Summative Evaluation:

Comparative Case Studies of Implementation at Five Sites

Conducted for
Pacific Science Center
Seattle, Washington

Carey Tisdal
Tisdal Consulting
November 16, 2011

Portal to the Public is a project supported by the National Science Foundation under Grant No. DRL-0639021. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

Table of Contents

Executive Summary....iv
Design and Methodology....v
Summary of Findings....vi
Conclusions and Recommendations....xi
Impacts....xii
Areas for Further Study and Final Reflections....xiii
Acknowledgments....xiv
Introduction....1
Background....4
Methodology and Methods....7
Design....7
Methodology....8
Methods....8
Data Analysis....10
Management of the Evaluation....11
Limitations....11
Characteristics of Respondents....13
Case Studies....16
Adventure Science Center....17
Discovery Center Museum....29
Discovery Center of Springfield....39
Explorit Science Center....49
Museum of Life and Science....60
Comparison of Cases....66
Background and Context....66
Preparation....67
Partnership and Relationship Building....68
Professional Development....71
Public Programs....74

Adoption and Sustainability 74
Impacts on Scientists and Public Visitors 77
Impacts among Scientists 77
Impacts among General Public Visitors 85
Conclusions and Recommendations 98
Preparation of Informal Science Educators to Support Implementation 98
Building Partnerships with Scientists and Organizations 98
Professional Development 99
Public Programs 99
Adoption and Sustainability 100
Impacts 101
Areas for Further Study and Final Reflections 101
References 102
Appendix A: Portal to the Public Dissemination Workshop Agenda 104
Appendix B: Dissemination Expectations 108
Appendix C: List of Instruments by Stage 110
Appendix D: Program Documents Included in Analysis 111
Appendix E: ISE and SCI In-depth Interviews 112
Appendix F: General Public Visitor Observation/Interview Demographics 113
Appendix G: Portal to the Public Project-wide Impacts and Indicators 114

Executive Summary

Portal to the Public (PoP) was a three-year project funded by the National Science Foundation (NSF) in 2007. It was one of several efforts to develop and test approaches to increase public awareness, understanding, and engagement with current science and technology. The developers described the project as follows:

> *Portal to the Public is a proven, scalable guiding framework for Informal Science Educators (ISE) to engage scientists and public audiences in face-to-face interactions that promote appreciation and understanding of current scientific research and its application (Pacific Science Center, 2010).*

The PoP approach had two important characteristics that set it apart from other efforts being developed and offered during this time: PoP (1) focused exclusively on face-to-face interactions between scientists[1] (SCI) and general public visitors (GPV); and (2) included professional development for the scientists interacting with the public.

The project began in July 2007 and included the development and testing of a guiding framework, materials, and approaches by three collaborating informal science education institutions. The three institutions that developed the approach contrast in size and are located in different geographic areas. Collaborating partner (CP) museums included the Pacific Science Center (PSC) in Seattle, Washington; Explora in Albuquerque, New Mexico; and North Museum of Science and Natural History in Lancaster, Pennsylvania. PSC is a large museum, Explora is a medium-sized museum, and North Museum is a small museum. The fourth collaborating partner was the Institute for Learning Innovation (ILI). ILI conducted a formative evaluation with the three collaborating partners during the initial development and testing of programming. Near the end of the project, ILI conducted a research study to determine the value of the PoP approach for scientist–visitor interactions at these three sites (Sickler, Foutz, Ong, Storksdieck, & Kisiel, 2011).

The collaborating museums decided against developing a single model for replication. Instead, they developed a guiding framework to support development of efforts that match the local context. In addition, the museums developed a *Portal to the Public Dissemination Manual* for other ISE institutions interested in implementing the approach. The manual included implementation areas that institutions need to consider in using the approach (i.e., Conceptual Planning, Partnership and Relationship Building, Professional Development for Scientists, and Public Programs). In addition, the collaborating partners developed a catalog of professional development activities that ISE institutions could use with scientists. At the project's midpoint, the PoP approach and drafts of the guiding framework and materials were disseminated to and tested at five user museums. The model and materials tested by the five user museums were drafts, not the final versions available at the end of project. Descriptions of the approach and materials cited in this report are the prototype versions upon which the five user-group museums

[1] The term "scientists" refers to science-based professionals, including research scientists, engineers, physicians, and others for whom science is a primary focus of their work. The term "science-based professionals" was used by the members of the PoP Team at the three collaborating institutions during the last two years of the project. The term "scientists" is used in this report because it is less awkward in narrative.

based their implementations. Materials used by the implementing museums included an initial draft of *Portal to the Public Dissemination Manual* (Pacific Science Center, 2009A) and the *Portal to the Public Professional Development Elements Catalog* (Pacific Science Center, 2009B). The implementation at the five institutions began at a Dissemination Workshop in Seattle in June 2009 and ended March 31, 2010.

The purpose of this summative evaluation was to evaluate the PoP dissemination strategy, guiding framework, materials, and approaches in supporting effective implementation of the program at five user museums. The Principal Investigator (PI) and Co-Principal Investigators (Co-PIs) requested this summative evaluation approach to avoid repeated requests for both research and evaluation responses from ISE and GPV participants at the three collaborating partner sites. The research study conducted by ILI in Year 3 of the project focused on the value of the PoP approach at those three sites (Sickler, Foutz, Ong, Storksdieck, & Kisiel, 2011). Providing findings about the applicability of the PoP approach beyond the three collaborating partner sites appeared a way to provide a greater understanding about usability of the guiding framework, materials, and approaches developed in the PoP project.

Findings in this report cover the range of adaptations among the five implementing institutions and identify factors that appeared to influence the effectiveness of implementation. The five implementing museums were:

- Museum of Life and Science (MLS) in Durham, North Carolina
- Adventure Science Center (ASC) in Nashville, Tennessee
- Discovery Center of Springfield (DCS) in Springfield, Missouri
- Discovery Center Museum (DCM) in Rockford, Illinois
- Explorit Science Center (ESC) in Davis, California

Using the number of full-time staff members and total attendance at each of these five museums and comparing them to percentiles at 119 institutions surveyed by the Association of Science-Technology Centers (Association of Science-Technology Centers, 2010), three of the five user-group institutions could be classified as small to very small (DCM, DCS, and ESC). The other two institutions, ASC and MLS, could be classified as medium to large.

Design and Methodology

Pacific Science Center contracted with Tisdal Consulting to conduct the summative evaluation. The study had three overarching questions:

- To what extent and in what ways were the PoP guiding framework, materials, and approaches implemented and adopted at the five sites?
- What factors affected implementation and adoption?
- To what extent and in what ways was the PoP approach effective in:
    - Building partnerships with scientists and science-based organizations?
    - Providing professional development to scientists?
    - Communicating current science to museum visitors?

The overall design of the summative evaluation was a comparative case study (Guba & Lincoln, 1989; Lincoln & Guba, 1985; Miles & Huberman, 1985; and Stake, 1995). Data were collected across five implementing sites.

Respondents to evaluation questions were members of the three target audiences of the PoP approach across the five implementation sites: informal science educators (*N* = 13), scientists (*N* = 38), and general public visiting groups (*N* = 16). Informal science educators were members of the PoP Teams at each location. The scientists and ISE staff members are population samples, but these populations were limited to the number of scientists and staff that the evaluation liaisons included in the study. General public visiting groups were purposively sampled (Miles & Huberman, 1985) at public programs attended by evaluators. Almost all general public visitors at all locations participated in programs in groups that included both adults and children. Respondents included 16 groups of general public visitors, with a total of 28 adults and 41 children.

Data collection began in August 2009 after final Institutional Review Board (IRB) approval and ended June 1, 2010. Methods included paper and online surveys, in-depth interviews, and naturalistic observations. Findings and conclusions were developed by identifying themes and patterns across cases through the constant comparative method (Lincoln & Guba, 1985, p. 339). The constant comparative method is discussed in the Methodology section of the report.

Summary of Findings

In this section, findings for the ISE audience are organized around the processes in the guiding framework (see graphic of guiding framework on page 5). One area in the guiding framework, Conceptual Planning, is included for the purpose of this study under a term describing a broader process, Preparation. This broader category includes decisions made at each institution related to selecting members of the local PoP Team. Findings related to these four implementation processes are followed by findings related to the two additional audiences: scientists and general public visitors. Findings about impact for scientists and general public visitors are organized around project-wide impact statements. Since all findings are based on qualitative data from multiple sources and multiple perspectives, terms such as most, many, several, some, and few are used to describe the breadth of impact rather than specific percentages or numbers that one would expect in a quantitative evaluation study.

Preparation

- Characteristics that appeared to make implementation less time-intensive and decision-making more streamlined include the following:
  - Previous experience in conducting professional development.
  - Previous experience organizing and offering public programs.
  - Higher levels of previous experience and ongoing relationships with scientists and science based-organizations.
- The Dissemination Workshop, the *Portal to the Public Dissemination Manual* (Pacific Science Center, 2009A), and the *Portal to the Public Professional Development Elements Catalog* (Pacific Science Center, 2009B), were perceived as highly useful in preparing ISE institutions for the implementations.
- Not all PoP Team members at each site attended the Dissemination Workshop. PoP Team members at each implementing site who had attended the Dissemination Workshop more clearly understood the overall purpose of the PoP approach and reported fewer challenges selecting and adapting professional development activities than those PoP Team members who did not attend the workshop.

- The *Conceptual Planning Worksheet* provided at the Dissemination Workshop offered a way for institutions to survey the landscape for implementation and to brainstorm possibilities for scientist recruitment, professional development, and public programs. Informal science educators at the five user museums cited this process as highly valuable. As the implementations unfolded, some strategies and tactics described in the plan did not always work as expected (e.g., phone calls and emails to local corporations did not produce scientists interested in participating in the program), and alternative methods had to be tried. Some initial strategies and tactics not working resulted in substantial differences between the planned and the actual implementations—that is, there were substantial differences between the *Conceptual Planning Worksheet*s submitted by some sites (i.e., DCM, ESC, and MLS) and the actual implementation carried out.
- The *Conceptual Planning Worksheet* lacked processes to help user museums anticipate and respond to challenges and obstacles encountered in implementation. Examples of challenges and obstacles included the adding of responsibilities to already heavy staff workloads, institutional politics, and economic conditions in the institution or the community. Planning that anticipated the need to overcome challenges could make implementations smoother and less time-intensive.

Partnership and Relationship Building

- Recruitment of scientists was a time-consuming process at all sites. This aspect of implementation was slower and took more time than most sites had anticipated, thus delaying the implementation of professional development and public programs from original timelines set forth in the *Conceptual Planning Worksheet*.
- Fairly similar tactics were used to recruit scientists at ASC, DCM, DCS, and ESC, with scientists being asked for similar commitments to both professional development and participation in new programs. These PoP Teams sent emails, made telephone calls, and developed flyers to send to science research organizations. These methods, while time-consuming, appeared productive in recruiting reasonable numbers at ASC, DCS, and ESC. The economic conditions in the community made these tactics less effective at DCM.
- The nature and extent of commitment asked of scientists varied among programs, ranging from 32 hours for medical students at DCM (required as part of the medical school curriculum) to an optional 1.75 hours at MLS. Closely tying the professional development to the opportunity to participate in a new public program appeared to make the value of the professional development experience more apparent to scientists. At MLS, professional development was added to an ongoing program, *NanoDays.* For MLS's scientists, some of whom had participated in *NanoDays* in previous years, professional development may have appeared an additional commitment of time for which they did not see a need. Therefore, some chose not to participate in the professional development (PD) workshop.
- For individual scientists across sites (N = 38), the most frequently cited motivation was the opportunity to *Communicate work and raise public awareness of science* (36.8%) and to *Encourage young people to enter science, technology, engineering, and math* (*STEM) fields* (21.1%).
- In contrast, the most frequently reported anticipated benefit by scientists in the program was to *Develop and improve communication skills* (65.8%).

Professional Development

- The implementing sites offered a range of PD experiences in terms of number of workshops and total time commitment for scientists.
  - Three sites (ASC, ESC, and MLS) offered one professional development workshop (ranging from 1.75 to 8.5 hours in length), with ongoing support at flexible time schedules for the scientists.
  - At DCS, four half-day workshops were offered once a month beginning in October 2009, leading to a series of small programs beginning in March. This timing appeared to cause some attrition (decreased scientist attendance) as the professional development continued.
  - At DCM, medical students committed to the program as part of their medical school curriculum with a total 36-hour commitment. Medical students attended two structured professional development workshops, observed afterschool programs, watched exhibit prototyping, staffed ongoing public programs, and worked with museum staff to develop their materials.
- Professional development at all sites was clearly shaped by the Dissemination Workshop, *Dissemination Manual*, and *Professional Development Elements Catalog* (Pacific Science Center, 2009). The catalog had 22 professional development activities (referred to as "elements" by the program developers). Across all 5 sites, 18 different PD elements were used in PD workshops for scientists. Four of the sites used the same 4 PD elements that the Dissemination Workshop prominently featured.

Public Programs

- Across the five sites, public program size ranged widely. Decisions were based on size of available space and institutional programming strategies. ASC offered a large-event program, with all scientists who had attended the professional development workshop presenting on the same day. DCM scheduled a smaller event in an exhibition gallery. DCS and ESC public programs featured individual or pairs of scientists. At MLS, scientists presented in a large annual event that was part of a national program.
- The five sites implemented a narrow range of public program formats. All five sites offered public programs with table-top materials-based activities. None of the implementations included lecture or other face-to-face formats sometimes used at science museums.
- Single-event public programs offered the advantage of staff members not having to spend additional time to contact and schedule individual scientists. One-time, single-event public programs also offered clear endpoints for scientists to finish developing their presentations and materials.

Adoption and Sustainability

- In general, after this initial implementation, all sites reported their intention to use the PoP approach to some extent and in some ways.
- Factors that appeared to support sustainability included the following:
  - The degree to which initial implementations had provided the development of expertise that continued with the same staff members (i.e., lack of staff turnover).
  - The extent to which the initial implementations supported community relationships that were widely perceived as valuable across the institutions.

    - The extent to which Professional Development Elements were perceived as applicable to a broad range of areas, including staff development and program formats other than materials-based table-top activities.
- Limited budget was cited as the primary obstacle to sustainability. This reported limitation centered on estimates of staff time to recruit scientists, provide professional development, and offer ongoing public programs. The budget for materials was not seen as an obstacle to sustainability.

Impacts

At the time of the dissemination, the three collaborating partners had not developed explicit impact statements and indicators for the project as a whole, which meant user-group museum PoP Team members did not have access to the project-wide impact statements when designing their programs. The draft guiding framework presented to the user museums showed examples of impact for each of the three project audiences. As part of the user museum's conceptual planning, each site developed impact statements for the three target audiences based on the site's own local needs and context. For the purpose of this report, data about impacts collected for the project were analyzed in relation to the selected project-wide impacts developed near the end of the project. This analysis allowed comparison across sites. Despite this advantage, this comparison is only somewhat reflective of each site's intentions. This decision is discussed further in the Limitations section of the report.

Scientists

- After observations at each of the five public programs, final in-depth interviews with scientists, and in-depth interviews with general public visitors at each of the five sites, evaluators reviewed observation notes and interview transcripts to identify characteristics associated with higher levels of engagement between scientists and general public visitors, as well as high levels of understanding by adults and children in general public visiting groups. Evaluators noted the following characteristics of high-level engagement:
    - Materials (e.g., table-top items, games, posters with questions) attracted visitors to walk up to scientists and touch materials, manipulate them, ask questions, or participate in a structured activity focused on science content.
    - Both adults and children were observed engaging directly (e.g., talking, listening, asking questions) with the scientists.
    - Both adults and children displayed focus, concentration, and enjoyment of content during their engagement.
    - Scientists adapted vocabulary, level of content, and tone based on age and interests of the visitors.
    - Scientists both talked and listened during the interactions, using facial expressions and comments to adapt and clarify during their engagements.
    - Scientists flexibly balanced length of engagement with level of crowding.
    - Scientists appeared comfortable and confident.

  Many of the materials and engagements evaluators saw included one or more of the characteristics above. Only a few included all of them. As a group, engagement between scientists and general public visitors and table-top materials at ASC and DCM reflected more of these characteristics than did those at other sites. This level of engagement appeared to be influenced by the extent and design of professional development experiences.

- Most activities and materials developed by scientists incorporated one or more of the ideas about effective learning in informal environments, as reflected in the Professional Development Elements and activities used in PD workshops[2].
- Among the respondents to the online survey (*N* = 11), all those responding (*N* = 9) reported they would participate in PoP-type programming in the future (2 did not respond to this item). All 11 respondents indicated they would recommend participation to a friend or colleague.
- Benefits of participation that scientists described during final in-depth interviews and in the online survey included the following:
    - Engaging with the public was fun, rewarding, and satisfying.
    - Concepts and skills they had learned could apply in other settings. For example, they could apply inquiry-based methods to university teaching or adapt the newly acquired communication skills when working with children and adults in their medical practice.
    - Engineers and scientists cited participation as an opportunity to communicate how their work benefited the public.

Impacts among General Public Visitors

- In-depth interviews assessed awareness of and enthusiasm for engaging with scientists.
    - When probed or asked directly, almost all respondents above age five responded that they were aware they had engaged with scientists or other types of scientists, such as engineers or architects.
    - Many visitors did express enthusiasm for interacting with people who were scientists and commented on learning about science careers about which they were previously unaware. Many children appeared to find it unsurprising to engage with "real" scientists in a science center.
- In-depth interviews assessed content learning. Children also were asked to draw pictures of their experience in the public programs. Holistic assessments were made by location, based on the varying numbers of interviews and observations that were possible on site visits.
    - Almost all adults and children remembered one or more science concepts from their engagements.
    - Depth and range of science concepts and ideas varied by age and location. This difference appeared to result from two factors: (1) scientists' exclusive focus on children at some sites; and (2) the level of vocabulary in conversations and the design of materials.
        - At ASC and DCM, both the adults and children the evaluator interviewed remembered more and had deeper understandings of science concepts. This finding appeared to be due to scientists' engagement with both adults and children and the appropriateness of materials and conversation for both groups.
        - At ESC and DCS, children had higher levels of understanding than did adults. These levels of understanding appeared to be due to the focus on children during engagement.
        - At MLS, adults recalled more science concepts than did children. The higher level of recollection appeared to be due to the vocabulary level and design of materials.

[2] Note that the PD workshop for scientists at each implementation site was different in content and length. Therefore, intended impacts (knowledge and skills implicit in the PD elements) for each site were also different.

Conclusions and Recommendations

The PoP guiding framework appeared adaptable and useful in a range of settings, and lessons were learned that can be applied to future implementations. Some of these findings can be applied only to sites deciding to implement materials-based programs—that is, they may not apply to lecture- or discussion-format public programs.

Preparation

- Selecting PoP Team members was an important factor in the implementation. Having team members with experience in professional development, public programs, and direct ownership for programs made implementation less time-intensive.
- A face-to-face implementation workshop experience appeared essential in preparing PoP Team members to implement the approach. The workshop provided an opportunity to clearly understand the guiding framework, recognize the benefits for scientists, and have time away from busy schedules to experience professional development activities and to plan.
- The conceptual planning process was a very strong element of the PoP approach. Representatives from all locations noted the importance and usefulness of this process, particularly in providing ways to adapt the approach to institutional and community contexts. Some sites, however, ran into unanticipated problems. Consideration should be given to adding a section on potential challenges and obstacles.
- The *Professional Development Elements Catalog* was an essential resource in preparing sites to implement the program. Using developed and tested activities saved staff time and provided a focus for sharing the program across institutions.

Partnership and Relationship Building

- The status of existing relationships between the institutions and scientists and organizations in which scientists work was an important factor in this set of implementations. Fully developing these relationships may take several program cycles.
- Additional focus on partnership and relationship building in the *Portal to the Public Dissemination Manual* and in workshop offerings also is recommended. Since this set of implementations began, Alpert (2010) has published a guide on this topic that may provide resources to further develop training for implementers of the PoP approach.

Professional Development

- The *Professional Development Elements Catalog* saved staff time, and informal science educators found it easy to adapt and implement. Scientists enjoyed participating in workshops featuring this element and cited numerous benefits from participating in these activities.
- For materials-based presentations, the importance of prototyping materials should be stressed so that scientists experience higher levels of success in their initial public programs.
- Some scientists were more skillful at engaging both children and adults and in accomplishing substantial learning in both these groups. Building knowledge and skills to engage with both adults and children needs to be stressed in revised materials and for future implementations.
- While there were advantages to all ranges and schedules of professional development offerings, first-time adopters of the PoP approach could productively try one full-day workshop scheduled close in time to the public event. This scheduling appeared to maximize attendance and provide a clear time frame for materials development.

Public Programs

- Both large-event and individual-presenter program formats were implemented and provided contexts for substantial visitor learning. Both larger and smaller institutions were able to make decisions well adapted to the size of their staffs, the organization of their buildings, and their audiences.
- Materials-based, face-to-face engagements appear to be fairly robust. Even presentations that may not be as well designed as others and are offered by scientists with less-developed communication skills can be somewhat effective in engaging with visitors.

Adoption and Sustainability

Factors that appeared to influence sustainability included the following:

- PoP Team members and administrators perceiving initial success at sites in recruiting scientists, conducting professional development, and implementing public programs.
- The amount of staff time to continue the program appearing reasonable in relation to the number of scientists participating in the program.
- PoP Team members perceiving a good match between the materials-based education approaches and those already being used in the institution.
- Low levels of staff turnover during and after the implementation so that skills and experience from the initial implementation could support continuing efforts.
- Arrival of the PoP approach in the institution being perceived as a vehicle to begin new programming and expand types or number of audiences.

Impacts

Informal Science Educators

In general, the experiences provided by the *Dissemination Manual* and *Professional Development Elements Catalog* prepared informal science educators to carry out locally adapted implementations. One area in the *Dissemination Manual*, Relationship Building, may need to be expanded. ISE at all sites reported recruiting scientists as one of the more challenging aspects of the implementation.

Scientists

Many scientists reported benefits from participation in PoP. These reports were from scientists with a wide range of previous experience in communicating science to the public. That means both experienced and inexperienced scientists reported benefits. Overall, most of the scientists participating in programs across all sites appeared to experience some increase in knowledge and skills. Their professional development experiences seemed to enable many of them to develop appropriate materials for informal learning and successfully engage with both children and adults. There were also several reports of scientists using PoP-developed skills and materials in other contexts (e.g., for other museum programs or for university teaching).

There is some indication that the recruitment processes and messages played a role in developing a "readiness to learn" among some scientists by making them aware the PD workshop could improve knowledge and skills in engaging with the public. Scientists who entered the program aware that participation could support improvement of their own knowledge and skills also appeared to experience greater impact. At the end of the program, these scientists (about two-thirds of the total number of scientists) exhibited greater knowledge about the differences between formal and informal contexts. That is, they used the vocabulary of the professional development experiences and were more likely to identify both strengths and weaknesses in their own behavior and to cite ways to improve their presentations.

Areas for Further Study and Final Reflections

Three important areas for further study were identified.

- Consideration needs to be given to the development and testing of the approach with other types of program formats beyond the materials-based approaches.
- Additional testing is needed so the PoP approach can be integrated into existing public programs, such as *Engineers Week* [3] or other special-events programming in which scientists have participated previously.
- Precise estimates of staff time for implementing different versions of the PoP approach would provide important information for planning and decision-making.

The PoP project as a whole has been a pioneering effort in implementing and testing a guiding framework, approaches, and set of materials designed to improve the experience of both scientists and the general public in face-to-face engagements. Each of these institutions shared the goal of providing common ground in which scientists and members of the general public could engage with one another. Informal science educators, scientists, and general public visitors who participated in this study were enthusiastic about the efforts and gained important knowledge, understanding, and skills.

---

[3] Some sites held *Engineering Day* (events) during *Engineers Week*. *Engineers Week* is the name of the national program sponsored by National Engineers Week Foundation (National Engineers Week Foundation, 2008). For consistency, *Engineers Week* is used throughout the report.

Acknowledgments

We want to acknowledge the contributions of several individuals and groups to this study.

The *Portal to the Public* Core Team included the following members at the three institutions that developed the guiding framework, materials, and approaches we studied. At the Pacific Science Center, we want to thank Lauren Russell, *Portal to the Public* project manager, who served as primary client for this evaluation study. We want to thank also Dennis Schatz, PI, who reviewed and commented on evaluation findings. Other Pacific Science Center core team members included Lauren Burman, Dana Vukajlovich, Meena Selvakumar, and Karen Hoffman. At Explora, core team members included Kristin Leigh as co-PI, Betsy Adamson, and Armelle Casau. At North Museum of Science and Natural History, core team members included Margie Marino as co-PI and Jim Ringlein. We want to thank also our colleagues at the Institute for Learning Innovation for sharing their experiences, findings, and instruments: Jessica Sickler as co-PI, Angie Ong, Susan Foutz, and Martin Storksdieck.

We sincerely appreciate the efforts of the *Portal to the Public* Summative Evaluation liaisons who coordinated data collection at their sites and provided information about implementation progress on a regular basis. These individuals and their colleagues welcomed us to their communities and provided helpful assistance during onsite visits. They include the following:

Larry Boles, Museum of Life and Science
Megan Contreras, Explorit Science Center
Laurie Duncan, Discovery Center of Springfield
Jeri Hasselbring, Adventure Science Center
Ann Marie Walker, Discovery Center Museum

At Tisdal Consulting, evaluation associates Barbara Addelson and Joan Esserman made substantial contributions to the study.

We wish to thank the National Science Foundation for its support of this project and its commitment to informal science education. NSF's long-term commitment has supported research and evaluation of development projects such as this one and provided opportunities for those of us who do it to improve our work.

Finally, and most importantly, thank you to informal science educators, scientists and general public visitors who shared their perspectives. They enriched our understanding of learning in informal environments. In naturalistic inquiry, these respondents are our collaborators in the understanding and exploration of the questions of the study.