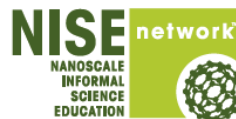


Sharing Science Workshop & Practicum Dissemination Project Report

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Prepared by:
Karine Thate & Carol Lynn Alpert
Strategic Projects
NISE Network RISE Group
Museum of Science, Boston



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INTRODUCTION

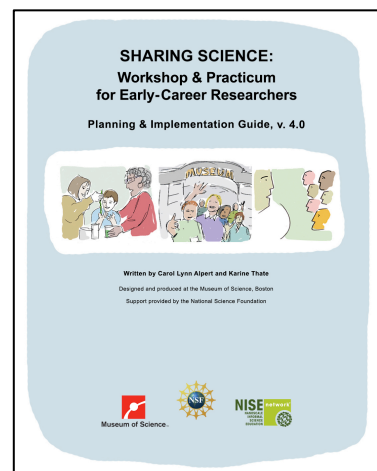
This report describes the cumulative results of a NISE Net-funded investigation exploring dissemination strategies for the Sharing Science Workshop & Practicum (SSW&P) professional development program. Developed by the Strategic Project Group at the Museum of Science (MOS), the SSW&P is a one-day (or two-half-day) professional development experience for early-career researchers that is designed to enhance their science communication skills, spark their interest in education and outreach, and prepare them for successful participation in “free-choice” learning environments such as science museums, science festivals and K-12 enrichment programs. While many scientists and engineers are interested in contributing to education and outreach, and many informal science education (ISE) organizations would gladly welcome their participation, content expertise alone is not sufficient to ensure a rewarding experience for all. The SSW&P is designed as a time-efficient, low-cost, low-commitment solution for both the hosting institutions and the university participants, preparing researchers for successful interactions with youth and community audiences. It can provide a useful first step in building education outreach partnerships between research centers and ISE institutions, and it is often implemented in advance of a significant outreach event intended to bring scientists face-to-face with public audiences.

Extensive evaluation of the SSW&P model, as developed and implemented at MOS since 2009, has consistently shown that participants find the workshop useful and valuable, experience increased confidence engaging with public audiences, and would recommend the workshop to their peers.¹ With NISE Net support, the MOS Strategic Projects group has pursued three different methods of disseminating the SSW&P model to other institutions: (1) Producing a Planning & Implementation Guide and making it available on the NISE Net website; (2) Hosting an Implementation Workshop in Boston with follow-through phone/email guidance for staff at implementing institutions; and (3) Providing Implementation Grants with follow-through phone/email guidance. This report will briefly summarize the first two strategies, and then focus on the third and most recent approach.

THREE DISSEMINATION STRATEGIES

1) PROVIDE A COMPREHENSIVE GUIDE.

The **SSW&P Planning & Implementation Guide** provides information and resources for planning and hosting a Sharing Science Workshop & Practicum, including sample agendas, planning timelines, facilitator commentary, media, handouts, and survey instruments. The guide first became available for download from the NISE Net website in 2011 at: http://nisenet.org/catalog/tools_guides/sharing_science_workshop_practicum. (The most recent update (v. 4.0) was posted in February 2016.²) Because the NISE website does not track downloads, and there was little evidence of broad adoption of



the SSW&P by NISE Net partners, the RISE team decided to invest in applying a more active dissemination strategy that had worked well for a different set of workshops.

2) IMPLEMENTING THE SSW&P Workshop (iSSW&P).

This dissemination approach was based on a model first used in 2012 to introduce a sister product - the Research Experience for Undergraduates (REU) Science Communication Workshops - to new university providers.³ It is a 'piggyback,' train-the-trainer model which provides trainees additional scaffolding by including them in observer/participator mode during an actual implementation of the workshop.⁴ MOS hosted the iSSW&P on Nov. 14-16, 2014 in Boston. With guidance from NISE Net Hub leaders, we solicited applications from staff who work with university researchers at several NISE Net affiliate institutions. We accepted seven applicants: Anna Barr from the California Academy of Sciences, Tracy Englert from University of Southern Mississippi, Sarah Fisk from SUNY Poly Children's Museum of Science and Technology (CMOST), Alex Laube from the Marbles Kids Museum, Brian Pollock from Cincinnati Museum Center, Nick Wethington from spectrUM Discovery Area, and Wendy Blackwell from the National Children's Museum. (Wendy was not able to attend because of a family emergency). Airfare, hotel, some meals, and workshop materials were provided to all attendees, who committed to implementing the SSW&P at their home institutions.



The 6 participants of the iSSW&P Workshop at MOS in November 2014: from left, Alex Laube, Sarah Fisk, Brian Pollock, Tracy Englert, Nick Wethington, Anna Barr

Workshop participants were given an orientation to the SSW&P. They observed the MOS team running a SSW&P with 16 graduate students and early-career researchers from Harvard, Howard, and MIT, and participated as small-group facilitators. They worked together to develop a variety of strategies for adapting and implementing the program at their own sites.



Tracy Englert (far left) and Alex Laube (far right) participate as small group facilitators working with graduate students during the SSW&P at MOS.

All six iSSW&P participants successfully implemented the SSW&P at their home institutions during the Winter and Spring of 2015, preparing a total of 65 volunteers for their NanoDays events. The MOS team and these six new SSW&P providers reported on their implementation efforts at the 2015 NISE Network Wide Meeting in June 2015, at a session called "Preparing Scientists for Working with Family Audiences: Seven Organizations Report on a New Streamlined Approach."⁵ All six new providers were interested in repeating the SSW&P implementation at their institution the following year. Two reported "yes, definitely," two reported "yes, with some changes," and two reported "maybe," with one respondent explaining that there were institutional changes that could preclude that possibility. (As it turned out, all but one of the institutions did repeat the SSW&P the following year.) All six sites also reported that their university participants appreciated the Workshop & Practicum program, and that it had led to enhanced experiences for visitors. Five of the six partners were pleased with their implementation and one had mixed feelings, but all six identified a few modifications they would make to improve their next implementation. When asked to report difficulties they had experienced, several respondents mentioned the challenge of finding support for staff time and funding for materials and refreshments. Some mentioned the complexity of working out scheduling with the researchers. In an effort to address the first of these challenges, the MOS team requested and received NISE backing to try a third approach the following year.

3. IMPLEMENTATION GRANT + PHONE/EMAIL GUIDANCE

Motivation and Goals

This third dissemination effort, launched in 2015, incorporated the NISE Net model of supplying "mini-grants" to affiliate institutions for specific projects. To receive the SSW&P Implementation Grant, an institution was required to submit an implementation plan and a brief budget of up to \$750 for eligible costs. The Implementation Grants were designed to address the financial challenges mentioned by 2014 iSSW&P program graduates and to encourage them to implement a *second* time, incorporating changes and lessons learned from their first implementation. We considered these mini-grants kick-starters, giving the institutions and their university partners a second chance to experience the mutual benefits that can accrue from these activities, and possibly motivating them to find ways to sustain them over time. We also wanted to invite a couple of new institutions to participate in the 2015 SSW&P implementation program to explore whether, with mini-grant and phone/email support - but without attending an iSSW&P workshop in Boston - they could still implement the SSW&P successfully.

Eligibility and Awardees

In order to be eligible for the Implementation Grant, NISE Net partner institutions were required to commit to implementing the SSW&P between 12/1/2015 and 4/30/2016, with the goal of preparing local researchers, graduate & undergraduate students for working with public

audiences at a museum, science center, or local science outreach event. They were required to recruit a minimum of six trainees, and following implementation, to administer evaluation tools, and complete an online report. Their proposals were to include a budget outlining how they would use up to \$750 to cover eligible costs, such as staff time, materials, participant support, and local travel.

Six NISE Net partner institutions were awarded the SSW&P Implementation Grants including five institutions from the previous year and one new institution. Awardees included: Hardin Engelhardt from Marbles Kids Museum, Tracy Englert from University of Southern Mississippi, Sarah Fisk from SUNY Poly CMOST, Brian Pollock from Cincinnati Museum Center, Suzi Taylor from Montana State University, and Nick Wethington from spectrUM Discovery Area.

Update of the Planning & Implementation Guide

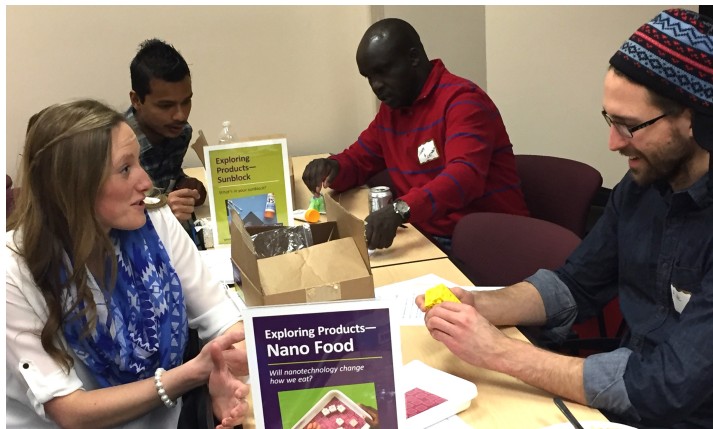
The MOS team reviewed all provider and participant feedback from previous years of implementation and developed an extensive revision to the Planning & Implementation Guide and accompanying materials, including the media assets and facilitator scripts. The new edition, v.4.0, was posted on the NISE Net website, and printed, chaptered versions with all digital assets and media on accompanying flash drives were sent to all the providers.⁶

Implementation Results

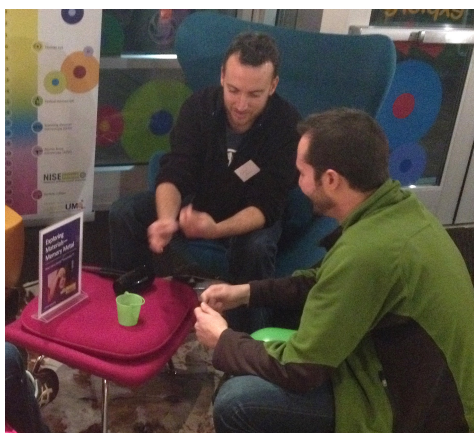
Numbers: Five of the six 2015 awardees had successfully implemented the SSW&P as of the date of this report, May 25, 2016. One awardee (SUNY Poly CMOST) requested a 3-month extension in order to implement the SSW&P with a group of 55 graduate student interns from the SUNY Polytechnic Institute.⁷ Including all six providers, a total of 116 university researchers and students experienced the SSW&P training and participated in informal science education outreach in 2016, in addition to those receiving training at the well-established SSW&P program at MOS.

Institution	# Trainees	Description
Cincinnati Museum Center	9	7 graduate students (Physics & Engineering) and 2 undergraduates from University of Cincinnati
Marbles Kids Museum	10	5 graduate and 5 undergraduate students from North Carolina State University
Montana State Univ.	15	Graduate students (various departments) at Montana State University
spectrUM Discovery Area	10	Graduate students & post-docs (various departments) from University of Montana
Univ. of So. Mississippi	17	3 faculty members, 7 graduate students, 3 staff members (various departments) at the University of Southern Mississippi
SUNY Poly CMOST	55	55 graduate student interns from SUNY Polytech Institute
Total	116	Faculty and students from six universities

Format: The format of the SSW&P is flexible by nature, and the providers took advantage of that flexibility to suit their institutional needs. Three providers implemented the Workshop & Practicum on a single day, and three providers planned separate days. Those providing the SSW&P on separate days gave their participants additional flexibility by offering several practicum options and dates, though one partner noted that this added a layer of logistical complexity they would seek to avoid in the future.



Montana State University graduate students practice with peers during their Feb 2016 SSW&P.



SSW&P participants at work in the spectrUM Discovery Area.



MSU graduate students at practice.

Elements: The providers generally used most elements of the SSW&P model, with everyone incorporating the critical “Practice with Peers” workshop element. One partner noted *“I’ve really liked how easy it is tailor the curriculum to our needs and use parts and pieces of it instead of the whole thing.”*

Funds: On average, the providers used about half of their Implementation Grant funds on staff time and benefits, and the other half on participant support such as food and materials.

Participant Feedback: A *FluidSurveys™* evaluation form was sent to all five providers in early spring, with a due date of May 15. Those who completed their programs before May 15 reported that most of their participants seemed to enjoy the SSW&P experience, and they also received largely favorable responses and great feedback in the evaluation survey. Here are some of the highlights:

- One partner noted that a participant who already had experience doing outreach mentioned how much more she'd learned at the SSW&P.
- Another partner noted that all respondents said they would recommend the workshop to their peers.
- Several shared direct quotes from their participant evaluations:
 - *"I loved seeing the surprise and awe on the kids' faces when they aren't expecting what they observe."*
 - *"A big take-home lesson was to ask more questions and listen to the students to engage them."*
 - *"It helps to see scientific contributions in a bigger picture in order to make more impact on people's lives."*

Provider Feedback: The five providers all agreed that the *SSW&P Planning & Implementation Guide* was very helpful, noting:

- *"I didn't have to create my own curriculum! Everything was right there."*
- *"It provides a clear outline, with timelines for planning and implementation that help greatly with organization."*
- *"It was terrific! Comprehensive and useful."*

The five providers all felt that the MOS team provided outstanding support for their SSW&P implementation, noting:

- *"Other than flying here and helping to put it on, I can't imagine any ways you could improve support."*
- *"I had a few questions... and they helped me immediately. The support was personal yet also extremely professional. Thanks!"*

The five providers were all pleased with their implementation of the workshop, including the one first-time provider who had not attended the 2014 workshop at MOS. All said they would recommend the SSW&P to other organizations interested in preparing researchers to engage in education outreach activities, noting:

- *"This is an excellent professional development program."*
- *"We pride ourselves on connecting STEM role models to the community... This is a nice compliment to our other initiatives."*

Challenges: Two of the university-based providers reported trouble with the logistics of providing practicum experiences, since they had to prepare an audience and a venue in addition to the training program. Several providers noted the continuing challenge of scheduling times that work for everyone involved. Two providers who held the Workshop & Practicum on the same day noted that it was a logistical challenge to move from the workshop area to the practicum location.

OVERALL OUTCOMES

What was the impact of the SSW&P on these institutions, their researcher partners, and their visitors? Did they conclude that the SSW&P was worth continuing in the future? We look at three pertinent dimensions: perceived benefits to visitors, to hosting institutions, and to building stronger partnerships.

Benefits to Visitors: When asked if they felt providing the SSW&P resulted in a more rewarding experience for visitors, four providers replied, “Yes, I’m convinced it did” and one replied, “Yes, I think it did”, commenting:

- *“I noticed an overall level of comfort and enthusiasm in the volunteers. This in turn made the visitor experience enjoyable and fun.”*
- *“Our volunteers were more confident and had better language to use with our unique audience.”*
- *“I noticed a marked difference between my volunteers who attended the workshop and those who did not.”*
- *“Our volunteers come with lots of content knowledge, but are less experienced with how to share science with young children... at the appropriate level. This workshop helped them gain those skills and deliver more effectively on the floor.”*



MSU graduate students lead NanoDays activities for students at Irving Elementary's afterschool program.

Benefits to Hosting Institutions: When asked if the SSW&P would be implemented again at their institution in the future, all five providers indicated that it would be. Some have further adaptations in mind. Several noted that they plan to adapt the content for other subject areas and target audiences, and one mentioned they would seek out more funding.

Fostering stronger science outreach partnerships: A key measure of success for the NISE RISE effort is to understand whether dissemination and implementation of the SSW&P can contribute to the development of stronger, more sustainable partnerships between research centers and ISE institutions. The iSSW&P awardees reported a big impact in this regard:

- *“This program was a great catalyst for forming a partnership with our Graduate School. We now have opened the door for future science communications/outreach programs. I also connected with many graduate students I never would have met, and they’re becoming involved in our other outreach programs.”*
- *“The SSW&P offers a framework for partnerships with universities and scientists. It is also part of our future plans to engage more university and industry partners in our programs.”*

- *"It's a formal opportunity for us to improve a program that we'd already been running... it's paid off in spades to have a ready-made curriculum to provide professional development to our volunteers from the university."*
- *"An adapted version of the SSW&P has been included as a portion of a grant we have applied for...We are also planning on offering the SSW&P to NSF grant awardees at partner universities."*
- *"Our campus has a new focus on active and engaged learning and this workshop is ideal for those purposes... when an outreach component is being planned by different STEM departments, this is something we can offer them."*
- *"The program is a great fit for our [museum] because we're part of the university system and this is a great way to prep the researchers for preparing to work with our visitors."*

CONCLUSION

We've learned that the SSW&P is adaptable to a variety of museum settings and some university settings, and that it is useful for developing and strengthening longer-term collaborations between informal science education outreach providers and university research groups. All institutions succeeded with their implementation, and all intend to continue with the program. The revised *Planning & Implementation Guide* worked extremely well for all providers. The one provider who had not attended the implementation workshop at MOS the prior year was able to pull off a successful implementation using just the *Guide* along with phone and email support. While obtaining support for staff time and materials can be a hurdle, providing modest start-up funding of just \$750 per site along with excellent planning and implementation materials and strong phone and email support produced very good outcomes, in most cases already leading toward stronger ties between the university and ISE partners.

ACKNOWLEDGEMENTS

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¹ UMass Donahue Institute Research & Evaluation Group. "Sharing Science Workshops, Fall 2009 Survey Results." 2009. Additional survey results from 2010-2015 are summarized in the evaluation section of *The Sharing Science Workshop & Practicum Planning and Implementation Guide v 4.0* (2016), pp. 55-57 (see url below).

² Alpert, Carol Lynn; Thate, Karine. *Sharing Science Workshop & Practicum Planning and Implementation Guide*, v. 4.0. Museum of Science, Boston: NISE Network, 2016. Accessed 5/25/16 at http://nisenet.org/catalog/tools_guides/sharing_science_workshop_practicum.

³ Alpert, Carol Lynn. *REU Science Communication Workshop Planning & Implementation Guide*, v. 5.0. Museum of Science: NISE Network, 2015. Accessed 5/25/16 at <http://www.nisenet.org/catalog/reu-science-communication-workshop-planning-implementation-guide-v50>.

⁴ Alpert, Carol Lynn. "Beyond "Train-the-Trainer:" a Preliminary Report on a New Scaffolding Strategy for Science Communication Workshop Dissemination." MRS Online Proceedings Library Archive, 2013.

⁵ Presentation materials from that session are available at: <http://www.nisenet.org/2015-network-wide-meeting-concurrent-sessions>.

⁶ Op cit., Alpert and Thate.

⁷ This extension was granted, in light of the opportunity SUNY Poly CMOST has to an ongoing program in partnership with the Institute. That large group will be split into two workshops hosted at the University in June, with four practicum sessions hosted at the Children's Museum in July.