for practitioners, fostering more peer-to-peer interaction), and new topics to cover, and making the CAISE culture less academic and more inclusive.
- Lack of representation, field-wide culture and norms, inclusive practices, resources/tools, professional learning and growth, and culturally response research and evaluation were identified by participants as the most salient issues regarding diversity, equity, access and inclusion (DEAI) for the ISE, SciComm and connected fields.
- The following were also recognized as resources or opportunities as related to centering equity and social justice in ISE and SciComm work: more dialogue and conversations; specific resource topics; types of resources; engagement strategies; time and funding; and leadership.

Survey Participant Characteristics

Professional Identity (n=544)

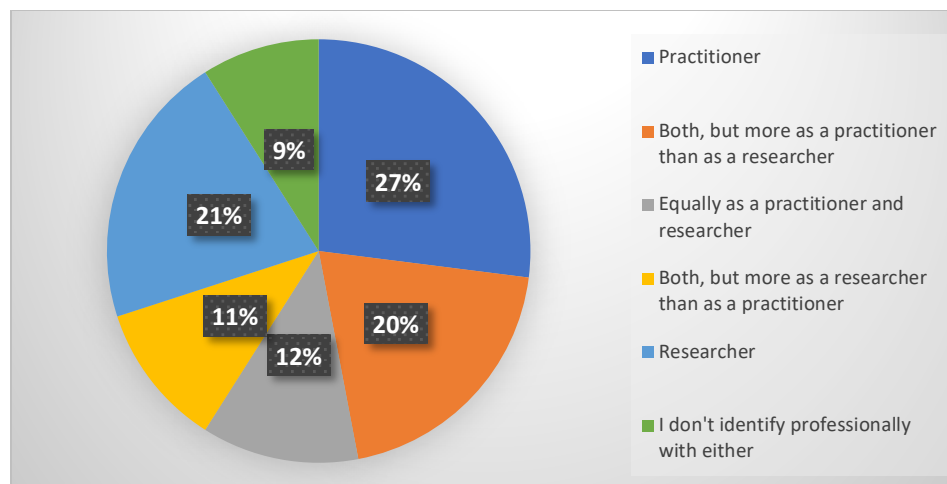
Figure 1. Professional Identity



- The sample represented a majority of ISE professionals, with more than half (59%) identifying primarily with ISE. About 12% total of survey participants identified primarily as a SciComm professional. A portion of survey respondents (16%) identified professionally with both fields (Figure 1).
- Participants who selected the option “*I don't identify professionally with either of these fields*” were prompted to indicate the field with which they do professionally identify. “*Environmental educator,*” “*retired,*” and “*evaluation*” or “*evaluator*” were responses mentioned by more than one participant. Other respondents indicated they were social science researchers (e.g., psychologist, anthropologist), scientists (e.g., evolutionary ecologist, applied physics), formal education professionals, or involved with adjacent fields (e.g., librarian, museum fundraising).

Professional Role (n=543)

Figure 2. Professional Role



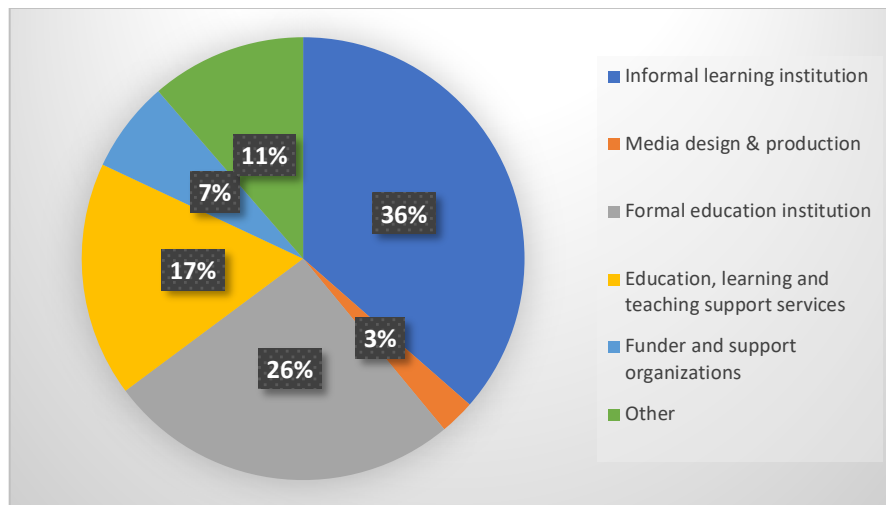
- The sample was nearly even with regarding to both practitioner and researcher audiences. Nearly half (47%) identified either exclusively or primarily as a practitioner while the percentages for researchers was about 42%. A small proportion of the survey respondents (12%) identified equally as practitioner and researcher (Figure 2).
- Survey participants who selected “I don’t professionally identify with either” were prompted to specify how they identify professionally. “Evaluator,” “consultant,” “retired,” “fundraiser” and “grant writer” were common responses or mentioned by more than one participant.

Years of Experience in the Field (n=543)

- Most survey participants (71%) had more than 10 years of experience in their field, 20% had 5-10 years of experience, and fewer than 10% of survey participants had less than 5 years of experience.

Organization Type (n=705)

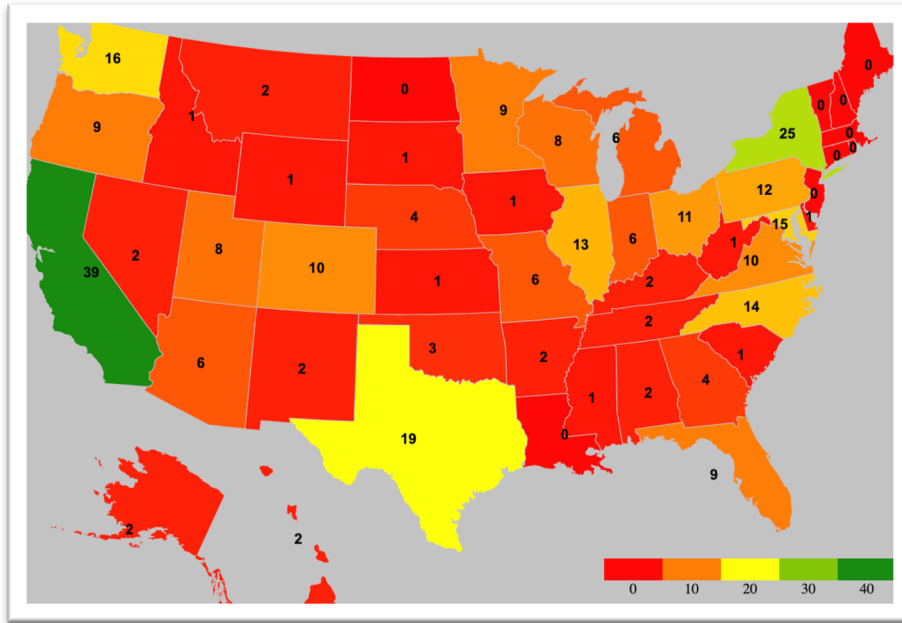
Figure 3. Organization Type



- About a third of respondents were from “informal learning institutions” and about a quarter were from “formal education institutions”. The remaining participants represented “education, learning and teaching support services,” “funder and support organizations,” and “media design and production” (Figure 3).
- Survey respondents who selected that none of the categories reflected their organization were asked to specify the type of organization for which they worked. As with the earlier survey items, “retired” and “consultant” were common responses. Other organizations described included “non-profit organization,” “NGO,” and “federal agency.”
- For most of these organizations (79%), STEM is a major focus of the organizations work while for the remainder (21%), STEM is a minor focus.
- Survey participants represented organizations from across the country, with high responses from California, New York, Texas and Washington, as depicted in the heat

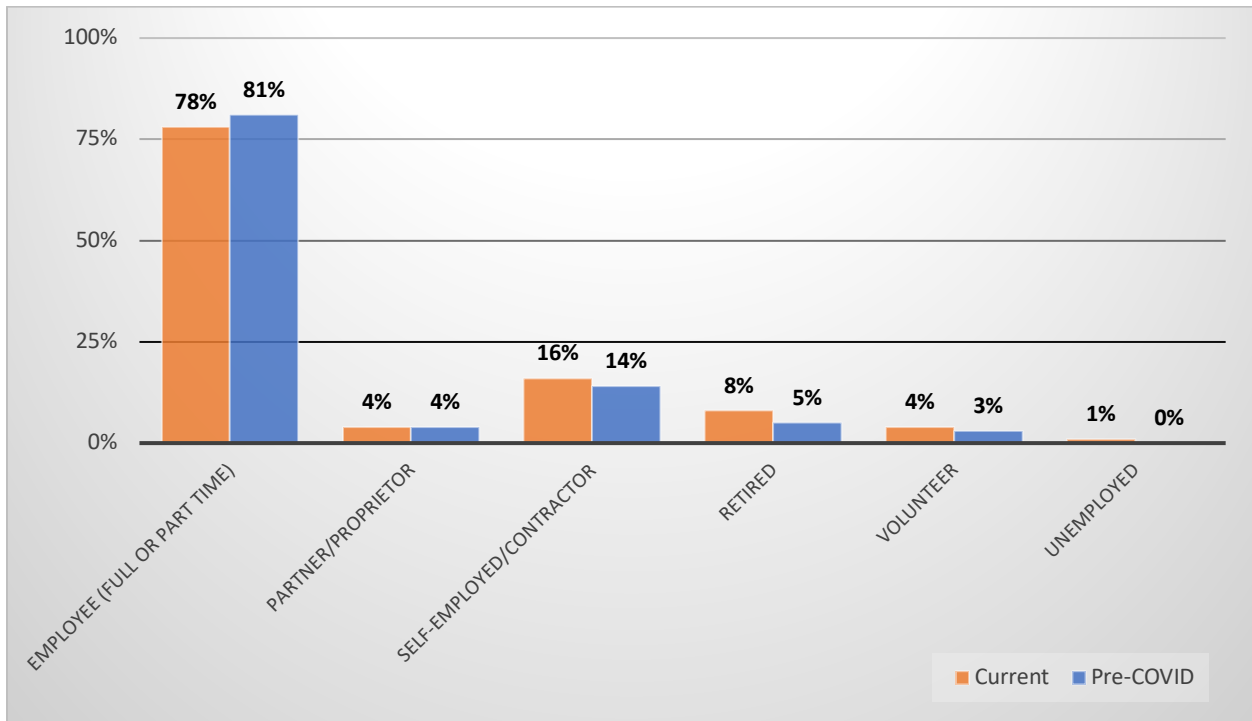
map (Figure 4). There were also about 100 responses that reflected organizations from other countries (e.g., Mexico, Canada, Australia, UK, Ghana) or invalid zip codes.

Figure 4. Heat Map of Organization Geographic Locations (n=307)



Employment

Figure 5. Current and Pre-COVID Employment Status

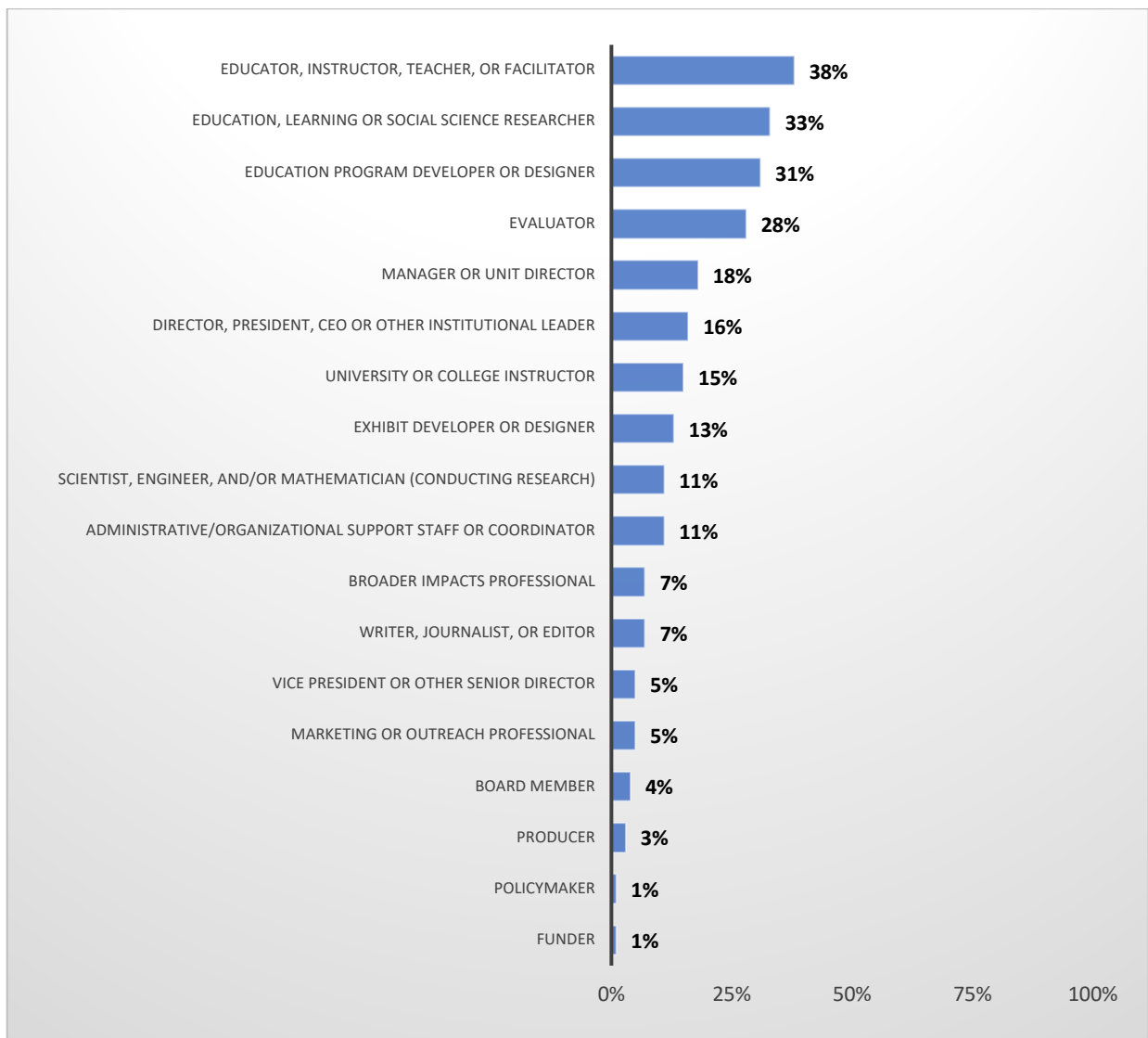


- Figure 5 highlights respondents current employment status (n=536) as well as their status before COVID (n=535). 78% of survey participants indicated that they were

currently employed either part-time or full-time as compared to 81% before the pandemic.

- 16% of respondents were self-employed, 8% were retired, 4% were volunteers and 1% were retired. 4% indicated they were a partner or proprietor of an organization. (Note, respondents could select all options that applied with regard to their current employment). This was relatively similar to pre-COVID status, although there were some slight fluctuations in the percentage of respondents who were unemployed or retired. Our sample might overrepresent those who were not as strongly affected by COVID as the industry as a whole, which saw considerable disruption in employment.
- Figure 6 displays survey respondent’s current employment position (n=540). “Educator, Instructor, Teacher or Facilitator” (38%), “Education, Learning or Social Science Researcher” (33%), “Education Program Developer or Designer” (31%), and “Evaluator” (28%).

Figure 6. Current Position

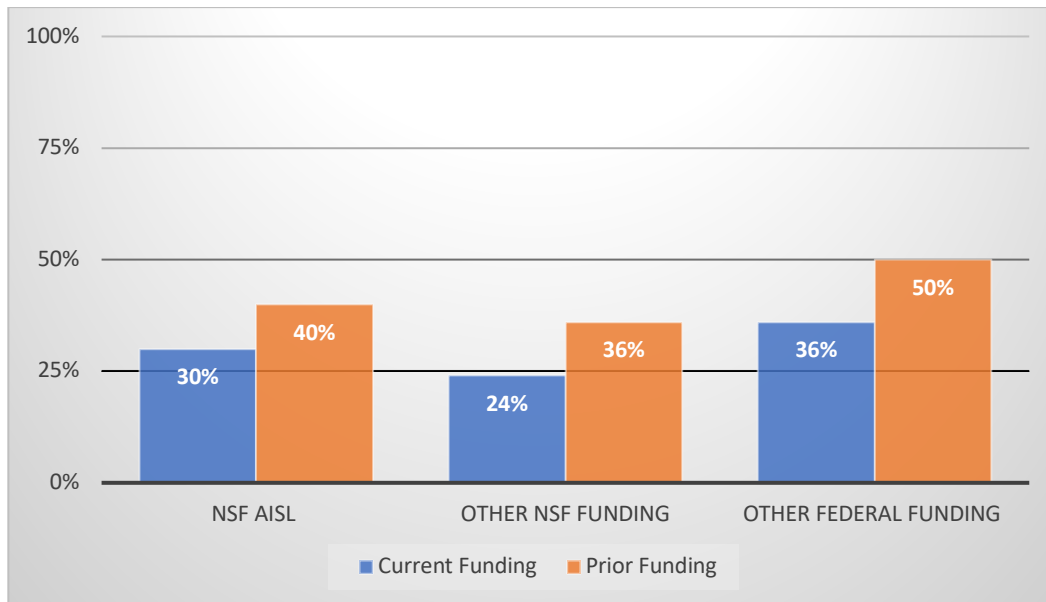


*Respondents could select more than one option

Current and Previous Funding

- When asked about funding, 69% of respondents currently or previously received federal funding while the remaining 31% had not.
- Of those who indicated they currently or previously received federal funding (n=377), it was a mix of funding through the *Advancing Informal STEM Learning (AISL)*, *Other NSF funding* and *Other federal funding* (Figure 7).

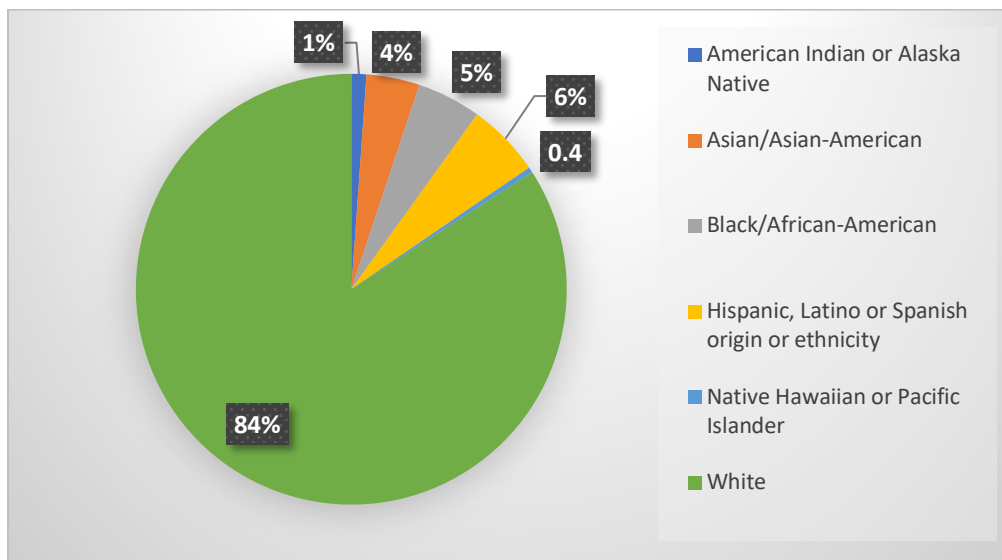
Figure 7. Current & Prior Federal Funding (n=377)



*Respondents could select more than one option

Demographic Information

Figure 8. Race/Ethnicity



- 71% of the respondents identified as female, 27% as male and 2% as non-binary (n=524) (Figure 8).
- Most of the survey respondents were White (82%). Other racial/ethnic backgrounds were represented, but in small proportions (0.4-6%). (n=520)
- When race/ethnicity data were broken out by gender, White women made up the highest proportion of survey respondents (60%)
- Lacking reliable industry data on race/ethnicity and gender in the ISE/SciComm workforce, we cannot state whether the sample is representative of those working in the field, although the sample description matches with informal observations and the discussions about diversifying ISE and SciComm.
- The demographics of the sample suggests refraining from analyzing data by race/ethnicity or gender since subsamples for non-white women are small.

CAISE/InformalScience.org Activities, Resources and Communications

Overall Familiarity and Engagement (n=666)

- Table 1 provides findings from survey respondent's overall familiarity and engagement with CAISE activities and resources, including InformalScience.org (ISDO). A majority of respondents noted, *"I am knowledgeable about CAISE/InformalScience.org activities, resources and communications"* and *"I access and read CAISE/InformalScience.org activities, resources and communications"* (58%, respectively).
- The question was designed so that response options demonstrated increasingly greater engagement with CAISE and ISDO. The results in Table 1 are shared in this order rather than by increasing percentage for responses.

Table 1. Engagement with CAISE and ISDO

	Percent
I am not familiar with CAISE/InformalScience.org activities, resources and communications	14%
I do not use CAISE/InformalScience.org activities, resources and communications	16%
I am knowledgeable about CAISE/InformalScience.org activities, resources and communications	58%
I access and read CAISE/InformalScience.org activities, resources and communications	58%
I apply or participate in CAISE/InformalScience.org activities, resources and communications in my work (cite resources, participate in webinars, implement toolkits)	24%
I refer my colleagues to CAISE/InformalScience.org activities, resources and communications	45%
I am a contributor who works with CAISE/InformalScience.org to provide resources, co-create content for informalscience.org or facilitate activities	5%
I have shared project work by uploading resources (e.g., evaluation reports, presentations, posters) to InformalScience.org	26%

These findings were consistent when the responses were broken out by professional identity. However, there were some differences in engagement when explored by years in the field (Figure 9), researcher/practitioner (Figure 10), and prior AISL funding (Figure 11). Participants identifying as researchers, professionals who have more than 10 years in the field, and those with current or prior AISL support noted deeper levels of engagement and these findings were statistically significant.

Figure 9. Engagement with CAISE and ISDO by Years of Experience

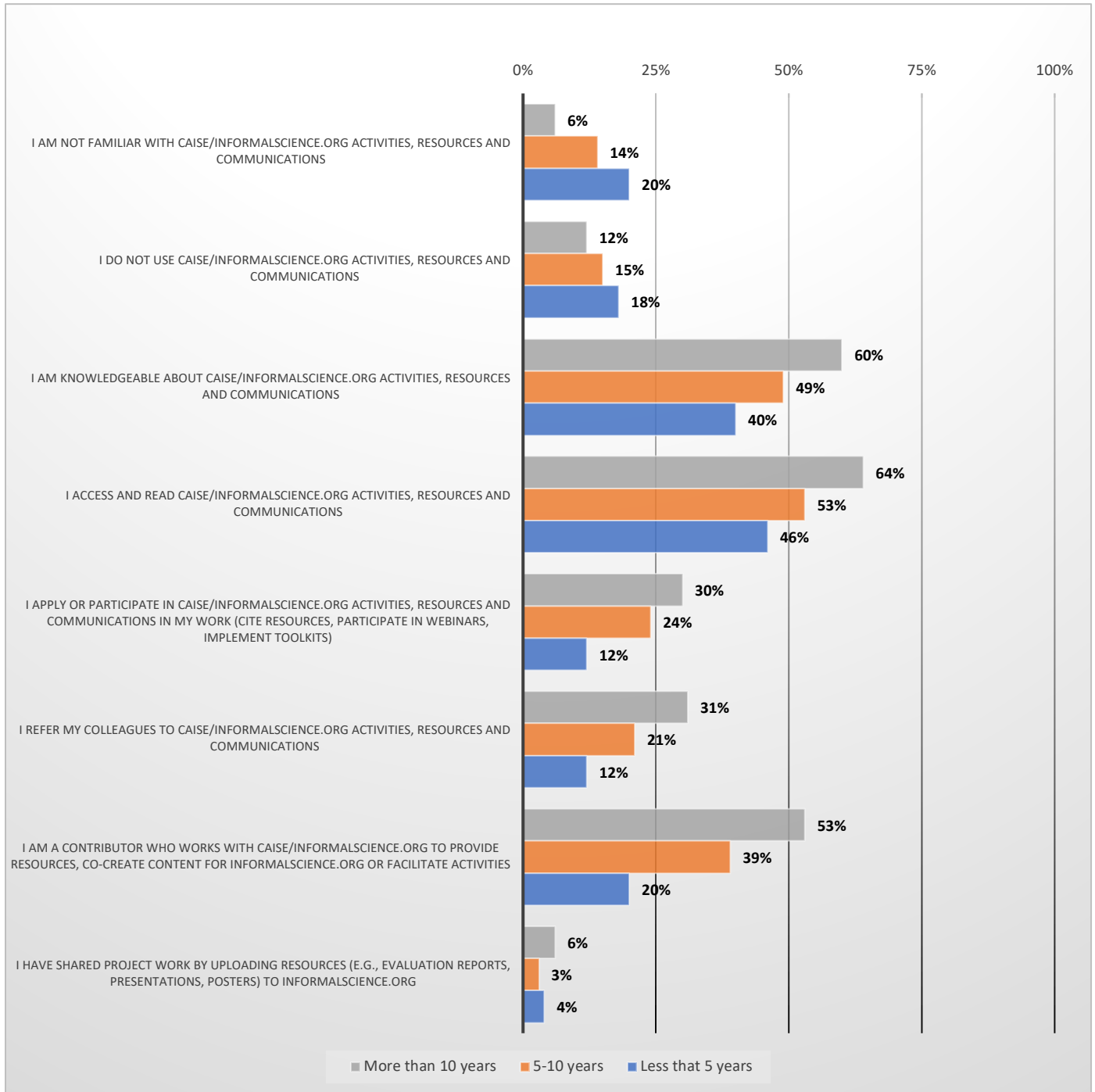


Figure 10. Engagement with CAISE and ISDO by Researcher/Practitioner

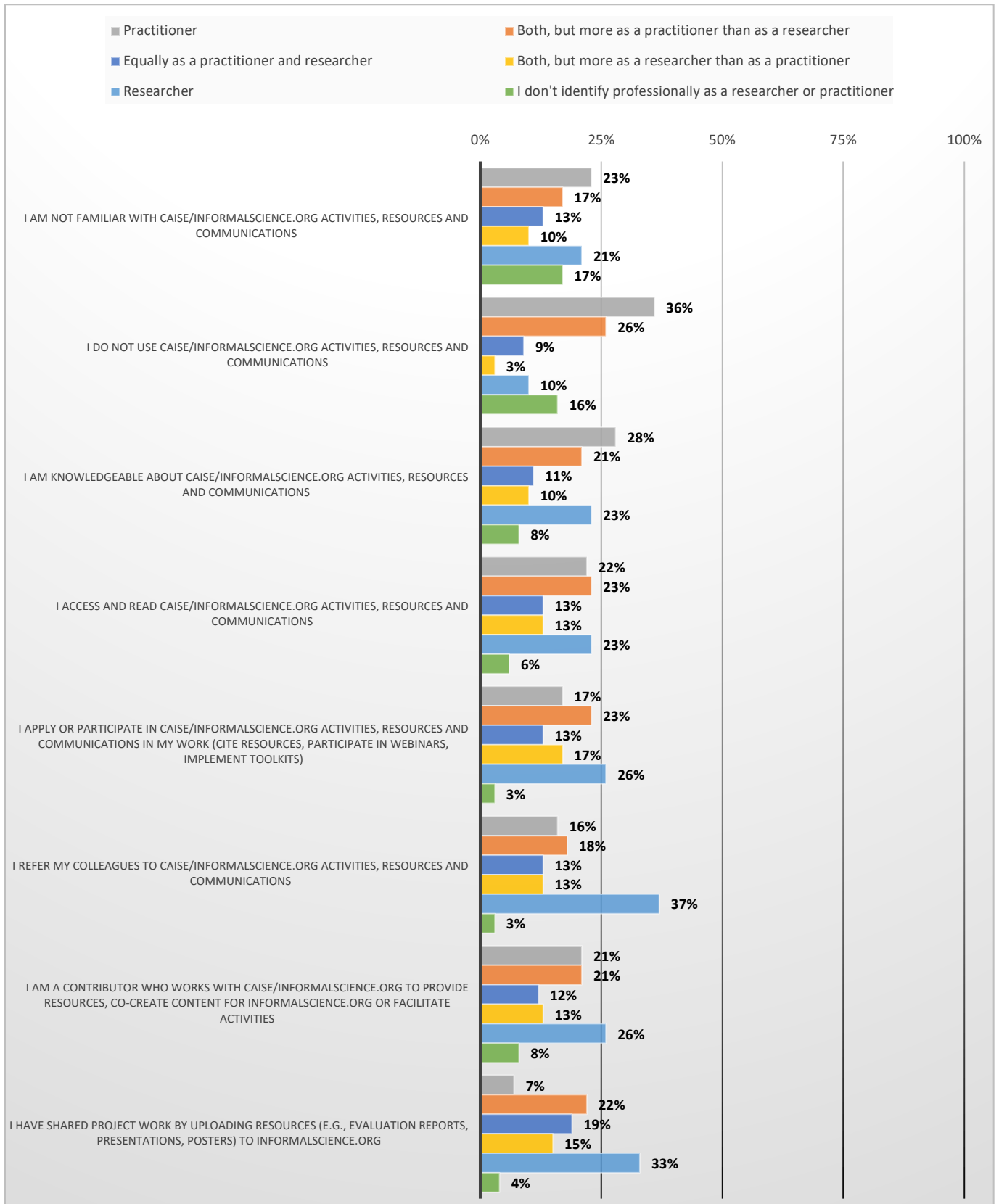
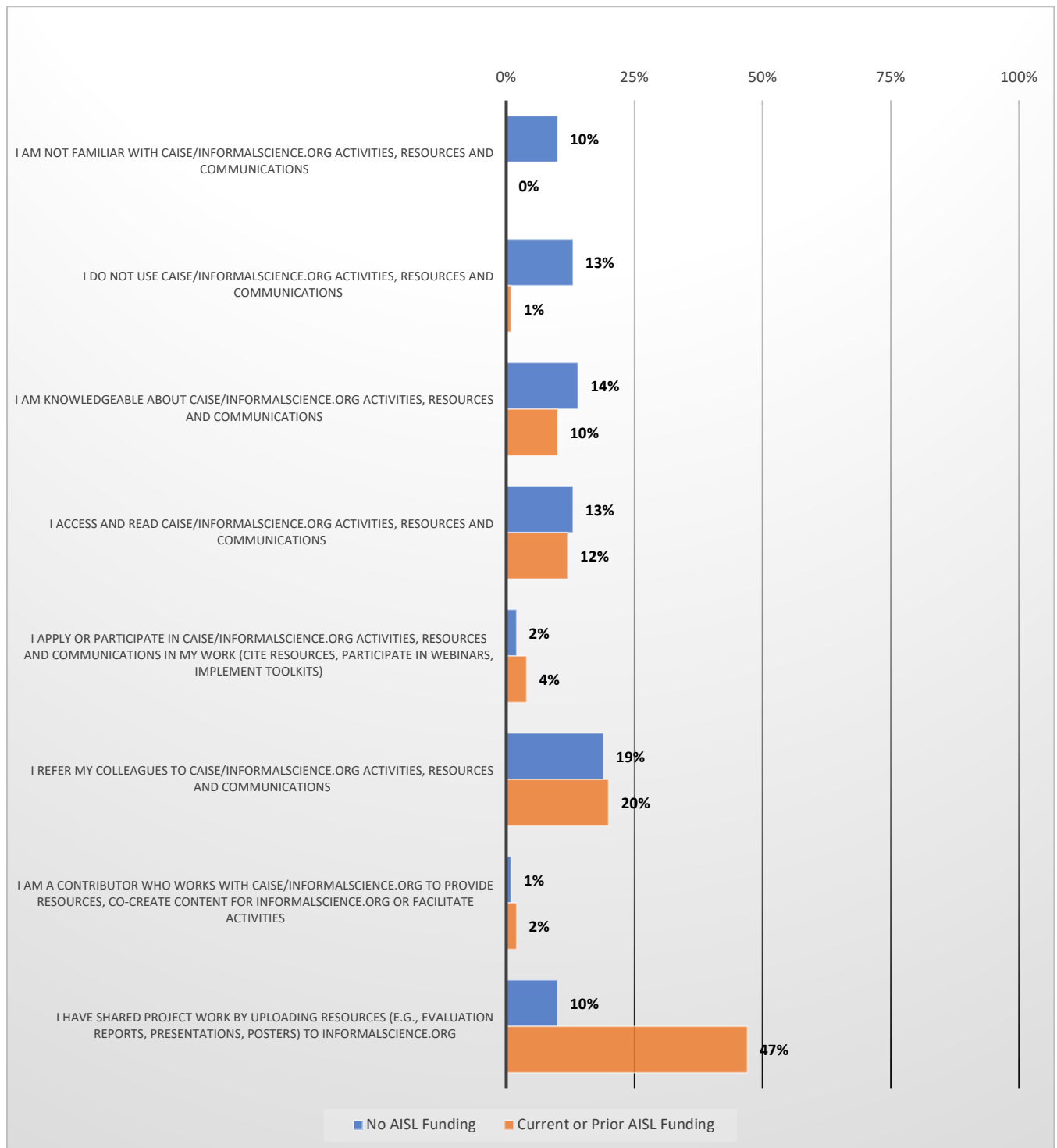
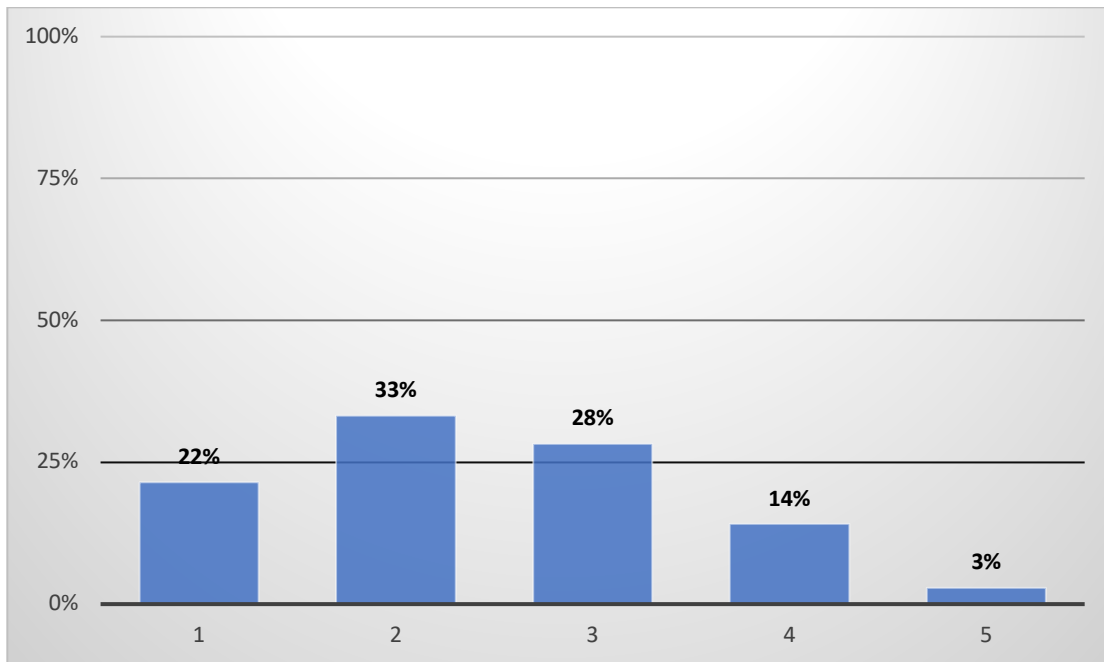


Figure 11. Engagement by Current/Prior AISL Funding



- Survey participants were also asked to rate their engagement (using a scale from 1 to 5 where 1 is “not at all” and 5 is “to a large extent”) on three items regarding their overall engagement with activities, including the meetings/ convenings, communications and resources. Figure 10 illustrates these combined scores. Overall, most respondents provided scores of 2 or 3, suggesting average engagement.
- There were significant differences on the overall engagement scores for the following:
 - Participants reporting current or prior AISL funding reported significantly higher levels of overall engagement.
 - Participants who did not identify as either researcher or practitioner reported significantly lower levels of overall engagement as compared to all other categories. No other differences were found between researchers and practitioners for the overall engagement score.
 - Participants with more than 10 years in the field had significantly greater overall engagement scores as compared to those with less than 5 years of experience and 5-10 years of experience.
- The lowest engagement was reported for the item referring to CAISE activities (including the AISL PI/ Awardee meetings, convenings, CAISE online forums, attending a CAISE session at various conferences, etc.) (Figure 12).

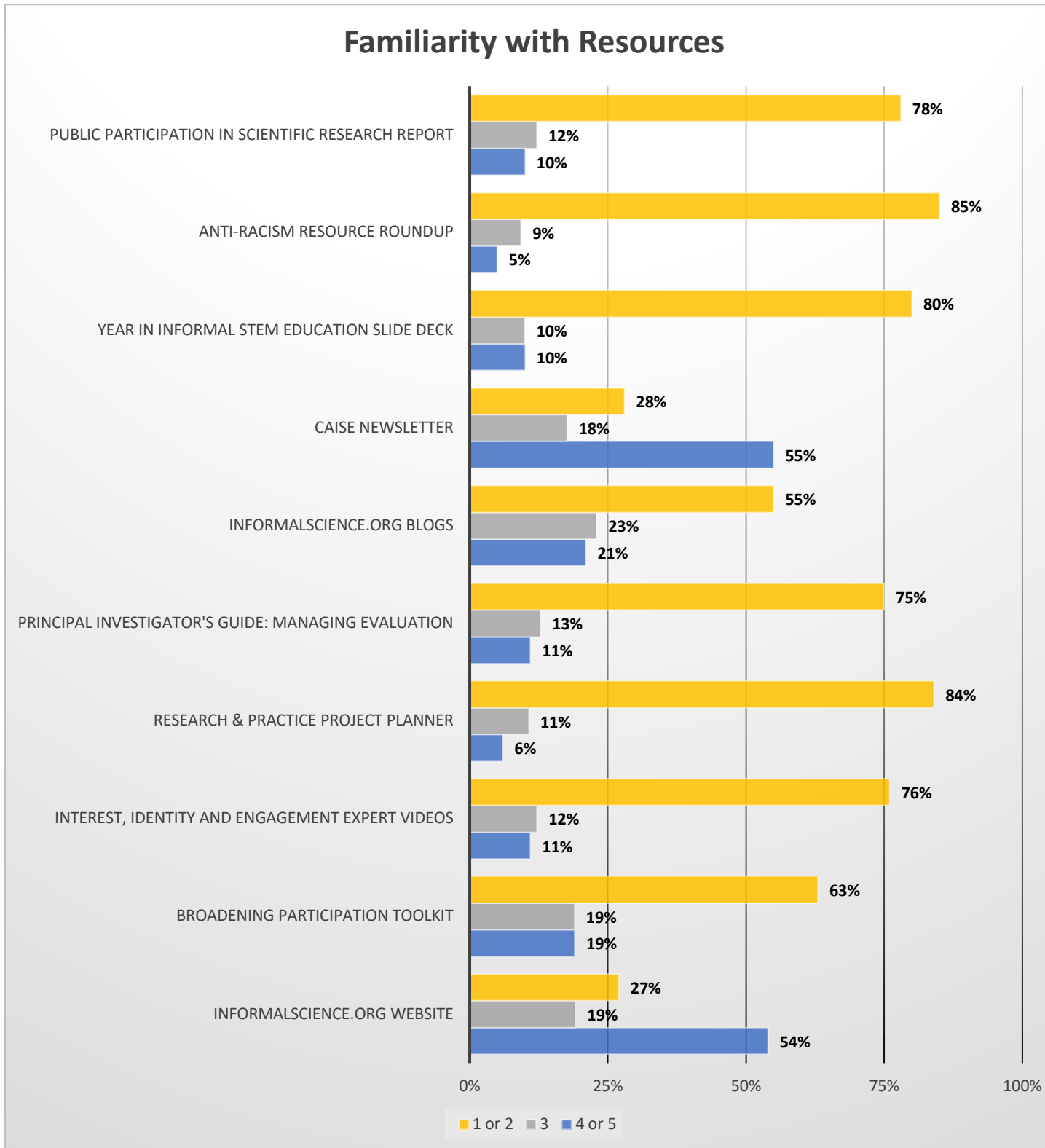
Figure 12. Overall Engagement Score



Familiarity with Resources

- Survey respondents were prompted to indicate their familiarity with CAISE resources using a scale from 1 to 5 where “1” is “not at all familiar” and “5” is “very familiar.” Figure 13 displays the distribution for each resource. Overall, respondents indicated they were the most familiar with the ISDO website and CAISE newsletter.

Figure 13. Familiarity with Resources



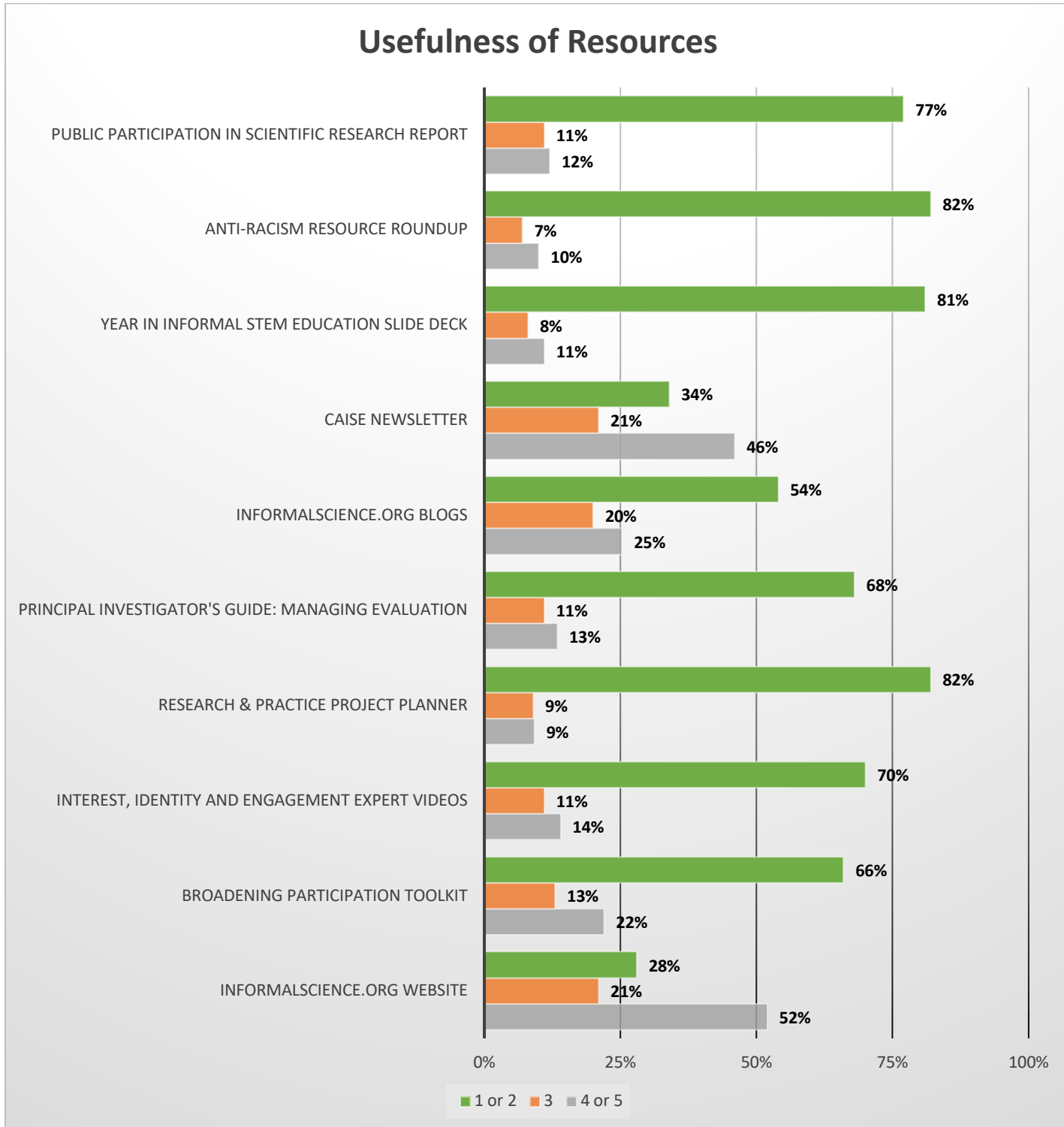
- When we compared between groups, the following differences in familiarity across groups emerged:
 - Participants with current or prior AISL support were significantly more familiar with all of the resources as compared to those who do not currently or have never received AISL funding.
 - Participants with more than 10 years of experience were more familiar with the following resources:
 - *ISDO website* (more familiar than those with less than 5 years of experience and those with 5-10 years of experience);
 - *BP Toolkit* (more familiar than those with less than 5 years of experience);
 - *Interest, identity and engagement expert videos*: (more familiar than those with 5-10 years of experience);
 - *Research and Practice Project planner*: (more familiar than those with 5-10 years of experience);
 - *PI Guide: Managing Evaluation*: (more familiar than those with less than 5 years of experience and those with 5-10 years of experience);
 - *ISDO Blogs*: (more familiar than those with less than 5 years of experience and those with 5-10 years of experience);
 - *CAISE Newsletter*: (more familiar than those with less than 5 years of experience and those with 5-10 years of experience);
 - *Year in ISE*: (more familiar than those with less than 5 years of experience and those with 5-10 years of experience);
 - *Public Participation in Scientific Research Report*: (more familiar than those with less than 5 years of experience and those with 5-10 years of experience);
 - The following differences in familiarity based on researcher/practitioner were significant:
 - *ISDO Website*: Participants who identified as “researcher” or with “both but more as a researcher” were more familiar as compared to “practitioners” or those who identified as “neither a researcher or practitioner”;
 - *BP Toolkit*: Participants who identified as “both but more as a researcher” were more familiar with this resource as compared to those who identified as “neither a researcher or practitioner”;
 - *Research and Practice Project Planner*: Participants who identified as “both but more as a researcher” were more familiar with this resource as compared to those who identified as “neither a researcher or practitioner”;
 - *PI Guide: Managing Evaluation*: Participants who identified as “researcher” or with “both but more as a researcher” were more familiar as compared to “practitioners” or those who identified as “neither a researcher or practitioner”;

- There were no differences in familiarity with any of the resources based on field (e.g., ISE or SciComm).

Usefulness of Resources (n=580)

- Participants who indicated familiarity with each resource were then asked to rate the extent to which they perceived each as useful to their work using a scale from 1 to 5 where “1” is “not at all useful” and “5” is “very useful” (Figure 14). If respondents selected “I am not familiar” with a particular resource, their usefulness ratings were not included.
- Participants rated the usefulness of the ISDO website the highest.
- When we compared between groups, the following differences in the usefulness of the resources across groups emerged:
 - Participants with AISL funding reported significantly higher levels of usefulness for all of the resources except for the Research and Practice Project Planner.
 - Participants with more than 10 years of experience provided significantly higher usefulness scores on the ISDO website (compared to those with less than 5 years in the field), the CAISE newsletter (compared to those with less than 5 years in the field and 5-10 years), Year in ISE (compared to those with less than 5 years in the field) and the Public Participation in Scientific Research Report (compared to those with less than 5 years in the field).
 - There were no differences based on field.
 - The following are statistically significant differences between researchers and practitioners:
 - ***ISDO website:*** Participants who identified as “researcher” or with “both but more as a researcher” were more familiar as compared to “practitioners.” Participants who identified as “neither researcher nor practitioner” reported significantly lower usefulness values as compared to all other groups.
 - ***Research and Practice Project Planner:*** Participants who identified “equally as a researcher and practitioner” provide significantly higher usefulness scores as compared to those who identified as “neither.”

Figure 14. Usefulness of Resources.



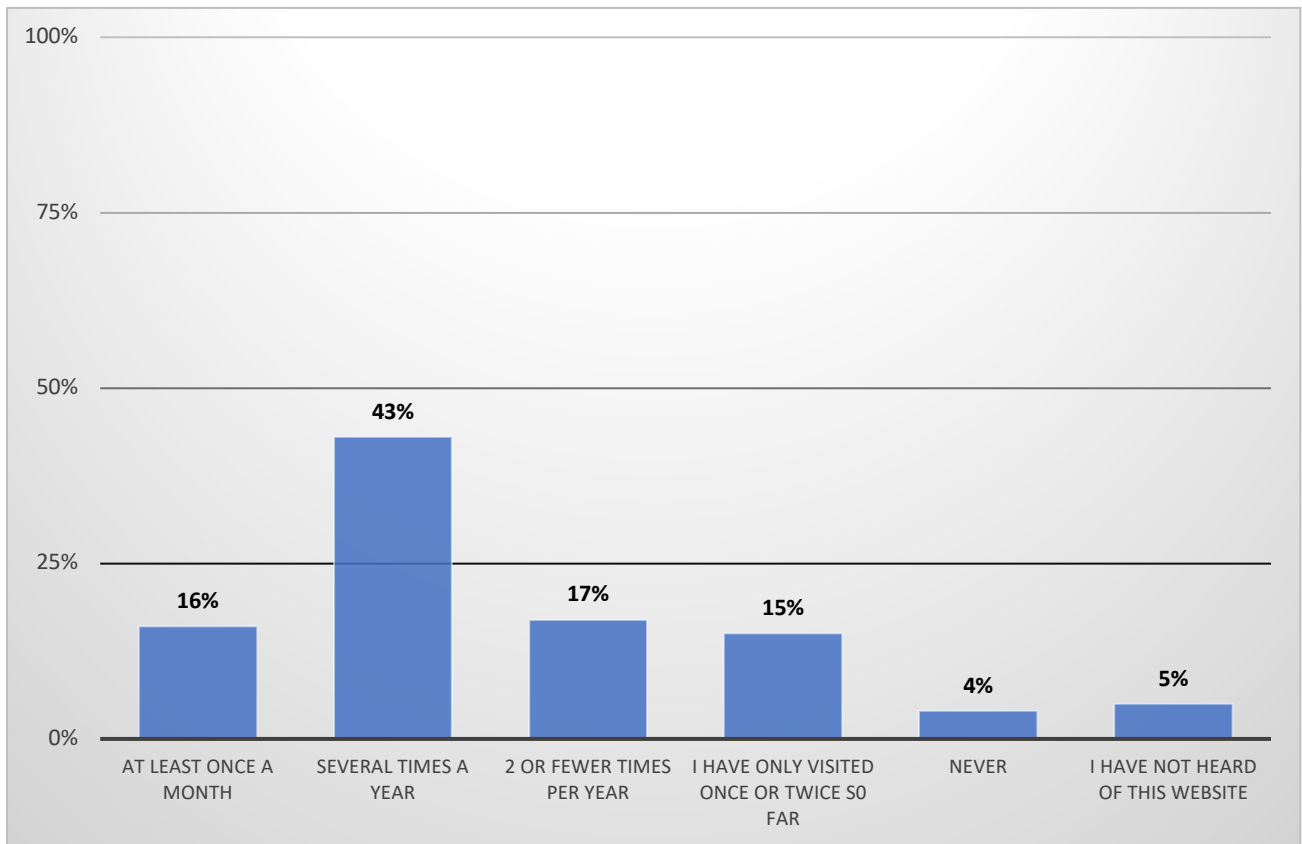
- A follow-up question was included prompting survey participants to note if there were any other CAISE resources that they found useful that were not included in the list. Comments such as “*evaluation reports,*” “*evaluation instruments,*” “*papers/published*

reports,” and “Jamie/CAISE staff” were mentioned by more than one respondent to this question.

InformalScience.org Website

- When asked specifically about the ISDO website, a majority of respondents (59%) visited ISDO at least several times a year with a small proportion (16%) visiting at least once per month (Figure 15).
- There were differences when we made comparison by groups: those with prior or current AISL funding visited more frequently than those who without AISL funding, those with more than 10 years in the field visited more frequently as compared to those with less than 5 years or 5-10 years of experience, and those who identify as “researcher” or as “both researcher and practitioner but more as a researcher” visit more frequently than those who do not identify as “either a researcher or practitioner.”
- When this was compared against the earlier question related to overall engagement, higher frequencies of visiting the ISDO website were significantly positively correlated with higher levels of overall CAISE engagement and the strength of the relationship is large ($r = .70$).

Figure 15. InformalScience.org Website (n=573)

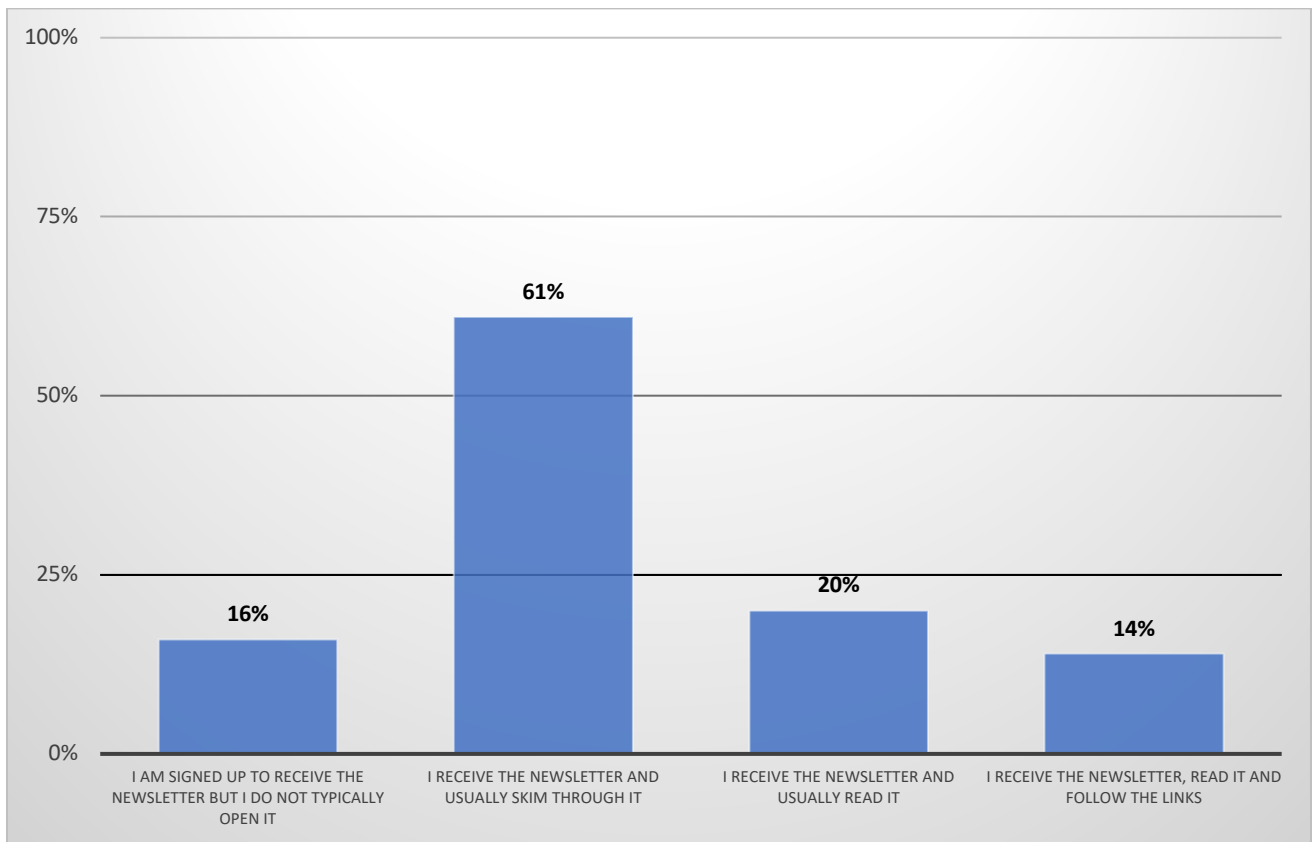


CAISE Newsletter

- A question on the survey asked respondents to indicate their engagement with the CAISE newsletter. Of the survey participants who responded to this question, 20% noted that they are not signed up to receive the newsletter. The remaining 80% were signed up to receive the newsletter and engaged with it in different ways (Figure 16).

- Most survey respondents who indicated that they subscribe to the newsletter typically open and skim it. These data are in contrast to the open and click rate from the general subscriber list which suggests last year the average open rate across all subscribers was about 32% and the average click rate of roughly 4%. This suggests that respondents to the survey self-reported higher engagement with the newsletter as compared to the general open and click rate from all subscribers.
- There were differences when we made comparison by groups: those with prior or current AISL funding engaged more with the newsletter than those who without AISL funding and those with more than 10 years in the field had deeper engagement with the newsletter as compared to those with less than 5 years or 5-10 years of experience.
- When this was compared against the earlier question related to overall engagement, higher levels of engaging with the newsletter were significantly positively correlated with higher levels of overall CAISE engagement and the strength of the relationship is large ($r = .55$).

Figure 16. CAISE Newsletter (n=590)



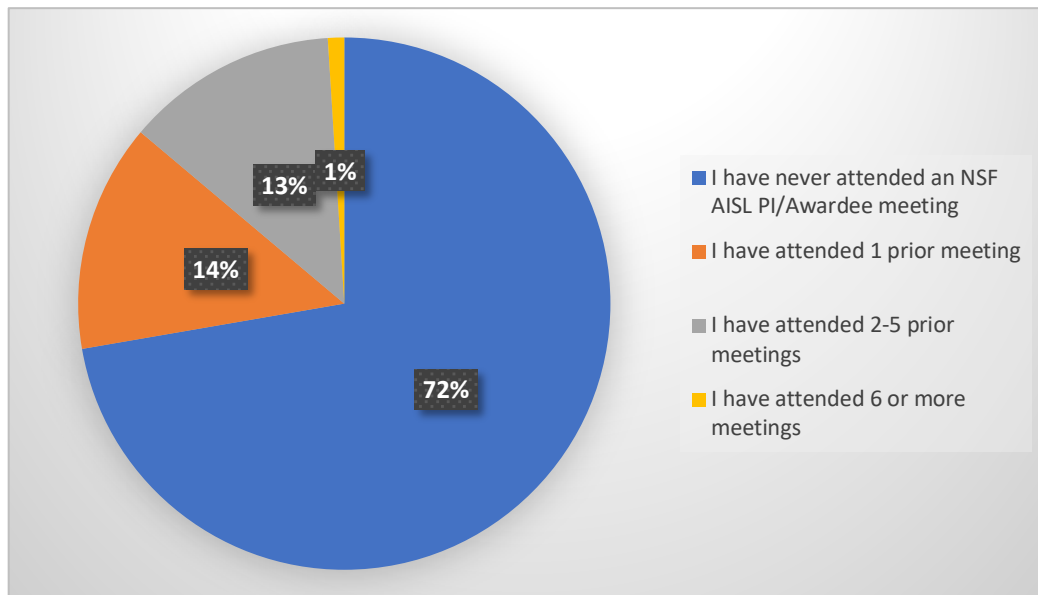
Engagement with CAISE Staff

- When asked about interactions with CAISE staff, 43% of respondents indicated “I don’t know any CAISE project team members.” Those who were familiar with CAISE staff or project team members noted either that they have not interacted or contacted them (33%), contacted them to find information (11%) or contacted them to broker connections or expand their professional network (13%). (n=585)

- When we ran comparisons by the different groupings, we found the following statistically significant differences:
 - Those who identified as “Both researcher and practitioner but more researcher” had deeper levels of engagement with CAISE staff and project personnel as compared to “practitioners” and those who did not identify with “either researcher or practitioner”.
 - Those in the field for more than 10 years had deeper levels of engagement with CAISE staff and project personnel as compared to those with fewer than 5 years and 5-10 years in the field.

AIISL Awardee Meeting

Figure 17. AIISL PI/Awardee Meeting (n = 584)



- About ¾ of the respondents who responded to the survey had never attended an NSF AIISL /PI Awardee meeting (Figure 17).
- A little more than a quarter had previously attended with most of those being professionals who attended either 1 prior meeting or 2 to 5 prior meetings.

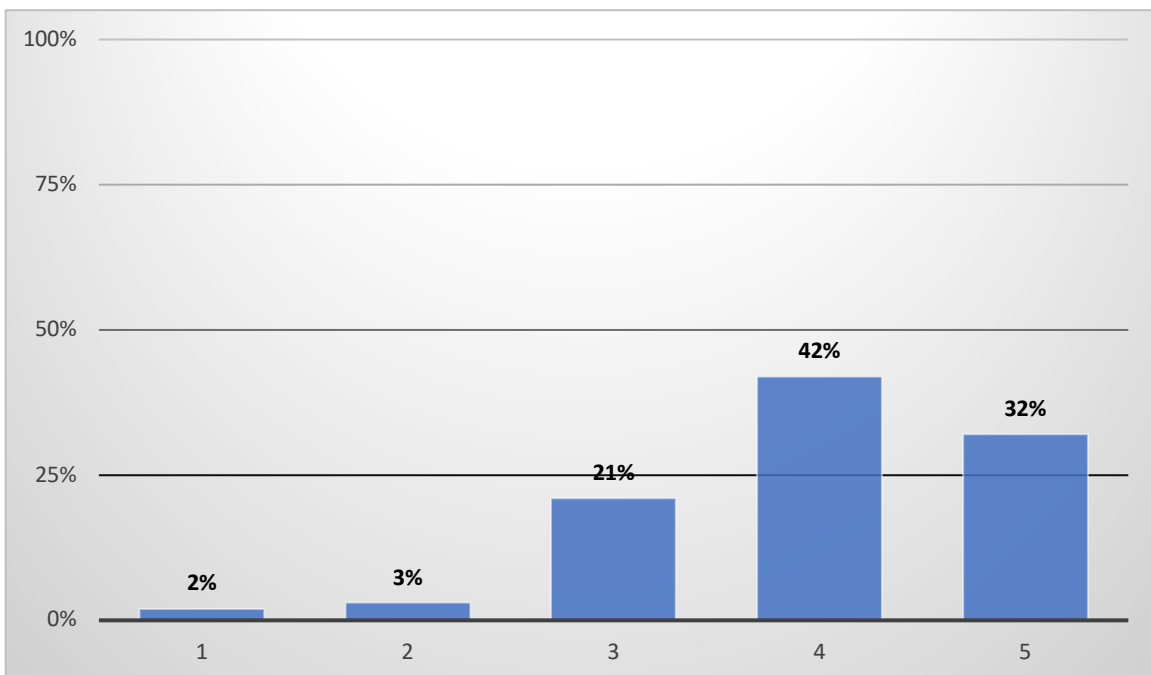
Value of Resources

Table 2. Value of CAISE/InformalScience.org (n=580)

	Mean
CAISE/InformalScience.org adds value to my professional work	3.9
CAISE/InformalScience.org is useful to other professionals in my field	4.0
CAISE/InformalScience.org supports the community of ISE and SciComm professionals	4.1

- The mean for the combined, overall value score was 4.0 suggesting respondents agreed to the overall value of CAISE.
- On a scale from 1 to 5 where 1 is “strongly disagree” and 5 is “strongly agree”, survey participants provided mean scores of around 4.0 suggesting they agreed that CAISE/ISDO was valuable to their work, other professionals in their field as well as the broader community of ISE and SciComm (Table 2).
- We found those with current or prior AISL funding reported significantly higher value ratings compared to those who did not have current or prior AISL funding; higher value ratings for those with more than 10 years of experience in the field as compared to those with less than 5 years; and those who identified as “Both researcher and practitioner but more researcher” reported higher value ratings as compared to “practitioners” and those who did not identify with “either researcher or practitioner”.
- Figure 18 illustrates the distribution of the combined scores of the value of CAISE.

Figure 18. Distribution of Value Scores



Examples of CAISE/ISDO Resources Use

Survey respondents were given the option to respond to the following open-ended question about resource usage: “From the list of CAISE/InformalScience.org resources identified in earlier questions, please choose one resource and briefly describe an example of how you used the resource. If none, please just write “N/A” in the text box.” There were 92 respondents who wrote N/A.

For all open-ended items, we separately reviewed responses to identify high-level themes that were then discussed in the evaluative thinking group. In this report, we share illustrative quotes that highlight these themes from across the data. We share a few examples in the main body of the report with additional supporting quotes to exemplify the richness of this data included in Appendix A.

In general, usage of resources focused on conducting research and benchmarking, informing new projects and proposals, providing grounding in the field/staying up-to-date on the field,

grant writing and literature reviews, a place to share work with others, and sharing resources with colleagues (informally or formally through workshops and professional development).

- **The most examples of usage were related to informalscience.org.** Respondents shared examples of searching the website when they are preparing proposals and literature reviews, and writing articles, and when they are beginning new projects:

I use the website to support literature reviews on certain topic areas by looking up prior research and evaluation reports in that topic area. (ISE, Researcher, more than 10 years in the field)

When writing an article or preparing a presentation, I frequently check related topics on CAISE. I also search it whenever I am carrying out some research when NSF links could be useful, or when trying to identify a resource for which I don't have accurate links. (SciComm, practitioner, more than 10 years in the field)

Look for relevant literature/projects related to science museums, and exhibit projects for individuals with disabilities. I'm most likely to use the website to look up projects from the field that might be hard to find information on otherwise or to find projects I haven't heard of but are relevant to current work. (ISE, researcher, more than 10 years in the field)

- Respondents also reported **using informalscience.org to inform their work** and stay up-to-date on **current work in the field**. Examples include the following:

I have read different articles and reports of research and evaluation projects to use them as reference to my work related to design of ISE strategies in a science museum in Bogota-Colombia. (SciComm, practitioner, more than 10 years in the field)

During the early planning for a permanent Maker facility at our (UK) science center, I searched through the informalscience.org archive to find examples of evaluations and other reports from similar projects. Through this search, I found the literature review by Shirin Vossoughi and Bronwyn Bevan which gave me both a summary of thinking from that time, plus some new ways to think about the project and names to look for when expanding my search. The net result has been a much better appreciation of how to frame and understand museum making which led to a better case for funding. (SciComm, practitioner, more than 10 years in the field)

I use informalscience.org as a first stop for getting a pulse on a particular topic (STEM identity, research vs. evaluation) from the informal science perspective. This is a great way to get some initial context, hear the most current narratives of certain topics, and to give me a starting point for finding additional resources. (ISE, researcher, less than 5 years in the field)

The ability to access reports/documents that would otherwise never be published or available outside of the institution they were created for/by is SO useful and has greatly improved the ability of the entire museum field to access and apply research and evaluation findings, or even just lived experiences. (ISE, researcher, more than 10 years in the field)

The evaluation reports, tools for the field, website with resources, and spirit of service to the ISE and science communities are fantastic. The team has historically done everything it can to champion and support the informal STEM field without an agenda. It's super great that CAISE has drawn in the science communication work because it's so complementary and really an important piece of the out-of-school puzzle. (ISE, researcher, more than 10 years in the field)

- Respondents also said **they share the website and resources** on the website with colleagues and clients, and some use it in their teaching. Examples include the following:

I often refer students and colleagues to the website for resources related to their research or teaching or outreach. (ISE, researcher, more than 10 years in the field)

I am now retired, (as of a year ago) and used CAISE/InformalScience with both undergrads and grad students. Since retirement I have shared a number of resources with both formal and informal educators that I have contact with through various working groups (the state science teachers association, State naturalist program, Master gardeners program in our state, the state environmental education association, etc.) (ISE, practitioner, more than 10 years in the field)

I have referred to some evaluation resources on the site to see what the current state of the art is, and I have shared some things I spotted in the newsletter with my state science education network that includes formal and informal education professionals. (STEM educator, researcher, more than 10 years in the field)

I often look to the "news and views" to get a quick snapshot of recent/emerging topics, and also point colleagues and students to those resources because they are quick reads on timely and important topics. (ISE, researcher, more than 10 years in the field)

- Respondents also reported using informal-science.org **to share their work with others**, through posting their projects and reports, and encouraging others to do so:

I regularly post reports and search for reports that are relevant to the work that I do - and encourage clients to do the later when they are preparing new proposals. (General education, researcher, more than 10 years in the field)

I have used project pages, research reports, and research to practice resources. My colleagues and I have also posted resources associated with our projects on informal-science.org. (Other field, not specified, equally a researcher and practitioner, more than 10 years in the field)

The informal science website is a fantastic way to find and "publish" resources for the field. I go there to find relevant projects, evaluation findings, and to share my work. It saves a lot of money as a way for us to have resources publicly available without having to pay to support a website. (ISE, researcher, more than 10 years in the field)

- Respondents also cited their **access to EBSCO** through informal.science.org. Examples of usage include the following:

I access the EBSCO research literature database. This resource is critical for those who do not work in academic institutions (ISE, practitioner, more than 10 years in the field)

- Respondents also reported **using “tools” found on informal.science.org in professional development** they are leading:

Use information about to have inclusive conversations in our communicating science workshops (Both ISE & SciComm but more with ISE, practitioner, more than 10 years in the field)

- Respondents also reported using informal.science.org **to find specific expertise** in the field:

I use the website to search for public engagement researchers or practitioners (Both ISE & SciComm, funder, more than 10 years in the field)

I used the evaluator database to find evaluators for my projects and have worked with one of them for some time now. I wouldn't have known where to start without this resource. (Both ISE & SciComm, practitioner, 5-10 years in the field)

- Respondents also shared examples of using the website to **find evaluation tools and instruments**:

I have benefitted from various case studies and assessment instrument used for informal learning, especially in recent time where universities are encouraged to adopt alternative assessment modes for distant/remote learning during the COVID19 pandemic and movement control. Students were encouraged to be more resourceful, making the best use of their time during lockdown to do surround science/or DIY experiments. I use informal learning portfolio to assess self-learning and also encourage peer group assessment. (Both ISE & SciComm but more ISE, practitioner, 5-10 years in the field)

I use informal.science.org to identify evaluations related to projects I am working on; also to see if there are assessment tools/surveys that I can adapt to current projects. It is helpful because it includes unpublished resources, such as evaluation reports, that are not available elsewhere. (ISE, researcher, more than 10 years in the field)

I appreciate being able to view evaluation tools when designing a plan for a new project (e.g. measures of belonging or STEM identity). (Both ISE & SciComm but more ISE, practitioner, more than 10 years in the field)

I have used evaluation reports from projects to look for models of instruments that can be used in similar work. (ISE, researcher, more than 10 years in the field)

- Respondents also mentioned going to informal.science.org to **find out about funding**:

I went to the website in hopes of understanding of how the awards work and the postings or disclosures on the site. (ISE, practitioner, 5-10 years in the field)

Importantly, there were comments in the examples of informal.science.org usage about the importance of getting information from a trustworthy site:

I think it's not easy to find an open access that are listed as organized database from organization that we trust. There are toolkits and research from private sites but they are not complete or totally reliable because we do not really know who produced them. But in the case of CAISE, we know that the materials were produced and selected from the experts in the field. (Both ISE & SciComm but more ISE, practitioner, more than 10 years in the field)

- Respondents reported using the **Identity, Interest and Engagement Videos** for their own enlightenment and professional development, to inform current project work, in professional development work, and in articles and grant proposals. Examples include the following:

I was probably writing something about interest development and identity and found the interview with Nicole Pinkard enlightening. I am sure I revisited the interview more than once and then I remember quoting Pinkard in a proposal or an article or both. (ISE & SciComm, Both practitioner & researcher, more than 10 years in the field)

I also used the site on "What is STEM identity?" to consider how to approach measuring this in my research projects. (Both ISE & SciComm but more ISE, practitioner, 5-10 years in the field)

- Respondents reported using the **Broadening Participation Toolkit** for their own professional development, in work with colleagues at their own institution, in proposal development, and sharing it with other colleagues. Examples include the following:

I have used the Broadening Participation toolkit when having conversations with practitioner partners. Particularly the line about not telling families how to be in the museum space from one of those resources has really sat with me and informed my work since the toolkit came out. (ISE, researcher, 5-10 years in the field)

I have recently re-discovered the broadening participation resource. I have used it for a number of projects. For one project, we used it as part of conversations to discuss broadening participation and what this means to us / definitions for the project. I also found the reflection questions helpful in thinking about the interview questions we wanted to ask participants about broadening participation. For another project, we used this document to reflect on broadening participation within the project and our group. We also used it to think about guiding team questions we want to use to reflect on our broadening participation questions. (Both ISE & SciComm but more ISE, researcher, more than 10 years in the field)

I used the Broadening Perspectives on Broadening Participation in STEM toolkit to

facilitate discussions for colleagues at two institutions where I have worked. I also used it as a resource for a graduate school project that involved designing a community of practice around designing and facilitating inclusive STEM programs in the informal science education field. (ISE, practitioner, more than 10 years in the field)

- Respondents used the **CAISE newsletter/blogs** primarily for staying up-to-date on the informal STEM education field. Examples of usage include the following:

I review CAISE blog and newsletter resources to learn how ISE is described nationally, and to capture the latest around the country and with particular focus on NSF-funded work. (ISE, researcher, more than 10 years in the field)

The CAISE newsletter has been a lifeline for me in transition between organizations. It has kept me connected with the most important developments and connected current world events to the work in my museum. (Both ISE & SciComm but more ISE, practitioner, more than 10 years in the field)

Many articles in the newsletter often provide the catalyst for us to initiate a discussion on a topic that when refined will become the basis for either our public or school programming and from time to time direct us to additional information and support material. (Both ISE & SciComm, practitioner, more than 10 years in the field)

The newsletter and blogs are very helpful in keeping abreast of AISL projects and looking for synergies. The newsletter also is a great place to publish findings from my own work through blogs to inform the field. I have had people get in touch with me after reading the blogs in the newsletter to learn more about the work that we are doing. The CAISE team has been very collaborative and supportive in facilitating and discussing topics of interest for the field. (Both ISE & SciComm, Both researcher & practitioner, more than 10 years in the field)

- Respondents provided examples of use for the **Year in ISE** slide presentation:

I've used the year end informal science slide presentation and shown this too my staff. (ISE practitioner, more than 10 years in the field)

As a PhD student interested in informal science learning, I use the "year in informal STEM education" slides to figure out what/who is relevant in the field, to understand how people are communicating their work, and to gather inspiration for the research work that I do (ISE, both a researcher & practitioner, 5-10 years in the field)

- Respondents shared examples of using the **Anti-Racism Resources**:

The anti-racism resources have been useful to attempt to meet sooner of my colleagues where they are on their various journeys. (ISE, researcher, more than 10 years in the field)

I used the anti-racism resources to learn more about anti-racism. (ISE, researcher, 5-10 years in the field)

- A respondent shared an example of using the **Public Participation in Science** white paper:

The resource I've used the most often is the collection of material on learning ecosystems. For that and Public Participation in Science resources, My #1 use is to prime my own thinking and to enter a field of work with which I'm not that familiar so I'm trying to have a place to start -- researchers and practitioners whose work I might start to follow to learn more. My #2 use is to introduce my staff or organization to a new field of ideas. A third use is to start to understand how an area within informal science education "organizes" itself -- what are the strand of work or thought within a broader category and how does our work fit in. This helps me find affinities of work similar to ours but also adjacencies that expand our thinking/work. (Both ISE & SciComm but more ISE, practitioner, more than 10 years in the field)

- A few respondents mentioned using the **PI Guide for Managing Evaluation**:

I no longer work in the ISE field, but routinely refer clients and colleagues to informal.science.org and to the PI's Guide to Evaluation as resources for literature scans, example evaluation designs, planning, etc. (General evaluator, researcher, 5-10 years in the field)

- A few respondents **mentioned resources that were not listed in the resources to choose from question**, such as the AISL PI Meeting, connections with CAISE leaders and staff, other specific resources from the website they use in their work.

Personal connections with CAISE staff have helped me grow my network and connect with new opportunities. (SciComm, practitioner, more than 10 years in the field)

I found the PI meetings to be an invaluable way to find my way into this field from the NSF professional side. It's been many years now since attending my first PI meeting back in the early 2000s but the interactions there with Jamie still stick with me nearly 20 years later. We were outsiders at the time but were treated like we belonged at the table (Both ISE & SciComm, practitioner, more than 10 years in the field)

STEM Programs in Out of School Settings. I'm working on ways to support experiential learning with online lessons and in particular on how to provide guided inquiries learners to engage with a high-level GIS tool designed for biodiversity conservation planning. (Both ISE & SciComm but more ISE, practitioner, more than 10 years in the field)

Gaps/Opportunities for Resources:

Survey respondents were given the option to respond to an open-ended question regarding what resources they believe are needed to support them in being part of the informal science education or science communication professional community. One group of themes focused on the website:

- **Create a clearinghouse for research synthesis, digests or research translation.**

It would be great to get digests of new research to help those at institutions without evaluation departments better keep up with and utilize advancements in the field. (ISE, practitioner, more than 10 years in the field)

It would be helpful to be able to identify seminal documents or learn the 101 of the field through this community. (Both ISE & SciComm but more SciComm, researcher, 5-10 years in the field)

Additional gold-standard research on STEM in afterschool and summer programs. (ISE, practitioner, 5- 10 years in the field)

- **An evaluators' group** to support people working with indigenous groups; tool gathering and sharing, address culturally responsive evaluation, develop evaluation mentors:

It might be helpful to have resources about ensuring that evaluation practices are inclusive / culturally responsive. (Both ISE & SciComm but more ISE, researcher, more than 10 years in the field)

A subgroup for evaluators who collaborate regularly with indigenous groups would have been most useful for several projects in which I have been involved. (Both ISE & SciComm but more ISE, practitioner, more than 10 years in the field)

- **Wider distribution and more support for using existing CAISE resources, and the continued curation of existing resources.**

As a mid-career, but younger (40 yrs old) professional I still need support and reminders to use resources like informalscience.org to build and expand my professional network. I need active support from senior leadership within my museum to remember to utilize these resources and provide me with ample time to use the resources. (Both ISE & SciComm but more ISE, practitioner, more than 10 years in the field)

Hmmm. This is challenging. Toolkits are great but people have to know they are there and how to find them. The site is much more geared toward researchers than practitioners. If it was more practitioner tested for ease of use and more practitioner-oriented tools it would have more impact on the actual work that goes on in the field. (Both ISE & SciComm but more ISE, practitioner, more than 10 years in the field)

- **Make the website more easily accessible/easier to navigate**

Honestly, an Informal Science concierge/librarian would be amazing. There is a lot of information to wade through on the website, and the ability to chat with someone about our particular program needs and be directed to resources would be so helpful! I don't have time to stay on top of the field constantly, are there better ways to learn about what research, toolkits, and other resources coming out are most relevant to my small, semi-rural science education program? (Both ISE & SciComm but more ISE, practitioner, more than 10 years in the field)

Finding resources on CAISE is actually not very intuitive (maybe there's another place to say this?) There are a lot of some types of resources, but very few of others. The resources are biased towards 10-15 projects, which don't reflect the diversity of work. (Both ISE & SciComm but more SciComm, researcher, more than 10 years in the field)

There were a lot of great resources on the list you shared that I wasn't familiar with. They've probably been referenced in the newsletter but I often just skim. I consume a lot of info on the go...and have found podcasts to be a means of allowing info consumption while on the go or engaged in other tasks - I'd love to see something like a "This week in ISE" podcast...or maybe a monthly or quarterly call that I could listen in on to get key highlights in the field. There is so much great work being done in this area - it could literally be a full time job just trying to follow it all, and that's why I value CAISE and their efforts to distill things down and share out highlights. (General education, researcher, more than 10 years in the field)

Additional suggestions focused on the theme of CAISE-sponsored convenings:

- Provide more professional development information and opportunities for ISE practitioners

Additional information about professional development opportunities beyond conference announcements and grant deadlines (such as calls for papers, invitations to review or edit, and courses for those not in academia). (ISE, both practitioner & researcher, more than 10 years in the field)

- **Sponsor more ways for peer-to peer interaction** through local networks, topical meetings, webinars, and/or communities of practice

Perhaps more regular, virtual, topical opportunities to connect with colleagues. Coffee hour types of events that focus in on some of the pressing issues, challenges, strategies playing out in the many projects (NSF and beyond).. Ways to cultivate learning communities across the field in between in-person times to connect that move beyond current PIs and go deeper than show-n-tells. (ISE, practitioner, more than 10 years in the field)

Short workshops, webinars open to anyone in the field. (Both ISE & SciComm but more ISE, researcher, more than 10 years in the field)

I need community and people who I can bounce ideas off of, possibly collaborate with along lines of shared interest, and feedback and working session geared toward AISL proposal development. Maybe I am unique in that I am working in a college (as a staff member even) that doesn't necessarily have many people who would be knowledgeable about this domain. It also feels like NSF program officers re the only go-tos, and it's sort of unclear to me how to tap into the (which?) conferences, symposia, workshops, and programs that would help cultivate successful research and program proposals — and effective knowledge networking. Are the AISL PI meetings something anyone can join? I've seen them listed as events, but they seem exclusive. (Other field, both researcher & practitioner, more than 10 years in the field)

Additional suggestions focused on new topics to cover, including the following:

- How to access funding
- Engineering projects for informal settings
- Developmental perspectives on learning
- Support for graduate students/new/early career job opportunities

- Peer-reviewed paper writing workshops and support
- Tightening the connection between ISE and formal schooling

As a young professional, I wish there was a more clear pathway for becoming involved in this community. I know that my advisor participates in the PI meetings - but that doesn't feel like a space for me as a PhD student. (ISE, both researcher & practitioner, 5-10 years in the field)

And finally, suggestions about CAISE culture, including the following:

- **Less academic, more practical**

So much of what is being produced is so academic, I find little use for it in running my museum. So basic operations/survival best practice information would be very helpful. (ISE, practitioner, more than 10 years in the field)

- **More inclusive**

I don't feel very connected to CAISE. I see staff at PI meetings and realize they are working very hard to organize the meetings, however I don't know who I would contact there if I did want advice. I had an ITEST grant a few years ago and I felt the staff at STELAR reached out to make me feel part of the community. (ISE, practitioner, more than 10 years in the field)

I think for a while you became "politicized." I also think your concentration with museums is unfortunate. You did little to represent other STEM youth programs/education services and informal learning spaces (Both ISE & SciComm but more ISE, practitioner, more than 10 years in the field)

DEAI Issues, Needs and Opportunities

Survey respondents were given the option to respond to two open-ended items regarding what they believe are the highest priorities regarding DEAI issues as well as opportunities and resources for centering equity and addressing social justice in their work.

In response to the item, "*From your perspective, what are the most pressing issues around diversity, equity, access and inclusion (DEAI) in the informal science education or science communication fields (or connected fields)?*" a number of themes emerged:

- **Representation:** respondents noted a need for diverse representation across institutions (especially in leadership roles), project teams and the broader ISE/SciComm field.

"The workforce in informal science learning/science communication is much less diverse than the population we serve. This is a self-fulfilling prophesy as diverse communities aren't seeing themselves in us, and so continue to look elsewhere." (Both ISE & SciComm but more ISE, practitioner, more than 10 years in the field)

"Representation from BIPOC communities on projects." (ISE, practitioner, more than 10 years in the field)

"Diverse representation in leadership roles."(ISE, practitioner, 5- 10 years in the field)

- **Field-wide culture and norms:** this included descriptions of norms (e.g., policies, resources, practices) that limit addressing DEAI in some way or something that needs to be addressed at the field/systems level to support DEAI efforts.

"1) There is a lack of funding sources that support long-term DEAI initiatives within informal science learning institutions; 2) The lack of salary equity, minimal opportunities for advancement, and poor work-life balance in informal STEM learning institutions is pushing already marginalized folks out of the field; 3) Federal funding often goes to already well-resourced institutions like large research universities because smaller community organizations do not have the same capacity to navigate federal proposal processes. Community organizations are often beholden to research partners to secure funding, resulting in power dynamics that favor academic interests over community needs." (ISE, both researcher & practitioner, more than 10 years in the field)

"Career development for educators and increasing compensation and benefits for informal science educators. In many instances, it's a career choice that is not tenable for folks who have limited family resources and support. Low pay, seasonal work and short-term grant funded programs that end, make it hard to develop a diverse workforce." (Both ISE & SciComm but more ISE, practitioner, more than 10 years in the field)

"Reinforcing systems of oppression within our own institutions (long hours, low pay, lack of support for physical and mental health, rewarding authoritarian leadership, "urgency" and 'scarcity' mentalities."(Both ISE & SciComm, practitioner, 5-10 years in the field)

"Another pressing issue, at the broader level, is the persistence of white normative culture characteristics within ISE and other STEM institutions. Decolonizing efforts and dismantling white supremacist culture norms are key."(Both ISE & SciComm, researcher, more than 10 years in the field)

- **Inclusive practices:** strategies or approaches that advance equity (or not), including content aligned with cultural background or interests of all, co-design of opportunities, engaging with communities. This is contrasted with "surface level" or "performative" efforts.

"Managing the relationships and engaging with youth and stakeholders is a very important part of the process. It's too easy to just design and run programs and gather the great feedback from those that choose to join us. It's much harder and takes more effort to go into the communities that are not engaging and find out why, and then change what you're doing to meet their needs." (ISE, practitioner, More than 10 years in the field)

"Trust and co-construction with communities which stand to benefit from research on informal STEM learning and innovative programming." (Both ISE & SciComm, both researcher & practitioner, more than 10 years in the field)

"The need to bridge between the 'Ivory Tower' and communities of color. I think that the last PI meeting did a good job in advancing this objective last year by elevating the participation role of the community partners. There is much more work that needs to be done in this area and there are also some researchers that come from the communities and have also done grassroots work in the communities." (Both ISE & SciComm, both researcher & practitioner, more than 10 years in the field)

- **Resources/tools:** an asset identified as needed in the field-, institution-, or individual-level to support DEAI.

"Developing tangible actionable items that the disciplines can use to create inclusive, accessible, and equitable spaces for everyone and establish scaffolding to ensure success among professionals"

from underrepresented populations.”(Both ISE & SciComm but more ISE, researcher, more than 10 years in the field)

“We need synthesized knowledge and information that is being developed across projects--e.g., down to evolving and culturally responsive terms for dealing with underrepresented groups in STEM.”(Other field, both researcher & practitioner, more than 10 years in the field)

- **Professional learning or growth:** opportunities or practices that prompt reflection, considering biases as well as specific areas for continued professional learning as a field.

“The most pressing issue to me is making sure the people who are conducting or running ISE have appropriate cultural, social, and bias training. I am not convinced yet that we don’t have an educator issue rather than an access issue.”(Other field, both researcher & practitioner, more than 10 years in the field)

“Everyone agrees it is a priority issue. I feel like we are repeating ourselves with the constant discussion of why this is important (see recent AISL PI meeting). We can spend more time on the “how” and less on the “why”. We aren’t being trained on how to do better DEAI research and/or to include it as an aspect or framework in our other projects. I pay careful attention to the field, routinely attend webinars, etc., and follow the key people in the field (Calabrese Barton, Dawson, Archer, etc.) and it educates me. But I still feel like I don’t know HOW to do it.” (ISE, researcher, more than 10 years in the field)

“Educating corporate leaders on the importance of broadening STEM education opportunities to students who have historically been excluded and how that requires not just student preparation but a change in the culture of higher education and corporate environments.” (ISE, practitioner, 5-10 years in the field)

- **Research/evaluation:** Research practices that are inclusive and culturally responsive, approaches that “research with” rather “research on” with different communities.

“The more the research teams reflect the diversity of the targeted audiences the less it will be ‘research on’ (which is kind of weird and often misses the mark where impact can be made) and will become ‘research with.’”

“Ways to evaluate informal science without making people feel studied or measured.”(Both ISE & SciComm, practitioner, 5- 10 years in the field)

“Alternative ways of knowing is a term/phase I’ve come to be familiar with in the past few years...but I’m still working to understand what that means in the context of different types of STEM projects and what it means from an evaluative perspective. What are the new boundaries and how have commonly accepted criteria for doing science and what constitutes scientific evidence evolved over time?” (General education, researcher, more than 10 years in the field)

“As an evaluator, it is important not only to continually reflect and adapt our practice, but to advocate for change, and challenge traditional practices and norms that promote inequity.”

(Both ISE & SciComm, researcher, more than 10 years in the field)

“That researchers are almost always from higher education systems. To access funds and the ability to communicate findings you need to have a partnership with an organization who has an IRB. These are necessary but limit the accessibility of practitioners from accessing/participating in research. The actual instructors become the subjects of research rather than the doers.”

(Both ISE & SciComm but more ISE, practitioner, more than 10 years in the field)

Survey participants were also encouraged to identify opportunities and resources that would support centering equity and social justice in their work. Specifically, an open-ended survey question asked, *“Given your role in the informal science education or science communication fields (or related fields), what other resources or opportunities do you believe are needed right now that might help you center equity and social justice in your work?”*

A number of ideas emerged from responses to this question including: more dialogue and conversations; specific resource topics; types of resources; engagement strategies; time and funding; and leadership.

- Respondents noted an interest in more **dialogue and conversation**, including opportunities to engage in dialogue to challenge one another, participate in ‘difficult conversations,’ have ‘critical peers’ and connect with colleagues engaged in similar work.
- Specific **resource topics** were noted in survey responses including: decolonizing science, anti-racist education resources, information on relevant models/ approaches (e.g., ethnomath, funds of knowledge), culturally relevant evaluation, inclusive pedagogies and specific instructional strategies, identifying and approaching community partners, building trust with groups or communities, and bias training. In particular, survey participants wanted more of a focus on application of these ideas and the “how to” rather than “why” this work is important.
- A need for **particular types of resources** was noted, especially those that focus on the “how to” aspect of DEAI work. Case studies of DEAI ideas in practice were mentioned multiple times as well as concrete examples of programs and practices aligned with DEAI principles. Other specific resource types included sample instruments, guidelines for culturally response evaluation/ research, standard tools for assessing DEAI efforts at individual institutions, and discussion guides.
- Participants suggested specific **engagement strategies** such as conversation circles, webinars, fostering communities of practice, mentoring programs (including for leadership), building networks or special interest groups, and discussion forums.
- **Time and funding** were noted as essential resources to engage in DEAI work including time to reflect on privilege and bias, time to engage authentically with partners for relationship building in communities, and funding to hire experts. This also included addressing the structural barriers that limit who can secure funding.
- **Leadership** was identified as a critical element of this work. Specifically, a need for more diversity in leadership roles, shifts away from top-down power dynamics, support from leadership to engage in this work and changes in funding priorities were identified as needed in order to center equity and social justice.

Appendix A: Illustrative Quotes from Open-Ended Survey Items

Examples of CAISE/ISDO Resources Use

- **InformalScience.org website:**

I search informalscience for examples of evaluation studies when I'm preparing for a new project as part of a literature review.

InformalScience.org is where I go when I need to find educational research to support proposals and project ideas.

If I'm starting a new project, I immediately go to informalscience.org to look up what other work has been done in this way or on this topic or through this medium.

I've also found the database of evaluation resources and reports generally useful from the standpoint of getting more details or following up after hearing a presentation.

I was researching literature and resources in prep for an AISL proposal, and I used the search function on the website to try to identify prior works, gaps in research and practice, alignments with research agendas, and possible partnerships. My attempts were somewhat inconclusive, but I did come away with areas where my work could possibly align with other national research agendas.

When I have a question about what my informal science education colleagues are doing currently in the field, I search the InformalScience.org site for current research or grant projects.

I have used (the website) to access reports and evaluations from other projects that relate to my work. I often use the CAISE website for research in my work. It is very well organized and easy to navigate and has made a great difference in what I do.

I have looked at programs that have been linked to CAISE to compare and understand what exists in the informal science landscape and how the programs/ideas that I might be thinking on are redundant or complimentary to other things that might already exist.

Honestly, we were big CAISE users at our public library before the pandemic. We are just now returning to programming, and we are not really in the best headspace for pushing out more in-depth programming yet. Pre-pandemic, the principles pushed through Informalscience.org were some of the most enlightening and helpful additions in our STÉM programming for kids.

For planning the activities, and for planning the evaluation

I frequently use InformalScience.org to identify relevant research to support my work.

Keyword search feature to find related projects reports blogs and tools

I use the report repository and have conducted literature synthesis research using that library of grey literature. I use the website to search for examples of projects and research that relate to and inform my daily work.

The projects section is most helpful as you can see what other institutions are doing around similar interests. I use it to share ideas with colleagues and learn from existing programs to better our own.

The repository of white papers and reports are very useful to me when preparing literature reviews. Also, the list of awarded grants is easier to use than the NSF web site and I've discovered relevant awards there that I didn't know existed.

I used the website extensively when I was preparing our proposal. It helped me find similar projects, and it has also helped me find good resources for managing AISL projects. Since I'm completely new to this field, this has been extremely valuable.

I have used the website to update my understanding of current trends in the field.

I use informalscience.org when I'm planning a project to see who is doing related work and I also use it when I'm doing a lit review and want to see recent projects that might not show up in the literature yet.

Recently we searched the website for any projects related to increasing inclusion.

I often send my graduate students to CAISE to explore research that relates to their interests.

for teaching, sharing with students to get inspired for project design.

shared brief reports with students, shared evaluator finder with potential PIs

I forward projects and articles that are useful on to others in my team who would find it useful.

I've directed my education staff to add informalscience.org to their list of professional development websites.

I use the website as a resource for Masters students - paper digests and searchability are great

I refer my graduate students to the CAISE website (informal.science.org) as a resource for example reports to learn more about methods or report writing.

I often use informalscience.org evaluation reports when I teach graduate students. It gives them a sense of how to organize an evaluation report, and can sometimes help with lit reviews.

The website is my go-to resource for supporting my client's projects (I'm an independent museum professional). The website allows me to point to existing research/projects that clients' projects can build on.

Project evaluation reports and project pages on informalscience.org have been immensely useful for me and my students. We look to them for findings, example research designs, and more. I have also used them in an archival way to find out about older projects and to remind myself of their goals.

Posting reports. Looking at reports from others. Many referrals to colleagues!

I do encourage our grantees and their partners to share their ISE-related research, evaluation, and products via informalscience.org.

Research and evaluation reports on informalscience.org are useful to my work in designing ISE research and evaluation studies as well as in my recommendations to potential PIs writing NSF proposals. Being able to post evaluations and research on ISE provides my company with a broader base of exposure, leading to business growth. Prior to informalscience.org, it was almost impossible to locate and obtain work in this area. The site is invaluable for ISE participants. It would be even better if it showed up more often in google searches - many in science communication academic community have never heard of the site.

I've used the EBSCO database to find articles that are otherwise paywalled to me

I frequently use the website to access materials through the EBSCO database. I also semi-frequently look for evaluation reports in the database.

The EBSCO library access is a great help, trying to keep up with research in the informal science biz.

The thing I use the most is access to articles. museums can't normally access scientific articles. This site helps with that for sure.

I have used the project pages on informalscience.org to find relevant resources like research articles, white papers, and evaluation reports. I have also accessed EBSCO via informalscience.org because my institution does not have any library privileges. This service has been very important in letting us access research on informal learning as a non-profit/non-academic institution.

The article database, I was able to find useful literature reviews for my dissertation

I have used some of their tools in workshops.

I have accessed the evaluation database to check out surveys that might be useful to projects I work on.

We use InformalScience.org website to get a sense of the types of projects funded by AISL and some resources to support in the application process.

I use informalscience.org research repository all the time to search for evaluation studies that might be similar to studies I'm planning, or that might be relevant research to help me frame my own research, or to seek out people doing research or evaluation similar to my own projects.

I searched the InformalScience.org database to find examples of developmental evaluation in informal learning contexts.

I have used the evaluation tools to think about how to write grants and conduct evaluation of my research

I have found research instruments on the website to use for my projects.

I used the contents of informalscience.org to inspire our own in-house surveys to measure visitor engagement in our science center.

When designing an evaluation tool, sometimes I look at other program evaluations to see if there are existing instruments.

- ***Identity, Interest and Engagement Videos:***

STEM interest and identity measures used in our current NSF project.

The engagement and identity videos have been helpful in framing my own research and scientists training work.

The videos on STEM identity. I watched all of these and used them to inform a research publication.

some of the STEM identity videos and would like to return to them again.

I really liked the identity videos, which helped me learn about interesting work in the field.

- **Broadening Participation Toolkit:**

I like the toolkit and research report. The toolkits provides guidance of how we can organize some activities based on experience of other experts in the field.

I have used the Broadening Participation toolkit for my own professional development, with my project teams, and have referred colleagues and project partners to it.

I have used the Broadening Participation resources in a variety of ways: in grant proposals, shared with student interns, shared with colleagues at my museum, and discuss in conferences when appropriate.

I have used the broadening participation toolkit to frame issues of equity in informal STEM institutions and argue for greater attention to advancing equity.

I joined an ASTC Virtual Preconference Intensive session "Tools for Conversations on Equity & Broadening Participation in STEM", in 2020 hosted by Jamie Bell and colleagues from CAISE. During the second day we engaged in role playing during the workshop. As part of the Tools for Conversations on Equity & Broadening Participation in STEM, the presenters shared a guide for role playing professional conversations. I found this very effective and fun! I have used the Broadening Participation Toolkit a lot in my work since then, shared them with others, and use them in my own work with clients.

I have used the broadening participation briefs in proposals I have written and when planning facilitated workshops with peers around these ideas and concepts.

I include the broadening participation documents on CAISE in my list of resources that I share with researchers that attend my broader impacts workshops.

Broadening Participation Toolkit, using for multiple projects to explore how people talk about DEAI in their work and how to foster conversations at my institution with non-eval staff.

I frequently read, reference, and share the Broadening Participation Toolkit. I have shared it with colleagues and excerpts from it with participants in our programming.

I have shared and presented the BP toolkit to researchers interested in DEI.

- **CAISE newsletter/blogs:**

I sometimes find interesting or useful reports or other resources via the newsletter.

I like reading articles listed in the newsletter.

I use the newsletter to keep informed of published work and to learn about free webinars and workshops of interest.

I use the blog and the links from it in courses I teach for professionals and students as well as for identifying materials to use in grant proposals.

Newsletter. I read it to stay up on interesting developments in the field; I often click through links that lead me to other organizations and projects that I find interesting. I have shared the newsletter in whole or part with other colleagues; I recommend CAISE resources and encourage participation with emerging professionals in the field.

I find the CAISE newsletter helpful to remind me about resources that exist and keep up to date on informal science topics since I do not have a lot of time in my work schedule to review the website constantly.

The newsletter is the most pertinent resource. I run a small informal science institution, and we don't have a large professional development budget. I use the newsletter to try and keep track of new reports that are being released that we might be able to benefit from.

I usually open and skim the newsletter when it arrives.

The CAISE newsletter helps keep me connected with existing and new professional resources. When it arrives in my inbox it is like an alarm/reminder to take some time to connect with what is happening in the field beyond my own bubble.

I use the newsletter and share the events and resources to our newsletter.

I often use the CAISE newsletter to keep up to date on current information on proposal opportunities and related research. I have contributed reports and articles to the Newsletter.

Newsletter: found out about funding opportunities.

I appreciate the newsletter as a way to see what others are doing across the field, especially as I've been able to travel less and hear less about the work that is being done across the field.

I read the newsletter that is sent to me and have participated in webinars and used some of the links to learn more.

I also use the CAISE newsletter to help me know what to look for on the website (i.e., new additions to the website).

Blog posts: to discover programs that our foundation can support through funding or capacity building.

I sometimes pursue information provided in the newsletter to pass on to my students and colleagues.

- **PI Guide for Managing Evaluation:**

We use the evaluation planning resources for our museum studies course on research and evaluation.

- **Other resources:**

Jamie is going to write the foreword to our book, Amplifying Informal Science Learning, and he has helped make connections to diverse informal educators who are also contributing.

PI Meeting was a great opportunity to see other projects and make connections.

Gaps/Opportunities for Resources:

- **Create a clearinghouse for research synthesis:**

Access to literature/journals is always an issue. EBSCO doesn't carry any of the journals I typically need. I think Google Scholar has started indexing informalscience.org and that is great!

I really like the research briefs which summarize important findings on relevant topics to the ISE field, and I would like to see more of these.

- **An evaluators' group:**

As somebody with extensive experience in STEM education but who is newer in the role of an evaluator, I appreciate all the valuable resources that the CAISE website provides, for example the Principal Investigator's Guide: Managing Evaluation in Informal STEM Education Projects. Personally, I would like to see more on-ramps to bring in new evaluators. How could CAISE support an ongoing dialogue around this, provide webinars, offer mentoring programs, etc?

Easier access to affordable and easy to use evaluation tools.

Evaluation tools are always the most difficult aspect of our work as practitioners.

I would encourage a more active outreach to gather unpublished evaluation resources and tools. To my knowledge, they are not actively solicited and it takes several months for submitted reports to show up on the website.

- **Make the website more easily accessible/easier to navigate:**

Wasn't aware of other resources that are being offered. These should be more prominently featured along with perhaps online events so people can be aware how some of these toolkits can be used. Wouldn't occur to me to reach out to CAISE staff for professional help. Not really visible in the platform.

The website feels cold and difficult to navigate. For example, I am interested in the search tool but I'm not sure how to simply browse resources without having a specific keyword in mind. I am also not entirely sure what the CAISE program is supposed to do.

I rarely use CAISE because it is very poorly organized. My few attempts to find information were fruitless and it is easier to use other resources to find what I need. I am surprised that NSF has funded this site

Resources in Spanish.

- **Additional suggestions:**

More informal, networking virtual meetings. Getting to know others and their perspectives would help us find areas of overlap and perhaps even open up areas of inquiry.

Stronger peer to peer interactions via the website. Or maybe webinars.

I am early-career (just about to defend my PhD), and access to job boards or advice on transitioning into informal education would be very helpful! Notice of job opportunities

What would help me, frankly, is someone who would set up a peer-review paper writing semester-long workshop, where I and a co-author or two could have space to meet and to call upon a CAISE staff member when we get stuck regarding other work to reference in the introduction, to help motivate the writing and make it feel more like part of my job (which it is) instead of something I have to do during off-work time (which rarely happens and thus my NSF-funded work in ISE never was published, to the detriment of the field, I feel.)

DEAI Issues, Needs and Opportunities

- **Representation:**

"Identifying and engaging diverse individuals for Boards and staff [is a pressing issue]."

"The most pressing issue is leadership at the top. We are not going to make the progress we should on diversity and equity as long as the boards of trustees, CEOs, and directors remain predominantly white male."

- **Field-wide culture and norms:**

Much of the work at the moment feels surface level, sometimes because grant opportunities aren't structured to foster deeper work, institutions or staff are uncertain how to engage more deeply with underserved audiences, or because the goals of informal science education don't align with the most pressing needs of underserved communities.

"The obsession with credentials and the writing for other academics rather than people who actually do the work keeps a dividing line between who gets to be in charge/get the funding, etc. and who the up-to-the-manager level folks are. More actual practitioners have to be engaged in the process and the products have to be aimed to their use."

"It needs to be centered in all our work and built into our systems; NSF should demand this work in a truly transformative way, which includes changing the ways grant funding works (for instance, even though we now often hear that we should involve community partners, it is really difficult for partners to invest the time, paperwork, etc. that goes into grant writing, and there's still a perception that these organizations are "not reliable grant recipients" because they don't

have the "typical" credentials of research. At an organizational level, we need to be making policies, setting goals, measuring these goals, writing job descriptions, etc."

- **Inclusive practices:**

"The presentation of people of color in science as being exceptional. This is condescending and does not foster a feeling of trust. And then when people of color are included, they are homogenized as if color has nothing to do with their work or the perspectives they bring."

"Moving past the language and awareness to practices that often require change."

"We need to co-create programs with community members instead of assuming we know what's best, or going in with a deficit mindset regarding the communities we want to engage."

- **Resources/tools:**

"Resources and education on how to identify and address barriers to engaging with informal science learning. Also, resources and a forum for discussion around how to integrate multiple ways of knowing into informal science education."

"While most of us have good intentions and care about DEAI we often do not have the knowledge to design programs that are based in DEAI best practices - create guidelines and easy to use frameworks to help us do that."

"Awareness - people continue to reinvent the wheel and not connect dots across these spaces. Continuing to amplify great work and research and effective strategies in these spaces is important."

"I feel we need real practical steps for engaging at a deeper and more systemic level."

"Case studies of those making progress--case studies often provide concrete way to change practice."

- **Professional learning or growth:**

"Personal reflection on values and recognizing potential biases is essential for authentic relationship building, as well as allowing for an ongoing discussion and data mining for extracting meaning from data in partnership."

"Continuing the struggle. There is not end to this effort the path ahead is rocky and we need each other to hold ourselves accountable to open doors and make space for each and every one of us to participate and shape a more just and equitable future through science and technology."

"We need more professional development on DEAI and ways to APPLY the lessons. I struggle to apply what I have learned to my own work since we run an outreach program that is in the classroom for a short period of time. This makes it tough to meet the kids where they are at because we don't have time to get to know them."

"Each person individually should explore their own biases, and organizations should provide resources to be able to do so."

- **Research/evaluation:**

"The more the research teams reflect the diversity of the targeted audiences the less it will be 'research on' (which is kind of weird and often misses the mark where impact can be made) and will become 'research with.'"

"Alternative ways of knowing is a term/phase I've come to be familiar with in the past few years...but I'm still working to understand what that means in the context of different types of STEM projects and what it means from an evaluative perspective. What are the new boundaries and how have commonly accepted criteria for doing science and what constitutes scientific evidence evolved over time?"

"Evaluation tools that are more nuanced and recognize ISL work as one part of a larger system and that change happens over time"

"Equitable evaluation strategies and adoption as standard practice."

"Metrics and standards that hold ISE org leadership accountable for true DEAI work vs window-dressing."

"Research processes that may be inherently exclusive [are a pressing issue]."

APPENDIX B

2021 NSF AISL Awardee Meeting Report

CAISE 2021

NSF AISL AWARDEE MEETING REPORT

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February 2022



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- Post-Event Survey Data Graphs
- Plenary Chat Analysis/Summary
- Open-Ended Survey Questions Summary

CAISE 2021 NSF AISL AWARDEE MEETING REPORT

February 2022

INTRODUCTION AND BACKGROUND

Inverness Research and Oregon State University, with support and input from CAISE, conducted an evaluation of the 2021 NSF AISL Awardee Meeting which was held virtually October 19-21, 2021. The evaluation effort included observing the meeting, participating in debriefing the meeting with CAISE co-PIs, the CAISE equity audit committee, and NSF Program Officers; developing and administering a post-event survey;¹ and analyzing data collected through both the survey² and Pathable, the virtual platform.

This report summarizes the key evaluation findings. It includes the following sections:

- Executive Summary of High-Level Key Findings and Lessons Learned
- Summary of Findings
- Appendices (chat analysis, open-ended comments summary, post-event survey data graphs)

The meeting specifically focused on inviting and including community partners, and on creating equitable partnerships as the major theme. Thus, our analysis and reporting is primarily focused on the difference in experience and ratings between community partner and AISL PIs/Co-PIs/staff, between those who see themselves as part of the AISL community and those who do not, and those who see themselves as researchers and those who see themselves as practitioners.

¹ We received 168 surveys; most questions were answered by 140-150 of respondents. The survey was sent out to 438 registered participants, which gives us a response rate of 38%. With removing registered participants who told us they had registered but were unable to attend, or whose surveys bounced back, and those with no start/stop time in Pathable data, the number is reduced to 369, which puts our response rate at 45%.

² Post-event survey was disaggregated by the following subgroups: AISL PIs, CoPIs, project staff/community partners; respondents whose primary professional focus was ISE/SciComm/those that were not; researchers/practitioners; years in the field (less than five years, five to ten years, greater than ten years); gender; race/ethnicity (the majority of participants were white, and the remaining participants were grouped into a non-white category for sub-analysis purposes). Co-analysis of post-survey data and behavioral data from Pathable was not possible since the two data sources could not be linked.

HIGH-LEVEL KEY FINDINGS AND LESSONS LEARNED

The 2021 NSF AISL Awardee Meeting had the following key features that differentiate it from previous meetings. Our summary of key findings will focus on these three main features:

- 1) The inclusion of community partners (those organizations that are key partners in or primary target audiences of AISL project work) versus an awardee meeting that involves primarily just the PIs, co-PIs, and staff from AISL projects
- 2) A virtual meeting versus an in-person meeting
- 3) A focus on equity, diversity, inclusion and access that was central throughout the entire meeting

In addition, we'll briefly summarize the overall summary ratings on quality, value, strengths and areas for improvement.

Including Community Partners

The 2021 AISL Awardee Meeting successfully incorporated the involvement of community partners. The participation of community partners in the meeting was viewed as important and valuable by respondents. Meeting attendees responding to the survey noted that the community partners added an important perspective to the discussions at the Awardee meeting, and reinforced the equity themes, as more perspectives and practices from people historically excluded from field-leading conversations were heard. The percentage of community partners rating their satisfaction with specific elements of the meeting was higher than the percentage of AISL PIs, which would indicate that community partners were somewhat more satisfied with the meeting than AISL PIs were.

The inclusion of community partners also presented design challenges for CAISE in how to create a satisfying professional meeting for two connected but different audiences. There was consensus among respondents that the participation of the community partners could have been more optimal with some additional supports. These supports included the following:

- more information beforehand on the presentations so PIs and community partners could work together to decide what was most important and beneficial for the PIs and community partners to attend,
- more community partner representation in the plenary sessions,
- at least one session that was just for community partners to be able to talk together (this was considered by CAISE as they were planning the meeting and the decision was made not to have separate sessions for equity reasons), and
- arranging the smaller breakout groups such that individual community partners would not find themselves the sole person representing community groups and thereby carrying the weight of representing them in those discussions.

Focusing on Equity

The 2021 NSF AISL Awardee Meeting's focus on equity was viewed as useful, thought provoking and valuable, and was highly appreciated by participants. The sessions most explicitly focused on equity were some of the most highly rated. Survey respondents appreciated that the equity theme carried throughout the entire meeting, and that the meeting gave them the opportunity to gain new insights into current equity and diversity work in ISE and SciComm. Specifically, participants reported important outcomes of the meeting related to the following points:

- having their ideas around equity and social justice practices reinforced,
- gaining a better understanding of the importance the NSF AISL program is placing on equity and social justice work,
- being challenged in their thinking about addressing equity issues in research and practice work, and
- being committed to applying equity ideas from the meeting in their own work.

Meeting Virtually

The 2021 NSF AISL Awardee Meeting was the first-ever virtual AISL PI meeting. Importantly, the majority of participants responding to the post-event survey had attended a virtual meeting before. For the most part, the virtual meeting was successful – survey respondents were generally satisfied with the meeting, and said it met their expectations. Open-ended comments from survey respondents indicated that this was “better than most virtual meetings” and even “the most productive and interactive online workshop I’ve attended.” The virtual platform was fairly easy for participants to navigate, and the poster sessions were more highly rated for this meeting than for past in-person meetings.

However, technical issues were a challenge. A few sessions started late, the breakout sessions ended abruptly, there were persistent sound issues where presenters’ sound was cutting out, and some facilitators were unable to get into breakout rooms. In addition, some of the networking, connecting and finding of future collaborators, which are outcomes that have generally been highly rated in past in-person meetings, were more challenging and less successful in the virtual format.

We found the virtual meeting presented interesting trade-offs. The virtual meeting allowed for the participation of community partners and more participants beyond the PIs and co-PIs who are normally the sole attendees, where the costs of travel, housing and additional participants would be prohibitive. In addition, community partners working in organizations that have few staff, who likely could not find staff people to cover all their time to attend an in-person meeting, were able to pop in and take advantage of as much of the meeting as their schedules allowed for.

We also think the plenary sessions were inviting in the virtual format, in that presenters seemed to be talking with each other, as theirs were the only faces on the screen, versus

broadcasting to a ballroom full of people. We also wondered if the chat function facilitated questions being raised during the plenary sessions; for example, we wondered if people felt more comfortable asking questions; they did not have to stand in line, worry about the session time expiring before they asked their questions, and perhaps felt less vulnerable when asking more challenging questions.

On the other hand, the virtual meeting was less successful in fostering connections and networking, which have been important features and outcomes of past in-person meetings, even with affordances built into the platform to facilitate networking. Having many opportunities to engage in small group conversations with people you choose to was less successful in the virtual format, and the technical challenges (many of which were a result of problems on the participants' end vs. the meeting platform's) were problematic.

Overall Quality, Value, Strengths and Areas for Improvement

Sixty-three percent of all respondents rated the meeting as high or very high quality; 67% of all respondents rated the meeting as high or very high value. While it is difficult to compare the quality and value ratings for this meeting with past meetings, because this was a virtual meeting, we note that these ratings were slightly lower than the two most recent meetings, but are similar and slightly higher than those for the 2010 ISE Summit which also included more participants beyond AISL PIs and co-PIs. When we examine the disaggregated findings, we noted the following:

- More community partners rated the overall value of the meeting high or very high than AISL PIs.
- More ISE/SciComm professionals rated the overall value of the meeting high or very high than non-ISE/SciComm professionals.
- More non-white respondents rated the overall value of the meeting high or very high than white professionals.
- Open-ended comments indicated technical challenges as a primary factor that impacted the perception of the meeting's quality.

The *Plenary Sessions* on day one and day two were the most well-attended and were among the most highly rated sessions of the meeting. Ratings for the *Critical Conversations* sessions slightly improved from day one to day two, but overall were rated lower than other sessions. There was considerable spread in ratings among the *Concurrent Sessions*; as has been the case over the past years' PI meetings, the specific composition of presenters, attendees, and facilitators, and the degree to which there is ample time for small-group discussions, impacted the perceived quality and value of individual sessions.

The most valuable aspect of the meeting across all post-event survey respondents was learning about the diversity of work funded by AISL. For AISL PIs, the most valuable aspects were the focus on equity and inclusion, and the inclusion of community partners in the meeting. For

community partners, the most valuable aspect of the meeting was the opportunity to participate in small group sessions.

In terms of suggested areas for improvement, the following were the primary areas mentioned:

- minimizing the technical issues,
- limiting or better defining/contextualizing academic jargon, and
- encouraging even more small group conversation and engagement.

In addition, some AISL PIs mentioned in the open-ended comments that the poster session was “challenging”, the Concurrent Sessions needed more time, and more facilitation was needed in the smaller breakout sessions.

For community partners, there were two suggestions related to power dynamics:

- Community partners felt there were challenging power dynamics when there was only one community partner in small breakout groups.
- They felt the broader power dynamics that sometimes make it difficult for community partners to even apply for AISL awards themselves (rather than partnering with another agency that is taking the lead) went unaddressed.

They also wanted more context and background information on the meeting prior to the meeting.

SUMMARY OF FINDINGS

This section of the report presents the detailed summary of findings and supporting evidence. For a comprehensive overview of the data collected, please see the appendices which contain a full set of graphs for the post-event survey questions, a summary of the open-ended comment questions from the survey, and an analysis of the chats from each of the three Plenary Sessions.

This Summary of Findings has the following major sections:

- Characterizing Respondents
- Meeting Participation
- Overall Quality and Value
- Satisfaction and Successful Meeting Elements
- The Virtual Platform
- Impacts and Benefits
- Strengths of the Meeting
- Areas for Improvement
- Findings on Types of Sessions

Characterizing Respondents

We received 168 surveys; most questions were answered by 140-150 of respondents. The survey was sent out to 438 registered participants, which gives us a response rate of 38%. With removing registered participants who told us they had registered but were unable to attend, or whose surveys bounced back, and those with no start/stop time in Pathable data, the number of likely active participants is reduced to 369, which puts our response rate at 45%. (Response rates for past AISL PI Meeting surveys have ranged from 50-54%.) Since demographic data were not collected of registrants, we cannot estimate the representativeness of respondents to participants. Results should therefore be interpreted with caution as possibly biased towards positive and strongly negative perspectives.

The majority of respondents (84%) were AISL PIs/co-PIs or project staff; 19% were representatives or staff members of community organizations partnering on an AISL project.³ The remaining were invited presenters or “other.” (n=143)

The majority of respondents (75%) see their primary professional role to be in informal science education or SciComm. (n=142)

³ This was a “check all that apply” question; there were five respondents who identified as both a PI and a community partner. Based on their background and history of involvement in ISE projects, for the purposes of this analysis, based on our knowledge of the individuals and their organizations, we placed four of the five in the PI category, and one in the community partner category.

There were slightly more researchers in the pool of respondents than practitioners. Forty-five percent identified on the researcher side of the continuum (researcher or both, but more as a researcher than a practitioner); 41% identified on the practitioner side of the continuum (as a practitioner, or both, but more practitioner than researcher). Thirteen percent identified as both equally (n=141). The balance of researchers to practitioners responding to the survey was slightly more even than the respondent pool to the 2019 PI Meeting survey which was higher in researchers.

The majority of respondents have worked in their professional field for ten years or more (72%); 25% have worked in the field from 5-10 years, while the remaining three percent have worked in the field for four years or less.⁴ Interestingly, 63% of respondents indicated that they had never attended an NSF AISL PI meeting before (n=138). For comparison, in 2019, there was a higher percentage of AISL PI Meeting survey respondents who had worked in the field for less than five years (12%) and a slightly lower percentage of survey respondents who had worked in the field for ten years or more (65%), and a similar percentage of respondents who had not attended a PI meeting before (61%).

The majority of respondents were female (66%). Twenty-six percent identified as male, while 1% identified as non-binary, 5% preferred not to answer, 1% preferred to self-describe (n=132).

The majority of respondents identified as white (74%), while 26% identified as “non-white” (all other ethnicities/races other than white only, including multi-racial (n=132).

Meeting Participation

The number of attendees were counted as those that had check in and check out times in the virtual platform data. Partial attendance was counted as 10 minutes to 29 minutes; 30 minutes or more was counted as full attendance. Most attendees spent 30 minutes or more in each session: once they joined, they stayed. For example, the majority of attendees (88% to 100%) participated in sessions for 10 minutes or more; 65% or more participated in sessions for 30 minutes or more. The Plenary Sessions on Day 1 and Day 2 were the most well-attended of all the sessions.

Overall Quality and Value

The overall quality of the 2021 NSF AISL Awardee Meeting was rated as high or very high (4 or 5 on a 5-point scale, with 1 being *very low*, 3 being *mixed*, and 5 being *very high*) by 63% of all respondents (n=147). The overall value of the meeting was rated as high or very high by 67% of all respondents (n=145). Thirty percent of respondents rated the meeting quality as mixed, while 27% rated the meeting value as mixed. Six percent rated the quality as low, with 5% rating the value as low, and 1% rated the overall quality and value as very low.

⁴ PIs were encouraged to bring early career professionals to the meeting if no community partners were available.

Respondents were also asked to rate on a scale of 0-10 the likelihood of them attending a meeting like this in the future and recommending a future meeting of this kind to a colleague. For the question on the likelihood of them attending another meeting like this, the net promoter score for this item was 26. For the question on the likelihood they would recommend the meeting to a colleague, the net promoter score was 18. While both scores are mildly positive (any scores above zero are considered promising, and over 50 is excellent), they also indicate that more than a quarter of attendees did not perceive the meeting as positive.

Figure 13: Likelihood of Attending Another Meeting

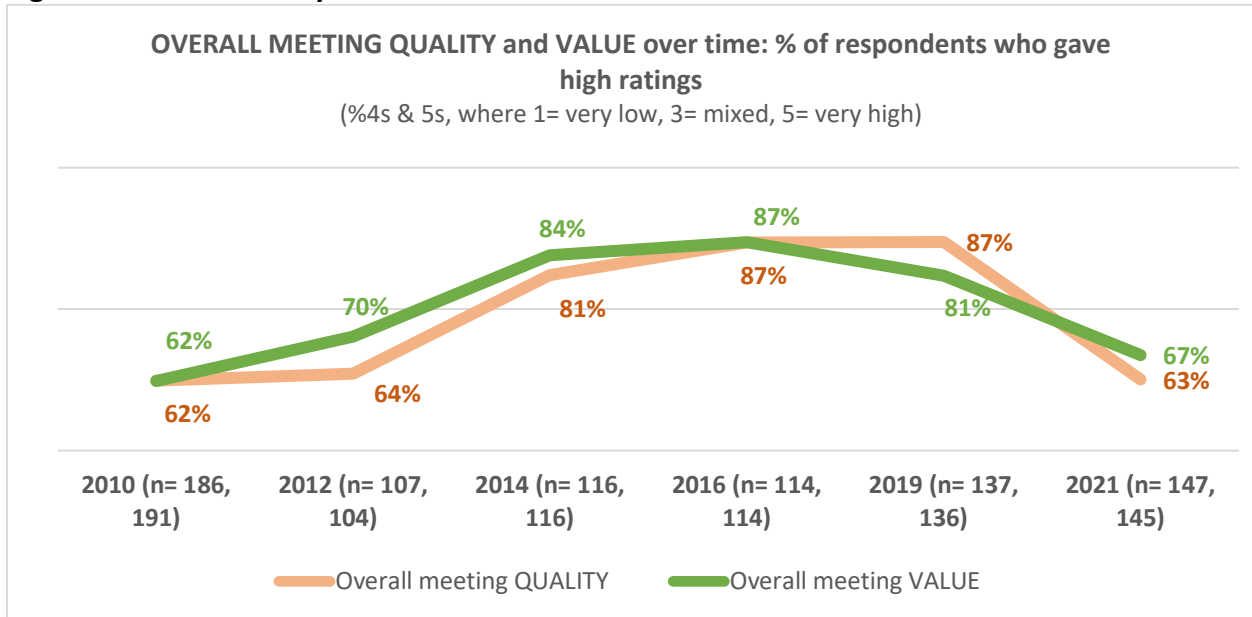
Detractors (% 0-6)	Passives (% 7-8)	Promoters (% 9-10)
26%	22%	52%

Figure 14: Likelihood of Recommending the Meeting to a Colleague

Detractors (% 0-6)	Passives (% 7-8)	Promoters (% 9-10)
27%	27%	45%

The questions on overall quality and value have been asked about in all previous PI meetings from 2010 on. It is difficult to compare the ratings for this meeting with other meetings because of the meeting being virtual; however, the 2010 ISE Summit involved a broader group of participants beyond AISL PIs, and so it might be the most comparable meeting, and the ratings for the 2020 meeting are slightly higher than they were for the 2010 Summit. Responses to open-ended comments point to the technical difficulties with the virtual format being the likely reason for the lower ratings for this one compared to the last few years’ meetings. Please see the appendix for a breakout of the full range of ratings for quality and value for the 2010-2020 meetings.

Figure 1: Overall Quality and Value Over Time



Consistent with data reported in other areas of this report, 77% of community partners (n=22) rated the value of the meeting as high or very high, compared with 65% of AISL PIs, co-PIs, and project staff. In addition, 72% of those who identified themselves as engaged in work that focused on ISE and SciComm (n=102) rated the value of the meeting as high or very high, compared with 56% of those who identified themselves as not engaged in work that focuses on ISE and SciComm. And lastly, 81% of non-white respondents (n=32) rated the value of the meeting as high or very high, compared with 67% of white respondents (n=93).

Satisfaction and Successful Meeting Elements

Attendees were asked to rate their overall satisfaction with the meeting, and the degree to which the meeting met their expectations. For the most part, respondents were satisfied with the meeting overall, and felt the meeting met their expectations. For example, 58% of all respondents (n=146) rated their overall satisfaction as high or very high (4 or 5 on a five-point scale, with 1 being *very low*, 3 being *mixed*, and 5 being *very high*).

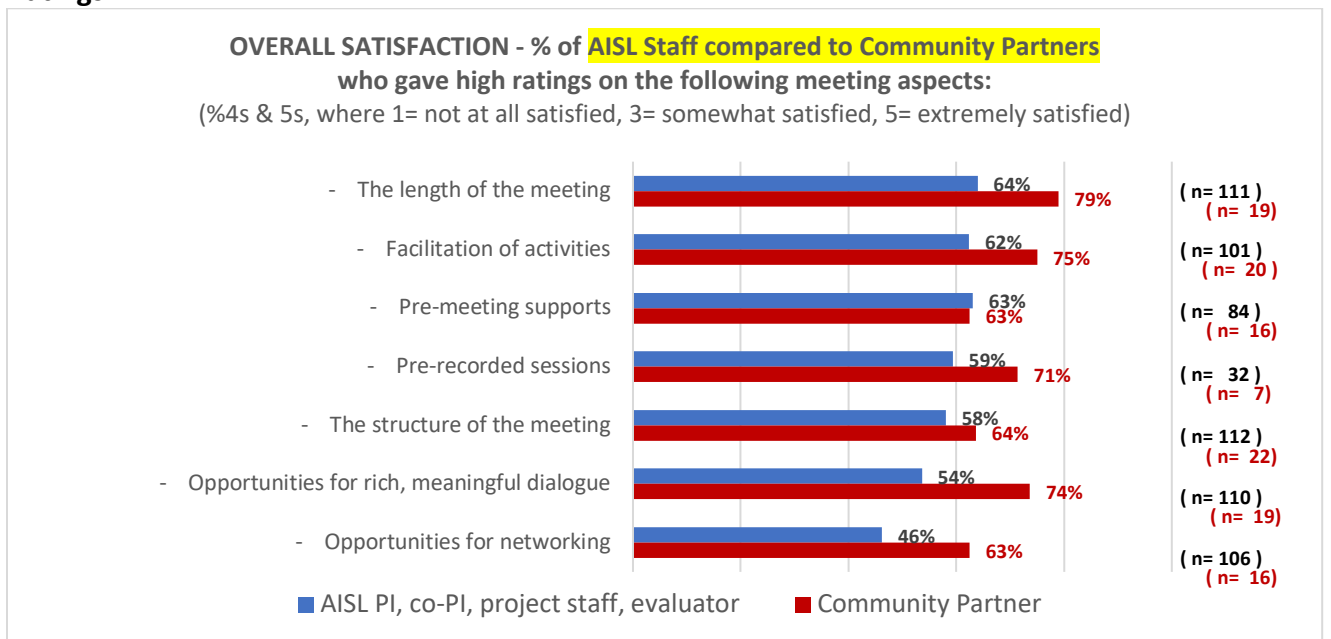
Attendees were also asked to rate their satisfaction with specific aspects of the AISL Awardee Meeting (on a scale of 1 to 5, with 1 being *not satisfied at all*, 3 being *somewhat satisfied*, and 5 being *very satisfied*). The majority of respondents were satisfied with the content of the meeting – from the focus on equity, to the clarity and relevance of the content, and to content that challenged their thinking or way of doing things. Specifically, the “focus on equity content and topics” was the most highly rated item on the list, with 88% of respondents (n=140) rating themselves as satisfied or very satisfied with this aspect of the meeting (a 4 or 5 on the scale). This is not surprising since this was the focus topic of the meeting and participants interested in this topic likely self-selected to attend.

Specific elements of the meeting that were less highly rated, particularly when compared with past, in-person meetings, included networking, making connections, and finding collaborators for future work. “Opportunities for networking” was one of the lowest rated items on the list, with 49% of respondents (n=131) rating themselves as satisfied or highly satisfied with this item. Figure 2 and particularly Figure 3 show that community partners rated most items more highly than AISL PIs did.

Figure 2: Overall Satisfaction with Aspects of the Meeting: Community Partner and AISL PI Ratings



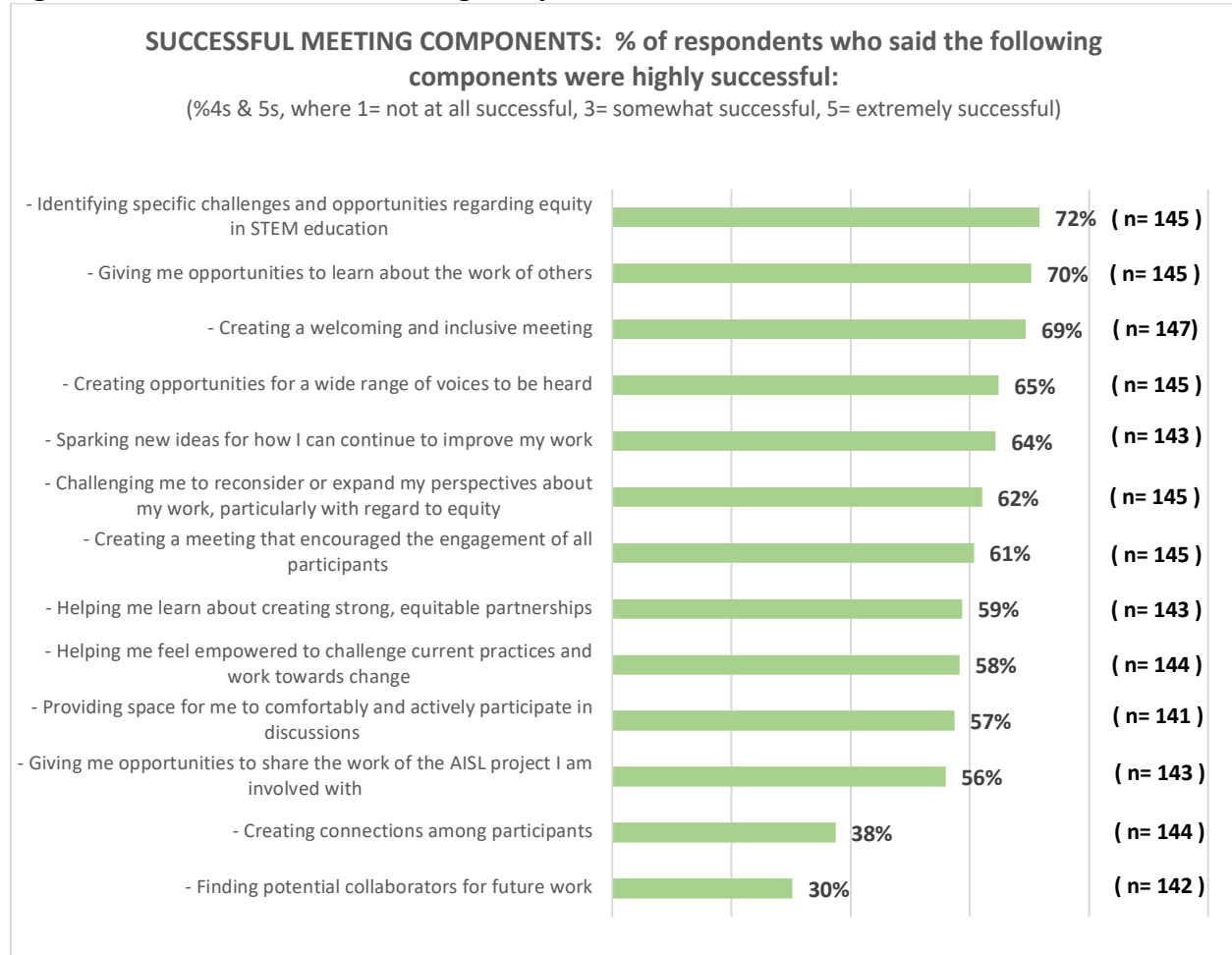
Figure 3: Overall Satisfaction with Aspects of the Meeting: Community Partner and AISL PI Ratings



Attendees were also asked to rate how successful they felt the AISL Awardee Meeting was in achieving a range of outcomes (on a scale of 1 to 5, with 1 being *not at all successful*, 3 being *somewhat successful*, and 5 being *extremely successful*). “Identifying specific challenges and opportunities regarding equity in informal STEM education” was the most highly rated, with 72% of respondents (n=145) rating this item a 4 or a 5) and this item was rated highly across all

subgroups. “Finding potential collaborators for future work” was the least highly rated, with 56% of respondents (n=143) rating this item as a 4 or 5. This item was rated the lowest by respondents across all the subgroups. Figure 4 below illustrates the data.

Figure 4: Successfulness of Meeting Components



For a few of the sub-groups, “Giving me opportunities to learn about the work of others” was their most highly-rated item (for those in the sub-group where ISE and SciComm were not their primary professional focus, those who placed themselves in the “both equally” part of the practitioner-researcher spectrum, those who have spent 10 years or more in their primary professional field, those who had not attended a PI meeting before, and White respondents). “Creating a welcoming and inclusive meeting” was the top-rated item for those respondents who have been in their primary professional field for less than five years. Those newest to the field likely have fewer connections, and a welcoming and inclusive meeting might matter more.

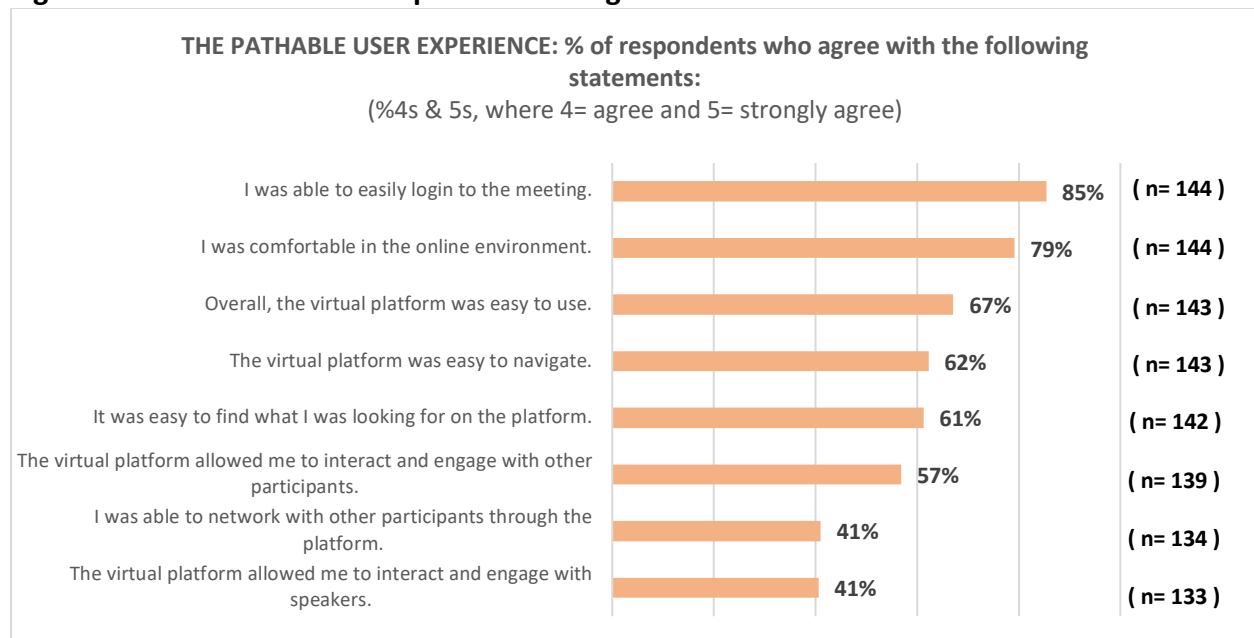
Some of the items that in-person AISL Awardee meetings have been more rated highly on in the past, including finding collaborators for future work and providing networking opportunities are almost certainly due to the meeting being virtual this year.

The Virtual Platform

As this was the first virtual AISL Awardee Meeting, attendees were asked to rate the extent to which they agreed or disagreed (on a 5-point scale, with 1 being *strongly disagree*, 3 being *neither agree nor disagree*, and 5 being *strongly agree*) with a series of statements about the affordances and ease of use of Pathable, the virtual platform. We also asked if attendees had participated in virtual meetings before which 92% had (n=132).

The majority of respondents were able to log in to the meeting and were comfortable in the online environment. Fewer than half of respondents, however, felt the online platform allowed them to network with, interact with, or engage with other participants to the extent they would have liked.

Figure 5: The Pathable User Experience Ratings



Open-ended comments highlight the degree to which the technical issues with the virtual format influenced people’s ratings on the overall quality of the meeting. For example:

The virtual format was terrible. It is not possible to network (the value of a real meeting) and it was not even possible to carve out time to focus on this content. I will not attend virtual meetings anymore.

Eighteen months into the pandemic this stuff should not still be going wrong: Speaker audio not working, hanging around for someone to start the Zoom breakout rooms, delays. Honestly, this was so frustrating I almost just left and didn't come back. And, this is not an impossible problem.

Even beyond the first day, the problems with the conference platform technology was rather distracting and didn't allow as much information exchange or interaction as I had hoped for.

Impacts and Benefits

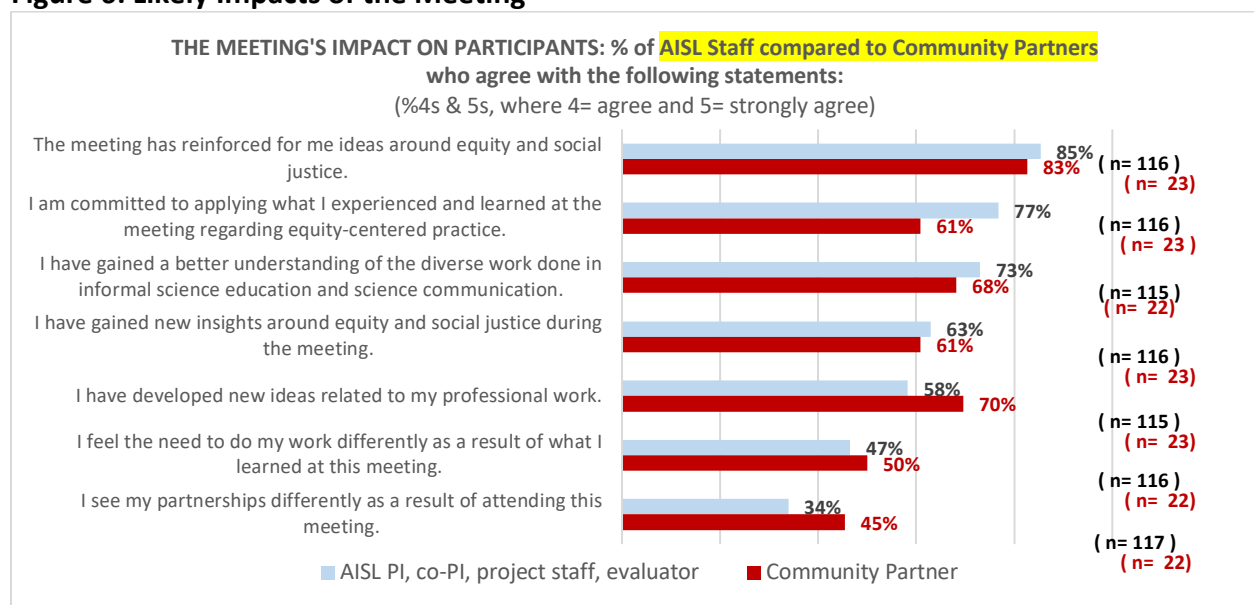
Attendees were asked to rate the extent to which they agreed or disagreed with a series of statements about potential impacts of participating in the meeting (on a 5-point scale, with 1 being *strongly disagree*, 3 being *neither agree nor disagree*, and 5 being *strongly agree*).

Constructs included:

- the degree to which the meeting reinforced their existing ideas around equity,
- whether they gained a better understanding of equity work in informal STEM education,
- their commitment to applying what they learned at the meeting regarding equity-centered practice, and
- the impact the meeting might have on their partnerships.

Eighty-five percent of all respondents (n=142) agreed or strongly agreed with the statement, “The meeting has reinforced ideas for me around equity and social justice.” Other items with a high percentage of respondents agreeing or strongly agreeing included, “I am committed to applying what I experienced and learned at the meeting regarding equity-centered practice,” (74% agreed or strongly agreed) and “I have gained a better understanding of the diverse work done in informal science education and science communication” (72% agreed or strongly agreed). In comparison, 35% agreed or strongly agreed with the statement, “I see my partnerships differently as a result of attending this meeting.” These higher and lower-rated items were consistent across subgroups.

Figure 6: Likely Impacts of the Meeting



Respondents were asked to reply to an open-ended question about what the most valuable aspects of the meeting were. For AISL PIs, co-PIs, project staff, and evaluators responses to this question included:

- Hearing about and learning from the diversity of work funded by AISL
- The inclusion of community partners
- The focus on equity and inclusion and maintaining that thread
- Hearing from all sides of partnerships
- The keynote and plenary speakers and the content of the presentations
- Poster sessions and informal conversations
- Networking and hearing about NSF funding opportunities

Sample comments from AISL PIs included:

For me it was knowing that I'm not alone with all these ideals around equity and justice in the NSF world. Reviewers often question the things this group was promoting. Knowing they're just behind the times, and not necessarily representing the views of NSF is frustrating but heartening as well.

Hearing perspectives, successes and challenges people were facing across such a diverse array of projects. Final session with discussion around future directions of AISL.

Fantastic plenary speakers! Loved the poster room software.

The plenaries on the first two days – excellent speakers, important and relevant topics, and thought-provoking presentations. Very well planned!

The most valuable aspect of attending this meeting for me was hearing what others in the ISL community are thinking about in terms of forming and nurturing partnerships, equity, and course correcting.

I appreciated the inclusion of community partners. It asked me to think about my own presentation differently as well as my comments in sessions, which seems very appropriate to the work we do. It surprised me to find myself working so differently with community partners in the room.

Understanding NSF AISL commitment to equity and inclusion and its ramifications for our work and how we think.

Hearing the perspectives and practices of folks with identities that have been historically excluded from field-leading conversations like this.

The small-group discussions were probably the most valuable, especially those that were focused with specific prompts/questions/or topics.

For community organization representatives the responses included:

- Learning about the different projects in ISE
- Small group sessions and opportunities for networking
- The Rethinking Rigor session (mentioned by two out of 12 respondents)

Sample comments included:

Seeing the work that is being done.

The Rethinking Rigor session was one of the best conference discussions I have ever attended. So many important ideas and varied voices.

To learn about other projects being implemented across America. To learn about the challenges, what worked and what did not work.

The critical conversations were very thought provoking.

Comments from people whose primary role is not science communication or ISE did not differ appreciably from comments from those whose primary role is in ISE or science communication. People who identify on the practitioner end of a continuum commented on the value of seeing the diversity of projects being supported by AISL, the equity focus framing the work in the field, hearing perspective from speakers they don't often encounter, and the opportunity to hear from community partners. People who identify on the researcher end of the continuum appreciated the inclusion of community partners, learning about the range of projects, hearing from NSF program officers, and the panel speakers and discussions, particularly the equity leaders in the field.

Strengths of the Meeting

Respondents were asked to identify what they saw as the strengths of the AISL Awardee Meeting. The strengths mentioned echoed responses to what people valued about the meeting: great speakers and participants, commitment to DEI issues, clear effort made to make the virtual format work, meeting new people and hearing about the AISL projects, the inclusion of community partners, and the diversity of formats (especially the small group sessions). Only 8 of 22 who identified as a community-based participant commented on this question, and their answers did not differ from the AISL PIs.

Sample comments included:

This was the most productive and interactive online workshop I've attended. Really well done in terms of having different formats and lots of opportunities to build connection and get to know other people and their work!

The number of break-out sessions and opportunities to work in small groups. Great job in pulling this together virtually. Despite my suggestions below, the general flow and structure of the virtual program were well planned and well implemented with a good balance of listening and participating.

Getting a chance to network with others and see some of the common challenges we are facing. Honestly, I somewhat dreaded the meeting this year because it was virtual, but the format was well designed, I enjoyed it, and I felt that I walked away with information and a more positive attitude.

I was particularly pleased to see Indigenous voices amplified and co-production of knowledge with communities placed in the center of the meeting. The keynotes and the concurrent session were generally great.

Creating an engaging and interactive conference that is completely remote is challenging. This conference is by far the best that I have participated in during the pandemic.

Areas for Improvement

The overwhelming problems that people had with the meeting were technology-related, for all sessions. Following that, participants commented on the difficulty of having more informal conversations, the need for more/better small-group facilitation and timing, and challenges navigating the poster session (although that session was relatively highly-rated and some people really enjoyed it).

Researchers, practitioners, AISL PIs and community members commented that some of the language used in the plenary sessions (and some others) contained academic jargon that was off-putting and wondered about the extent to which community members were authentically included.

Respondents offered the following areas for improvement:

- Too many technical issues – people getting cut off, late starts, sound issues, etc. (discussed in the previous section of the report on the Virtual Platform)
- More time was needed for the concurrent sessions

- Facilitation in small-group breakouts could be provided, lack of instruction/prompts, and no report-outs
- Better descriptions of the sessions and more background/context on the meeting
- Poster sessions were challenging for some participants; see the previous section on the Poster Sessions.
- Networking, conversation and engagement were difficult, even with a good technology; hard to identify other PIs working on similar projects, and there was a lack of time during the meeting to continue discussions
- Inclusivity: too much academic jargon, more could have been done to be inclusive for community partners
- Too focused on the conceptual, and not enough on the practical/application for projects
- Equity content while important and valued could have been balanced with other themes

We include here a sample of comments organized by theme.

More Time for Small-Group Conversations/Facilitation

Overall, it feels like too much time and emphasis was placed on people talking, even though we know that lecture style presentations really aren't that useful. I don't know what the time breakdown is, but it seemed schedule wise to be about 70/30 of lecture/presentation to small group + posters. In terms of usefulness, we might want to see the opposite balance (70% small group and poster mixing).

It was difficult to find people to chat. Also, the break-out sessions often cut people off mid-sentence and there was no easy way to contact everyone in that group to finish the discussion.

Some of the small-group discussions were not that satisfying or useful. Better prompts or closer ties between the facilitation of small-group discussions and a presentation or poster would perhaps have been better.

The Inclusion of Community Partners

I was a community member and had little context or background information provided to me about what this experience would entail. While this is not necessarily a negative point, I did not feel equipped to participate in the ways I would like.

As a community partner it was really hard to follow along with everything. There were times that I had no idea what people were talking about. I think if you are wanting more community partners to join this, I think you need to rethink who you have presenting and also about the types of audiences you may have. This was my first time attending this and it left me feeling very intimidated and uncomfortable in some of the breakout rooms.

I wasn't able to attend very much of the meeting because of other obligations. That said, the sessions I did participate in didn't live up to the goal of including community partners as much as I'd hoped. I really appreciate that you intended to design it this way, but I think it would be helpful to have more of those community partner perspectives represented in the plenaries.

Although I appreciate the invitation to expand the meeting to many partner organizations, I'm not sure it was productive to have all of us together in all aspects of the meeting. There were times when I felt like there was more harm than good in these interactions when it became clear that we are operating in different contexts, with different norms, resources, privileges, or constraints.

Expectations for PIs and community partners, and how they should plan to engage in the meeting activities together or separately, were unclear. More direction on this front in advance would have been very helpful, if the expectation is that this representation will continue in the future.

*We'd do better by having a meeting where community partners run a lot more of the show (i.e., sessions like a "problem fair" where people show their current priority issues and trends in what's worked / failed in their community). This would need to be not just existing community partners but bringing in strong community partners who *don't* have much research going on.*

For several months as this meeting was being planned, it wasn't clear what the role of our community partner was meant to be. One thing I noticed was that there was an assumption that they were co-investigators on the grant. This is not often the case. There needs to be a more gentle introduction for our community partners. Coming into a meeting with professors and researchers can be intimidating. Also, it wasn't clear what the expectations were for her nor what sessions she could target and I was somewhat embarrassed to ask her to just come and see what happens. My community partner has a busy, full-time job. She would need to know the schedule a few months in advance, not just two weeks in advance. Finally, could there be special meetings specifically for community partners? I wasn't aware of any.

Equity Content

While I appreciated the strong theme, I do wish there had been more variety of topics across the 3 days. It began feeling repetitive.

I would have liked to see a diversity of conversations around different themes, not just on DEI issues.

For one participant, the inclusion of community partners, the session on Rethinking Rigor, and the conversations about co-design and co-creation of both education and research efforts hit a nerve, but also highlights the need to be careful in how framing issues in certain ways can be understood as exclusionary rather than expanding the conversation:

This whole meeting, in particular, was all about virtue signaling and using as much woke jargon as possible. I didn't find much of this insightful (I study these topics and did not need hours of this), and, as someone who has decades of experience proposing traditional research, I didn't really appreciate being told over and over again that I am the main part of the problem, even when my own research is cited! One mediator literally told me that my approach to traditional research should simply go away. Yes, community activists belong in the conversation, but not to the exclusion of those of us that have been recipients and reviewers for NSF for decades. My main takeaway from this meeting was that, in the eyes of the leaders of most of the conversations, I should simply no longer be part of the process or community. I'm sure you realize how you could have been sending that message to people like me, right? Consider how inclusivity can also come across as simply being an argument for excluding whole classes of research that has been at the heart of the NSF. If NSF doesn't want to fund people like me anymore or my kind of research (e.g., the stuff that academics publish on consistently, driven by research questions, not just community empowerment), then at least have the courtesy to not invite us to the meeting in which our exclusion is discussed for hour after hour.

Jargon/Focus on the Theoretical

Not inclusive, academic jargon

Too much technical references for grassroots participants, not enough options. Did not feel my contributions were valued.

There was A LOT of jargon and inaccessible language in some of the sessions. I saw in the chat some frustration about this. If we're inviting community partners and practitioners to these meetings, then we need to ensure that accessible language is being used.

I felt like this meeting was very much pitched at individuals who were comfortable or firmly entrenched within informal science education. Many of the plenaries and discussions were at a high technical or theoretical level and were hard to translate to the on-the-ground work that I've been focusing on in our project. Transcending these levels was very difficult for me. The co-creation and authentic partnership discussions were useful, but they are difficult to implement in the middle of a project. They seemed more appropriate for individuals considering future projects and applications. The technical challenges made it difficult for me to fully engage with the content that was being provided.

As a practitioner (not a researcher or evaluator), I found much of the content was not especially connected to the core focus of my own work. The equity lens was largely directed at researchers and how they engage with the communities they study. This makes sense given NSF's mandate, but personally I would like to see more balance between research and practice in the plenaries and conversations.

I'd like more analysis of how impactful project findings across the portfolio are on the field at large (e.g., outside of the PIs who work at academic institutions and read journal articles).

Networking

It is difficult to network during plenaries or when there are dozens of virtual posters. Instead of relying on the same formats, re-evaluate goals and design a format that meets the goals.

If there is a way to flag the communication/learning spaces that each person identifies with that would be great. For example, if someone is working in documentary film, it would be good to know where to find them. While I got a lot out of the meeting, I did not find sessions or other attendees who were the most directly related to the space I work in who I would have liked to engage with.

Not Addressing Key Issues

It did not feel possible to speak frankly about some of the biggest equity/inclusion barriers for projects funded by NSF/universities: the amount of time and resources required to apply for grants, administer grants, and report on grant activities. Such requirements set up an automatic power dynamic between university researchers and community partners that is very, very difficult to shift even using all the best practices in university-community research partnerships. As a result of not being able to speak frankly about this, much of the conversation touched on well-known challenges in university-community partnerships at the person-to-person level, as opposed to really getting into an analysis of structural / systemic difficulties.

There should probably be discussions and ideas about how NSF itself could be structuring its programs and practices for better impact. Especially as we consider equity as more central, there's structural issues about how to bring in more voices and how to have community stakeholders help set the agenda for research, rather than having researchers come with a hammer and discussing if this community has issues with nails. Because of NSF's commitment to generalizable research, I think projects can gravitate toward "searching for the keys under the lamppost" (solutions with good underpinnings, but potentially not for a community's highest-priority problem). I'd like to see a good balance of making sure we're also getting a pull for the highest priority problems in

communities and then ways to match-make getting the best research teams paired up to address them.

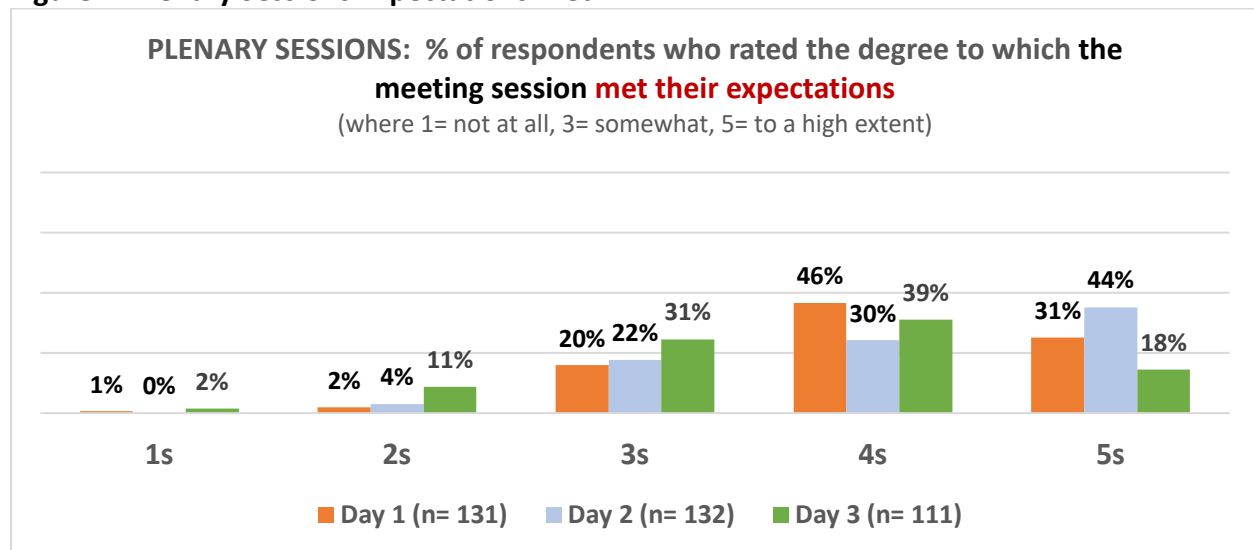
Findings on Types of Sessions

In this section, we summarize findings on the different types of sessions offered during the meeting, including the Plenary Sessions, Critical Conversations sessions, Concurrent Sessions, and Poster Sessions. We present data from the virtual platform, the post-event survey, and the plenary chats. Additionally, for the day one and two Plenary Sessions, we present data on the video views from YouTube where those sessions are available for those who did not attend the meeting.⁵

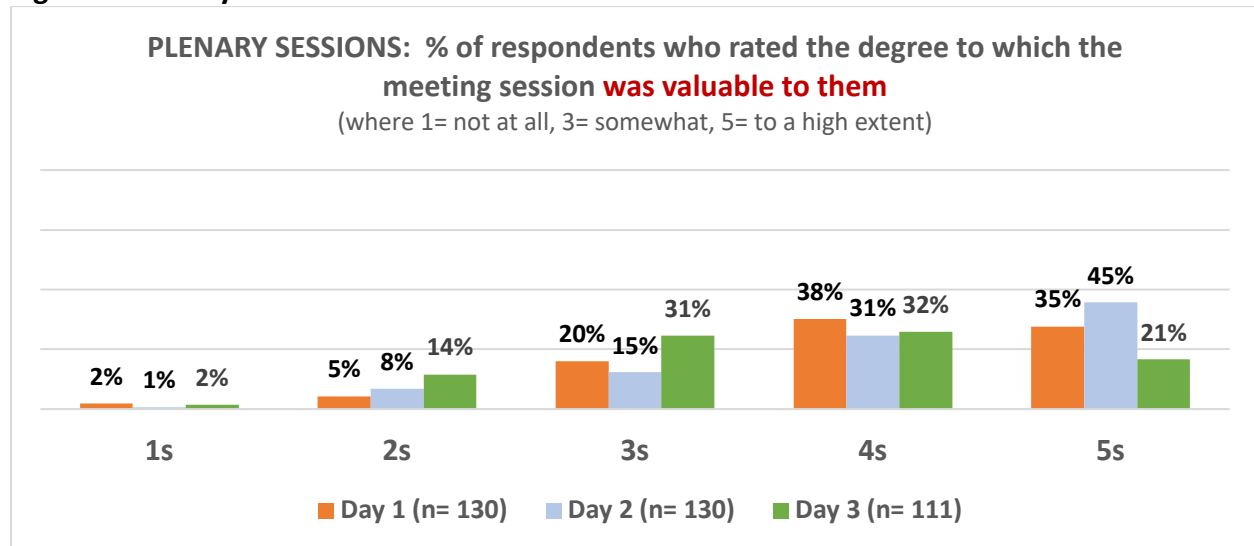
Plenary Sessions

All three of the Plenary Sessions were well attended, and the day one and two plenaries were some of the most highly rated sessions of the meeting. The Plenary sessions fostered interaction with key ideas and questions raised, and dialogue among participants in the chat. For the most part, the ratings for these sessions among subgroups were not widely different; we highlight those differences where they were notable. The day three plenary had more technical difficulties than were encountered on day one and two. Figures 7 and 8 below show the ratings for the percentage of respondents who rated the three plenary sessions as having met their expectations and having been valuable to them.

Figure 7. Plenary Sessions Expectations Met



⁵ We also have data collected from YouTube about the number of post-meeting views of the Pre-recorded NSF Videos on Grant and Fiscal Management for AISL (15 views) and NSF Funding Updates and Opportunities (49 views).

Figure 8: Plenary Sessions Value

➤ **Day 1 Plenary: Engaged Community Partnerships**

The day one Plenary was called: Engaged Community Partnerships: Opportunities and Challenges in Urban, Rural and Virtual Contexts. This session was one of the most highly rated sessions of the meeting: 77% of all 130 respondents responding to this question rated this a 4 or 5 for meeting expectations (where 5 = *to a high extent*), while 72% rated it a 4 or 5 for value (where 5 = *to a high extent*). This was also the most highly attended session of the entire meeting. Data collected from YouTube shows 17 views after the meeting of the recorded session.

There were differences in the value ratings for this session amongst some of the sub-groups. For example:

- a higher percentage of community partners (86%, n=14) rated this session a 4 or 5 than AISL PIs (71%, n=98).
- 77% (n=87) of respondents who identified themselves as focusing on ISE and SciComm rated this session a 4 or 5, compared with 61% (n=23) of those who said they don't identify as focusing on ISE and SciComm.
- 88% (n=26) of those who identified themselves as working in their primary field for 5-10 years rated this session a 4 or a 5, while 70% (n=81) of those working in their field 10 years or more rated this session a 4 or 5.

An analysis of the virtual platform chat from this Plenary highlighted the following important themes that resonated with participants:⁶

⁶ A full summary of the chat analysis for the three plenary sessions can be found in the Appendices to this report.

- Focusing on partnership-specific outcomes first, with the acknowledgement that other specific outcomes might fluctuate and change as partnerships evolve
- A need for focusing on outcomes of partner knowledge and institutional change (not just individual learner-focused outcomes)
- The role of funding agencies, RFPs and reviewers relative to the acceptance of emergent outcomes – the need for greater acceptance of emergent outcomes throughout the whole grant process
- Reciprocity as a key construct
- The importance of co-creation and co-design in community partnership work
- Revisiting listening and language often throughout the process of community partnership work
- Appreciation for the ideas of “allyship” and “value holders” as important constructs in community partner dynamics
- Being aware of power dynamics in every phase of the work and the role they play in the accomplishments and challenges in community partnerships
- The idea of creating shared resilience

➤ **Day 2 Plenary: Rethinking Rigor**

The day two Plenary was called: Rethinking Rigor: Considering Racism and Colonialism in ISE Research and Evaluation. This session was also well-attended and highly rated. Nearly three-quarters of all survey respondents (74%) rated this session a 4 or 5 for meeting their expectations (where 5 = *to a high extent*), while 75% rated this a 4 or 5 for value. Data collected from YouTube shows 23 views of this recorded session.

The differences of note in the ratings amongst sub-groups included the following:

- More community partners rated this session a 4 or 5 for meeting their expectations (78%) and value to them (89%) than AISL PIs (73% rated this session a 4 or 5 for meeting their expectations; 74% rated this a 4 or 5 for value to them).
- More professionals whose work focuses on ISE/SciComm rated this session a 4 or 5 for meeting their expectations (77%) and value to them (81%), than professionals whose work does NOT focus on ISE/Sci Comm (61% rated this session a 4 or 5 for meeting their expectations; 61% rated this a 4 or 5 for value).
- There were similar ratings for expectation and value for both researchers and practitioners, for subgroups representing different years in the field, for those who had attended a PI meeting before and those that hadn't, and for white and non-white participants.

An analysis of the virtual platform chat from this Plenary highlighted the following important themes that resonated with participants:

- The importance of unpacking the “uniqueness and purpose of each word” in the DEIB (diversity, equity, inclusion, and belonging) acronym

- Appreciation for the framing of “epistemic supremacy” and questions about how to overcome it
- Evaluation
 - o Ways to evaluate the validity, credibility and reliability of research and practice work in ways that move beyond the current epistemically supreme methods
 - o Relational validity and accountability
 - o Using Photovoice as a method in evaluation and research
- The importance (and challenges) of co-design/co-creation as strategies
- Power dynamics (engaging with communities authentically vs. “doing stuff in or to the community;” “which economies are we watering;” “let marginalized communities be in the driver’s seat”)
- Questions and implications for NSF
 - o Recommendations for NSF to overcome epistemic supremacy
 - o The Racial Equity in STEM Ed program call, and its emphasis on expanding the array of epistemologies, perspectives and experiences in STEM, and how this might influence the funding and priorities of other RFPs
- Frustration with the panel/hard to follow academic jargon (discussed in more detail in the areas for improvement section)

Additionally, there were multiple thanks and kudos to the panelists for the thought-provoking discussion, the references and resources that were shared, and NSF for being willing to host the discussion.

Open-ended comments in the section on both the strengths and areas for improvement cited this particular plenary. For some respondents, this plenary was one of the most important of the meeting for the key ideas it was highlighting. For others, the amount of technical language that was shared was off-putting. For example:

The Rethinking Rigor session was one of the best conference discussions I have ever attended. So many important ideas and varied voices.

The second plenary panel, all academics, used SO much jargon (e.g., axiology). I was able to follow it, but I was concerned for the many community partners and collaborators at the meeting.

There was A LOT of jargon and inaccessible language in some of the sessions. I saw in the chat some frustration about this. If we're inviting community partners and practitioners to these meetings, then we need to ensure that accessible language is being used.

➤ Day Three Plenary: Catching Up with the Future

This plenary session was one of the sessions most plagued by technical difficulty. It was late to start, and the primary speaker's sound was cutting in and out. This may have affected the attendance and ratings for this session: this plenary was attended by fewer participants than the day one and two plenaries and was also rated somewhat lower than those. Of all respondents, 57% rated this session a 4 or 5 (with 5 = *to a high extent*) of meeting their expectations, while 53% rated this session a 4 or 5 for value to them.

The differences of note in ratings among subgroups included the following:

- More community partners rated this session a 4 or 5 for meeting expectations (69%) and value to them (62%) than AISL PIs (55% for both expectations and value).
- More respondents whose focus of their work is NOT ISE/SciComm rated this session a 4 or 5 for expectations (72%) and value to them (61%) than professionals whose focus of their work IS ISE/SciComm (54% for expectations and 56% for value).
- There were only small differences in the ratings for these items between researchers and practitioners, and between white and non-white respondents.
- Fewer respondents who have been in their field for five years or less rated the meeting a 4 or 5 for value (40%) compared with those who have been in the field five to ten years (65%) and greater than 10 years (54%).
- More respondents who had never attended a PI meeting before rated this meeting a 4 or 5 for meeting their expectations (63%) and value to them (59%) compared to respondents who had attended a PI meeting before (48% for expectations and 50% for value).

Because of the nature of this plenary was more question-and-answer focused throughout, the chat analysis showed more questions and included more back-and-forth among NSF Program Officers and participants, with CAISE staff sharing links to specific resources as topics and questions arose. There was exchange around the following topics:

- Interest in specific programs, particularly the Polar STEAM Program
- Interest in and questions around becoming an NSF Program Officer and/or a proposal reviewer; of note was interest on the part of community partners/members in participating in the review process
- Questions about what NSF is doing to address issues of equity in STEM education, particularly around innovations in RFPs to better address issues of equity, and emphasis on research and evaluation methodologies that align with shifts discussed during this meeting
- Questions about the structural constraints of doing community partnerships, including around proposal development, processes, evaluation and outcomes
- What counts as "technology"
- Questions about informalscience.org and a desire for more information on evaluation partners in projects.

Critical Conversations

Critical Conversations Roundtable sessions were small-group discussions immediately following the plenary sessions. The ratings for the Critical Conversations sessions improved from day one to day two, but overall were rated lower than other sessions. The day one Critical Conversations session had some technical difficulties with getting participants and facilitators into breakout rooms which likely affected the ratings for this session.

For all respondents, 56% rated the day one session a 4 or 5 for meeting their expectations (with 5 = *to a high extent*), while 59% rated the day one session a 4 or 5 for value to them. For the day two session, for all respondents, 60% rated the session a 4 or 5 for meeting their expectations, while 67% rated it a 4 or 5 for value. Figures 9 and 10 below show the ratings for expectations and value for the two Critical Conversations Roundtable sessions.

Figure 9: Critical Conversations Roundtables Expectations Met

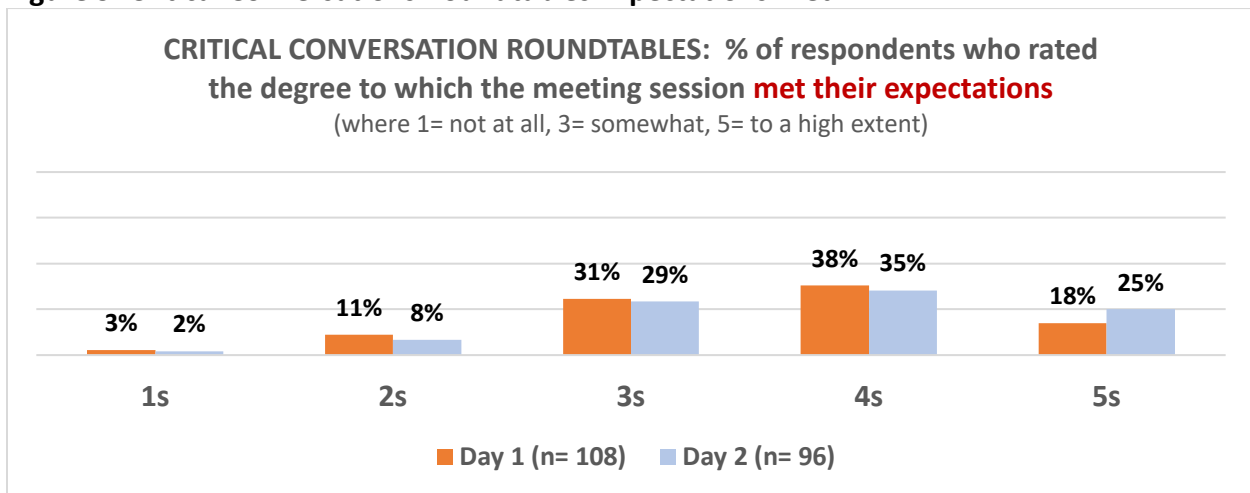
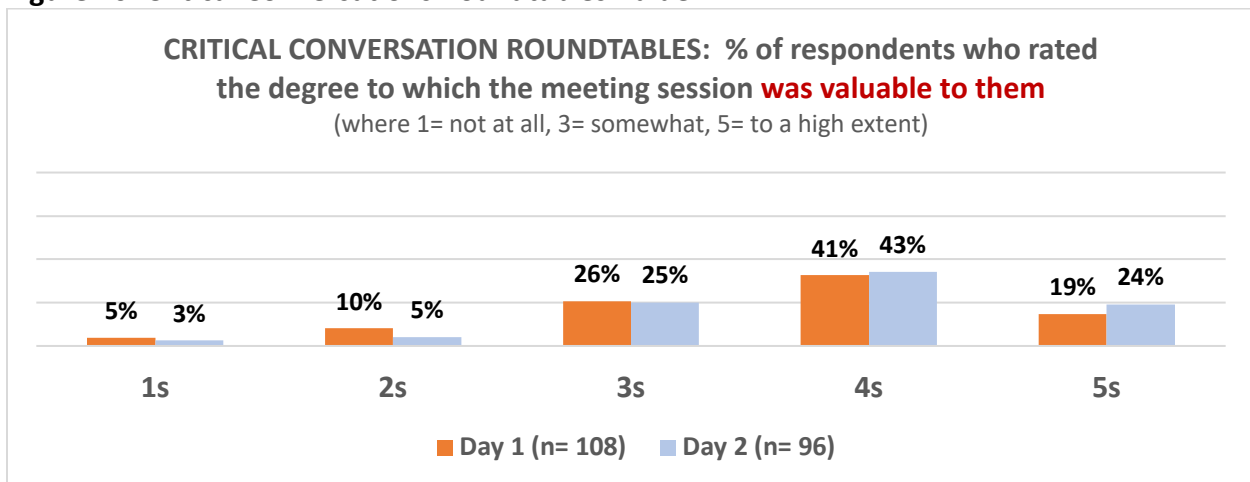


Figure 10: Critical Conversations Roundtables Value



Specific comments related to the Critical Conversations sessions included the following:

The critical conversations were very thought provoking.

The discussions during critical conversations were good but not long or meaty enough.

Concurrent Sessions

There was considerable spread in ratings among the Concurrent Sessions; the specific composition of presenters, facilitators, size of breakout groups, and facilitation impact the ratings. Figures 11, 12, and 13 show the ratings for quality and value for the Concurrent Sessions.

Figure 11: Day 1 Concurrent Session Ratings

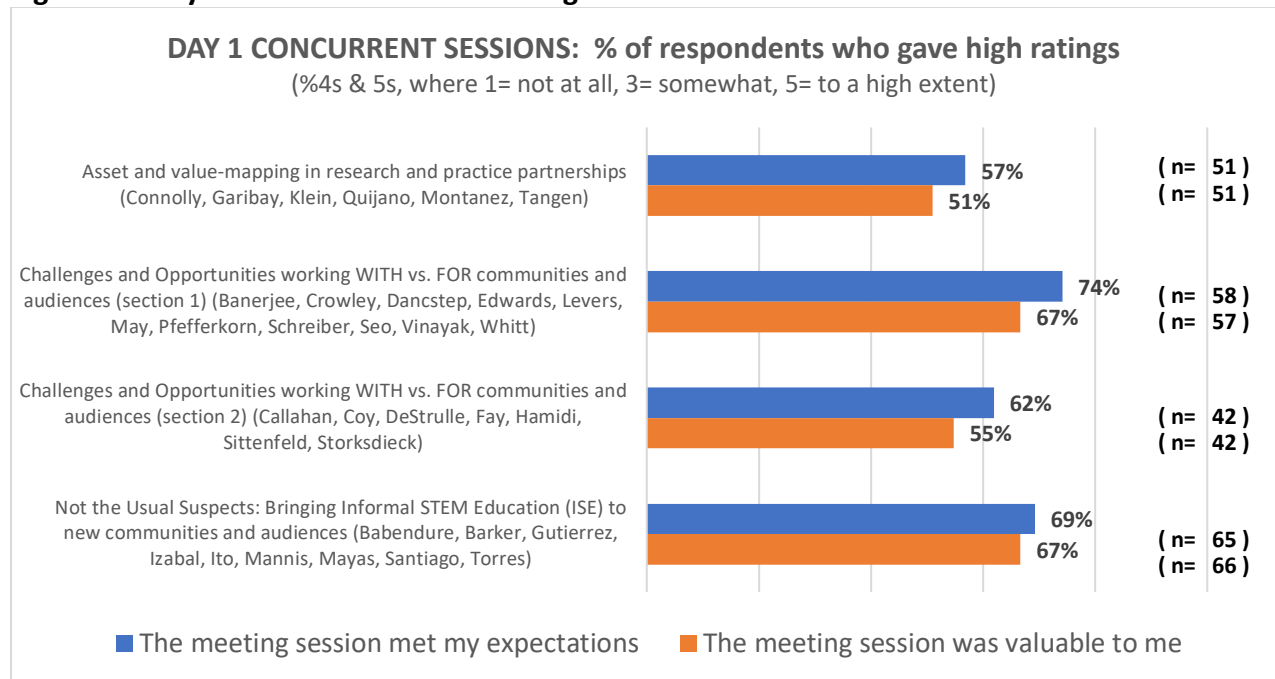


Figure 12: Day 2 Concurrent Session Ratings

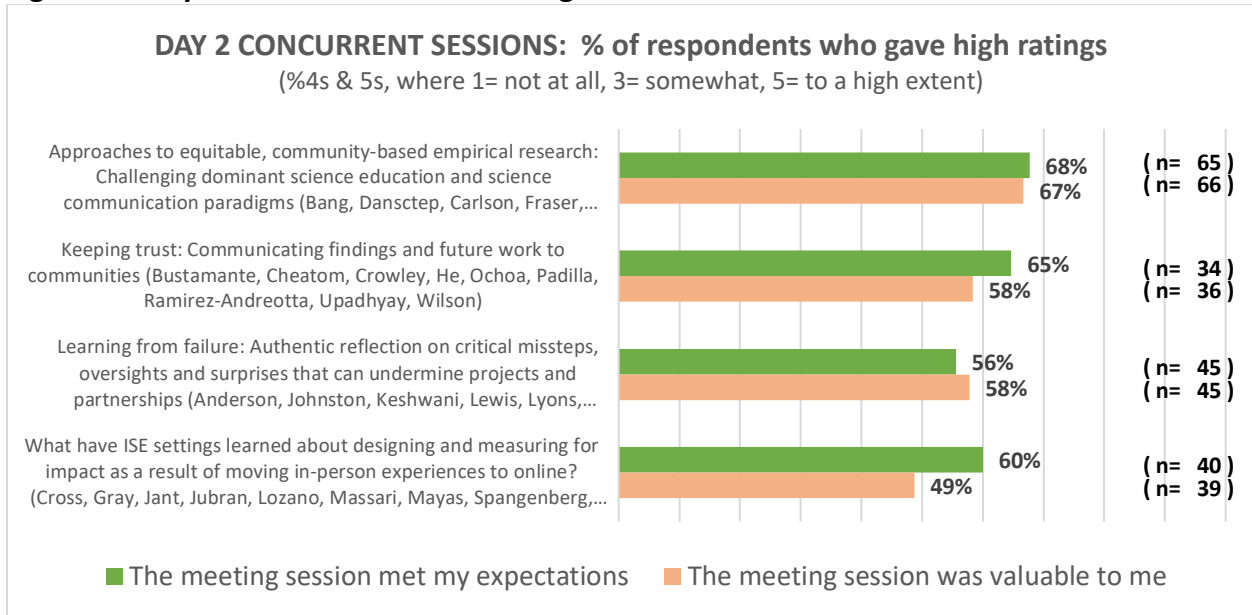
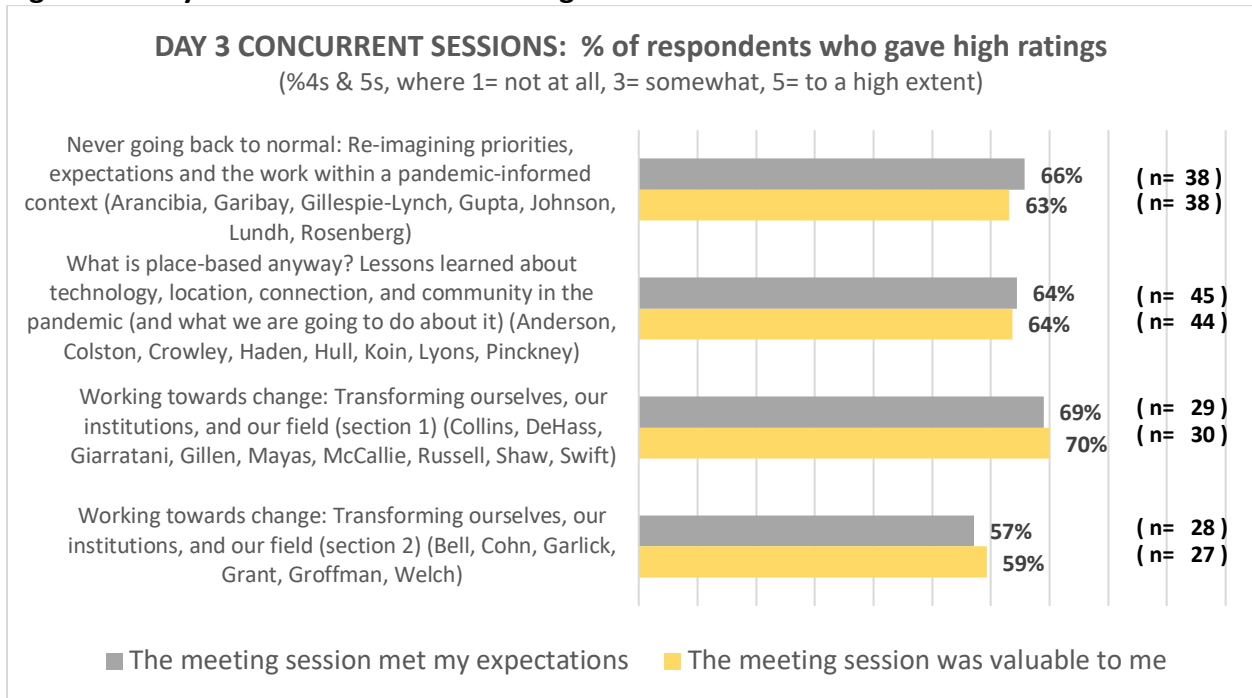


Figure 13: Day 3 Concurrent Session Ratings



In general, those new to PI meetings (which tended to be community partners, those who had not attended a meeting before, those who had been in the field for 10 years or less) tended to value the Concurrent Sessions more highly.

In general, respondents commenting to open-ended questions about the value of, strengths and areas for improvement related to the meeting liked the Concurrent Sessions in that they

provided them opportunities to learn about the diversity of work in the AISL portfolio, and provided them with opportunities to have smaller-group discussions. Sample comments included:

(The most valuable aspects of this meeting were) hearing perspectives, successes and challenges people were facing across such a diverse array of projects.

The small-group discussions were probably the most valuable, especially those that were focused with specific prompts/questions/or topics.

To learn about other projects being implemented across America. To learn about the challenges, what worked and what did not work.

In the open-ended comments on areas for improvement, some respondents raised concerns about these breakout sessions ending abruptly, and about the need for better prompts and facilitation (we'll discuss this more in the Areas for Improvement section of this report). For example, one respondent said,

Some of the small-group discussions were not that satisfying or useful. Better prompts or closer ties between the facilitation of small-group discussions and a presentation or poster would perhaps have been better.

Poster Sessions

The Poster Sessions were rated more highly than ratings for poster sessions in past meetings. For example, 66% of all respondents rated the 2021 NSF AISL Awardee Meeting Day 1 Poster Sessions as valuable or very valuable, while 70% of all respondents rated the Day 2 Poster Sessions as valuable or very valuable. For comparison, the 2019 meeting poster sessions were rated as high or very high value by 55% of respondents.

Figures 14 and 15 show the ratings for expectations met and value for the Poster Sessions.

Figure 14: Poster Sessions Expectations Met

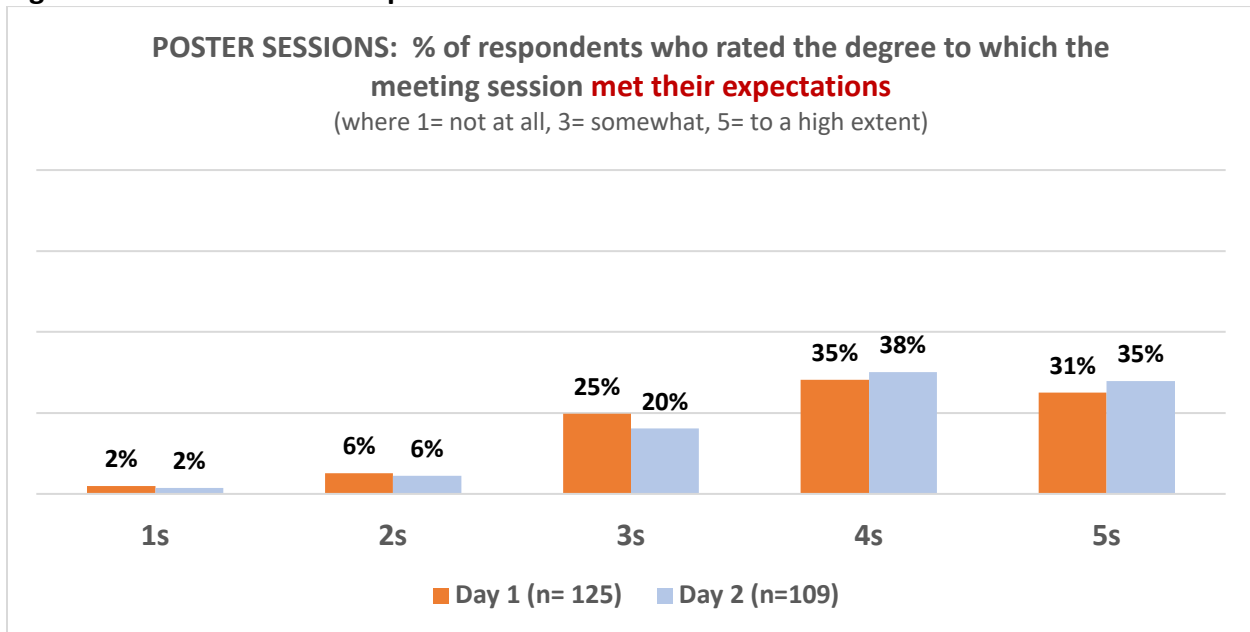
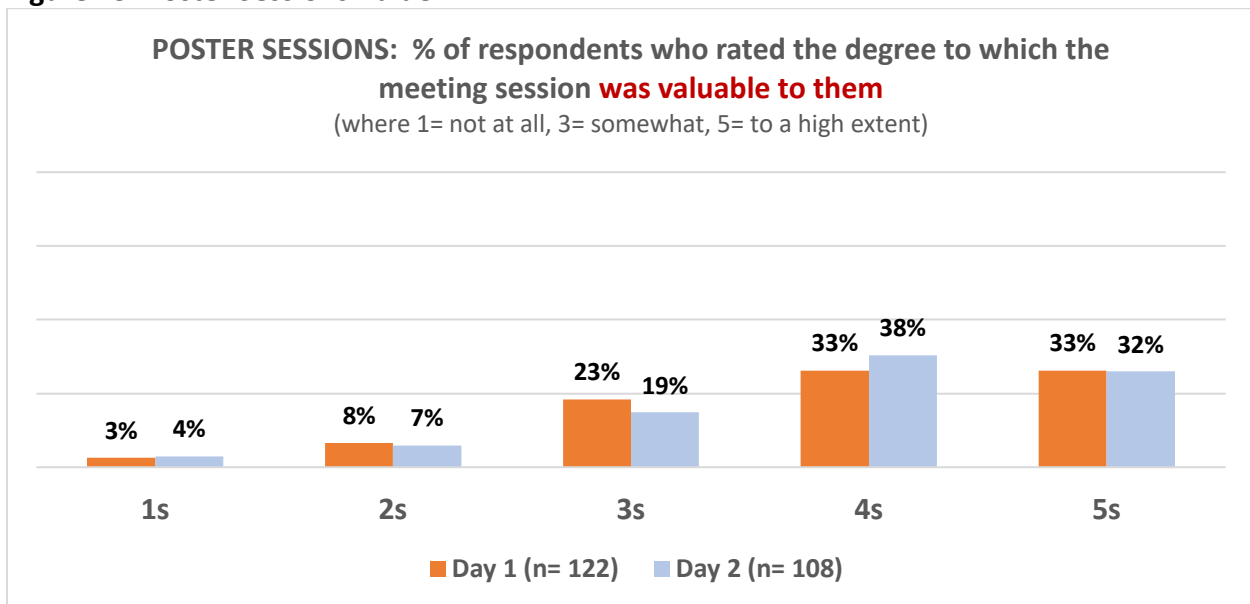


Figure 15: Poster Sessions Value



For both the Day 1 and Day 2 Poster sessions, the ratings amongst the subgroups were quite similar. There were two categories of subgroups (community partners and AISL PIs and those who had never attended a PI meeting and those who had) that had similar breakouts of differences in ratings for both the Day 1 and Day Poster Sessions. For example, 87% of community partners rated the Day 1 Poster Session and 92% rated the Day 2 Poster Session a 4 or a 5 for value (with 5 = *to a high extent*), while 61% of AISL PIs rated the Day 1 Poster Session and 69% rated the Day 2 Poster Session a 4 or a 5 for value. Similarly, more respondents who had never attended a PI meeting before rated the poster sessions on both days a 4 or a 5 for

value to them, compared with respondents who had attended a meeting previously. For the Day 1 session, 72% of the never-attended group rated the value a 4 or a 5, and 76% rated the Day 2 session a 4 or a 5, compared with 51% for Day 1 for those who had attended previously, and 66% for Day 2. We think these ratings likely reflect not having previous, in-person poster sessions to compare this virtual poster session with, and a value among those less familiar with the AISL portfolio in learning about the AISL projects.

In responding to the open-ended comments questions on the survey, respondents offered some thoughts on what they liked about the poster sessions, and what they found challenging or felt could be improved.

The poster sessions and small-group discussions [were the most valuable aspects of attending this meeting].

Loved the poster sessions, great format.

...wonderful virtual poster platform.

Loved the poster room software.

I liked the diversity of formats (plenaries, critical conversations, and the poster room in particular). This helped keep the pace interesting and allowed for us to engage at the virtual meeting in more than one way. Bravo!

I think the team did a great job considering the virtual format. I would definitely consider this virtual poster format again, even if we can meet in person in the future! Normal poster sessions can be such a drag.

For some, the Poster Sessions were challenging. They were placed at the end of the day which meant some people did not or could not participate. Presenters needed more support and practice. Some respondents felt the Poster Sessions could have used more curation. And for some participants, they were hard to navigate.

I found the format for the posters quite useful but, given that I was presenting a poster, I had limited time to visit other posters while the presenters were there. If a virtual format were needed again, it might be useful to have more poster palooza sessions, each with fewer presenters to enable those of us who are presenting to visit more posters while the presenter is present.

The poster session might be rethought. I felt like people spent a lot of time creating their posters but it wasn't clear how much they were really able to share with others.

Navigating the poster areas needs much more explanation and when you click on a different room it should put you into the neutral center, then you can choose which of

the 4 sections to go to. I always either landed right in the middle of an ongoing conversation with voices asking if I had questions before the server updated fully the visual of where I was, or directly on top of a poster icon, again having to make apologies to navigate to where I was trying to go. Would have used contact info after poster sessions as asking for an email during the session was difficult with time, other people talking, etc.

SUMMARY

The NSF 2021 AISL Awardee Meeting successfully incorporated community partners with AISL PIs around a theme of equity and sustainable, equitable partnerships that resonated with participants. The majority of respondents valued the inclusion of community partners in the meeting and appreciated that the meeting emphasized hearing from diverse voices and perspectives. While more supports could have been provided to foster an optimal meeting for community partners, the vast majority of all the different subgroups of post-survey respondents found sessions and discussions that had value for them. And while a few respondents did not find the meeting valuable — either because of the virtual format, and/or the inclusion of community partners or the emphasis on equity that felt threatening to them — the majority gained important new insights. They had their ideas around equity and social justice practices reinforced, gained a better understanding of the importance the NSF AISL program is placing on equity and social justice work, and were challenged in their thinking about how to address and apply what they had heard at the meeting relative to equity in their own research and practice work.