CAISE Practice and Research (PaR) Initiative Survey Synthesis

2. Briefly describe how your recent work connects research and practice in the informal science education (ISE) field.

- Several respondents highlighted themes of collaboration, synthesis, translation, and innovation as driving their work. For example, one respondent is moving from collecting and disseminating research in their sector to convening a group to identify and synthesize existing research, resulting in a much stronger afield-wide agenda. Another respondent is heading a learning center that focuses on providing direct service while developing, testing, and researching education models that build on prior work. One respondent discussed infusing evaluative thinking throughout their organization to impact practice.
- One respondent highlighted connections to the formal education world as being a "catalyst for a paradigm shift" in how researchers use science centers (the respondent's sector).

3. Who is the primary audience for your research-and-practice work? Please check all that apply.

- All respondents include ISE practitioners as at least one primary audience.
- Researchers and policymakers are frequently cited (6/11 respondents and 6/11 respondents, respectively)
- "Other" answers include scientists/STEM professionals; funders/business leaders; formal education educators and administrators; NSF

4. Briefly describe how your research-and-practice work has impacted the following areas: a) research; b) practice; c) policy; and/or d) scholarship.

- Two respondents specifically called out influencing policy by working with a diverse group of stakeholders, and specifically contributing to policy initiatives
- One respondent addressed their evaluation work as being known in the ISE community, but only in an anecdotal way
- One respondent reported that their project has been impactful by "blurring the lines" between research, practice, policy, and scholarship

- One respondent highlighted their use of "social marketing research"
- Two respondents did not have specific answers because they are in the point of collecting data (one knows that their product is used in very diverse ways)
- One respondent saw their work as impacting practice at their institution through "blurring the lines" of evaluation and research, which also impacted the field; they also highlighted collaboration with a local university as impacting scholarship

5. Briefly describe any lessons that you have learned about the connections between research and practice that might be of interest to other ISE researchers or practitioners. In your response, please cite any anticipated findings, surprises, and/or challenges/barriers that have informed these lessons.

- One respondent reported that getting a diverse group of stakeholders together provided "a very interesting and productive dynamic"; a challenge for this respondent was "striking the right balance between type of research, breadth and depth, and being unique while contributing to the larger field."
- One respondent highlighted collaboration with formal education teachers and administrators beyond in-person visits to science museums
- One responded detailed numerous impacts in implications for practice, including understanding inquiry, understanding specific content, motivation [of learners], and the impact of materials in the classroom.
- One respondent noted that translating research into "language/themes" for practitioners and policymakers was a challenge, particularly when deeper reflection is the goal. They stressed that there is a demand from practitioners to not have to reinvent the wheel for each new project by building on prior work, and a need for academic credibility that will attract funding and policy. Similarly, two other respondents mentioned the need for an easier way for practitioners to access pertinent research—which includes putting it into context and providing enough time/space for productive exchanges, as well as more "concrete examples"
- One respondent said that a success has been having their researchers and evaluators advocate on their behalf with funders. They also stressed having the data support future work.
- Highlighting a practitioner point of view, one respondent mentioned that they sometimes have to implement summative

evaluations prematurely due to "contract deadlines and demands for results," which can inhibit the research process

- One respondent stressed that linking research, practice, policy, and scholarship within an organization is a challenge that is rooted in changing the organizational culture of individual institutions.

6. Please respond to the following questions with information about a project or initiative that BEST represents your recent work on research-and-practice in the ISE field. What is the name of the research-and-practice project or initiative?

- All respondents responded with one specific project, with one emphasizing that their work is cumulative in nature

7. Is this project or initiative completed or still in progress?

- All but one respondents reported that their project or initiative was "in progress"; that respondent had multiple projects highlighted, of which two were in progress and two were completed

8. Briefly describe the most significant accomplishment to date for this project or initiative.

- Five respondents answered this question with one or more quantifiable products, including a conference; two websites; a new position for a researcher/evaluator; number of school districts and number of students served; products created and evaluated; and receiving a large gift to support the inclusion of research into the implementation of practice
- One respondent highlighted anecdotal evidence that their project has been well-received by their colleagues across the country and that it has been used as both a resource and a model
- One respondent offered that the evaluation of their project demonstrated that their sector (media) was an effective way to communicate STEM content, which has implications for additional research that could be done in this area

9. What do you think are one or two of the most exciting or promising developments in the last three years in research-and-practice in the ISE field?

- Two respondents highlighted online resources (such as informalscinece.org) as promising developments in disseminating and communicating progress in the area of research-practice (specifically, one respondent was intrigued by the integration of

multiple existing sites that serve different spaces along the continuum of research-practice)

- One respondent mentioned new academic opportunities— namely, a PhD that includes doing research in ISE settings
- One respondent mentioned new technologies (such as using heart monitors to explore physiological response) and borrowing from other disciplines
- One respondent called out design based research in informal settings
- One responded highlighted the general awareness of this phenomenon, bolstered by concrete work such as the LIFE center and LSIE report.

10. In what area(s) of research and practice do you think the ISE field should concentrate its efforts to make the most impact in the next three years? Please respond with one or two ideas.

- All respondents gave different ideas, including:
  - A "network of networks"; balancing the needs of each sector with those of the wider field; identifying common research themes, and even assessment frameworks and instruments, across different ISE sectors to gauge total impact on national dialogue about science topics
  - Investigating online and interactive media components of STEM learning (including as components of other ISE projects)
  - Looking to other fields of learning and beyond, such as social marketing research and the formal education world
  - Making the research process easier for ISE (for example, being able to better navigate the IRB/RRB paperwork)
  - Completing a study on the impact of "the facilitator" on visitor experience, so as to better hire and train a competent workforce around those qualities
  - Helping science researchers access the world of ISE
  - Providing compelling documentation of what learning is
  - Two respondents highlighted moving outside the bounds of what is considered to be ISE—such as looking at how the communications field supports science learning
  - Reframing evaluation to focus on "formative at a project level, and field wide impact research at an organizational and field level"

11. Are there themes in the current research and practice

discussion or thinking that you think the ISE field needs to move beyond?

- Two respondents repeated their answers from the above question
- Three respondents mentioned that because evaluations/research have become a widely accepted—perhaps inevitable—component of the ISE landscape, best practices and examples of such work should be disseminated in a more effective way, with one respondent adding the nuance that the "efficacy and value" of ISE resources
- One respondent mentioned focusing on "research or alternative modes of assessment that support cross-project comparisons and guidelines for good practice"; similarly, one respondent characterized this as "adoption versus adaptation" or "the silver bullet theme."

12. Given the current research-and-practice projects and initiatives with which you are familiar, what would be a helpful role for CAISE in advancing our thinking about these areas and their connections? Do you have one or two specific suggestions for activities that CAISE might consider, or resources we might provide?

- All responses spoke of the need for greater coordination and communication, particularly through online resources (but also in-person). One respondent mentioned that CAISE should make sure to include national sources in the conversation. Another specifically called on CAISE to continuously be aware of the many initiatives and studies that exist in this area, and to not "reinvent the wheel."
- One respondent seemed to think that there are resources, but there is a need for "navigation tools"
- One respondent thought that highlighting examples of research-practice partnerships and their successful elements would be helpful
- One respondent saw the greatest challenge as getting research and practice to be truly "mutual"

13. Are there others whom you think we should be talking with about the state of the ISE field with regard to research and practice and their connections?

- Individual evaluators specializing in media
- Research firms: SRI International, the Education Development Center, WestEd
- Agencies: IMLS, Department of Education

- International sources where ISE is more influential in education policy, such as New Zealand and Australia
- Other fields whose research informs their practice, such as clinical psychology, communication theory, and engineering; also the DBIR model
- New study with Bevan, Penuel, Bell, and St. John.

14. What do you think is the most challenging misconception about the integration of research and practice in ISE?
- One respondent mentioned that there are two kinds of research—academic, and formative evaluation—and related to this answer; another respondent highlighted that research is only valuable with dissemination
- One respondent mentioned that a misconception is that research and evaluation are peripheral to practice; another respondent echoed this with the idea that some see research as "irrelevant or esoteric." On the flipside, that same respondent cautioned that research should not be seen as having "answers."
- One respondent said that there was a tension between measuring the developed resource according to the needs of outside sources versus after it has been tested and refined
- One respondent is concerned that there is a dichotomy being reinforced that "research" and "practice" is two separate things.
- One respondent cautioned "the practitioner field could get co-opted by reshaping it to fit a researcher agenda."

15. What do you think are the unique opportunities and problems in these areas that the NSF AISL community should be aware of?
- One respondent referred to the above question—that there needs to be better dissemination of research that is produced; likewise, one respondent saw the issue being with "social marketing" of the ISE field to Congress and saw documentation and a strategy of "offense, not defense" as a need
- Another respondent clarified that to them, "the current AISL structure doesn't necessarily support projects/proposals at the intersection between research and practice. It seems… that proposals are solicited either as development/implementation proposals or as projects with specific research questions and methods already identified and fleshed out."
- One respondent reiterated that products developed within the timeframe of a grant (such as those provided by NSF and the U.S. Department of Education) cannot be fully evaluated with regards to their effectiveness in learning

- One respondent urged the informal STEM learning field to look at other models to which it can contribute, such as the medical translational research effort, the Carnegie advancement of teaching effort, the WT grant efforts, and the MSP collaboratory

16. Finally, what else might CAISE, or the field writ large, do to help the AISL program better understand ISE research-and-practice work across ISE sectors (museums, media, out-of-school time, cyberlearning, etc.), NSF program portfolios, or across other federal funding agencies?

- One respondent suggested commissioning papers that could influence policy
- Two respondents mentioned doing work to look at the wider landscape of ISE as well as how it fits into STEM education as a whole, in order to understand how ISE supports the STEM education infrastructure/influence in culture more widely
- One respondent said to "be bold in supporting the exploration of new approaches" specifically to argue for certain types of evidence (qualitative and narrative)