

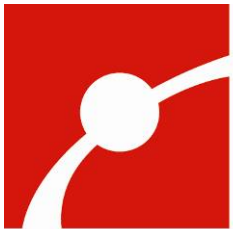
***Workshop to Explore Engaging Broader
Publics in Conversations about
Assessment of the Societal Implications
of New and Emerging Directions in
Science and Technology***
Summative Evaluation

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EXECUTIVE SUMMARY

The *Workshop to Explore Engaging Broader Publics in Conversations about Assessment of the Societal Implications of New and Emerging Directions in Science and Technology (ECAST Workshop)* was created to explore network-building activities to more broadly involve the public in deliberations about the assessment of technology. The workshop aimed to develop models for leveraging the work done by ECAST (Expert & Citizen Assessment of Science and Technology), and specifically expand the reach of the World Wide Views (WWViews) on Biodiversity deliberations. The project team wanted to brainstorm ways to increase the reach of WWViews on Biodiversity so that publics who cannot participate in the formal deliberations may still be able to informally participate. Therefore, team members invited non-partisan science policy organizations, university scholars, and informal science educators to participate in a workshop about possible activities to broaden WWViews on Biodiversity conversations.

This report summarizes the findings from the summative evaluation for this project, which focused on understanding the impact of the workshop on informal science education professionals. The goals of the workshop which were measured through the summative evaluation included the following:

- *Awareness, knowledge, or understanding.* Workshop participants will feel more informed about public engagement activities.
- *Engagement or interest.* Workshop participants will have a renewed interest in implementing public engagement activities.
- *Behavior.* Workshop participants will brainstorm ways to implement workshop activity ideas at their own institutions.

A post-survey was created to measure the impacts that the project had on workshop participants. This survey consisted of close-ended and open-ended questions and was given to participants at the conclusion of the workshop. In total, 14 of the 29 workshop participants filled out the post-survey for a return rate of 48%.

Survey data highlighted the following evaluation findings:

- Participants felt more informed about methods, topics, and others involved in public engagement due to their participation in the workshop.
- Participants had a renewed interest in implementing PES activities due to the workshop.
- Participants reported highest interest in implementing PES activities that align with their institutional missions and least interest in ideas requiring extensive resources.
- Participants reported that the workshop impacted their future work by increasing the likelihood they would implement the activities brainstormed during the workshop.

TABLE OF CONTENTS

| | |
|--|----|
| Executive Summary | ii |
| I. Introduction | 1 |
| About ECAST..... | 1 |
| About the Workshop..... | 1 |
| About the Evaluation | 2 |
| II. Methods..... | 3 |
| Workshop Post-Survey | 3 |
| Data Analysis..... | 4 |
| III. Results and Discussion | 5 |
| 1. Participants felt more informed about methods, topics, and others involved in public engagement at the end of the workshop..... | 5 |
| 2. Participants had a renewed interest in implementing PES activities, with highest interest in those ideas aligning with institutional missions and least interest in ideas requiring extensive resources. | 7 |
| 3. Participants reported that the workshop impacted their future work by increasing the likelihood they would implement workshop activities. | 12 |
| IV. Conclusion | 15 |
| References..... | 17 |
| Appendix A: Workshop Agenda..... | 18 |
| Appendix B: Workshop Survey..... | 19 |
| Appendix C: Other Survey Data..... | 20 |

I. INTRODUCTION

ABOUT ECAST

Expert and Citizen Assessment of Science and Technology (ECAST) is a “national network of non-partisan policy research institutions, universities, and science centers working together to conduct nonpartisan and balanced technology assessments” (Expert & Citizen Assessment of Science and Technology, n.d.). ECAST is led through a collaboration of the Woodrow Wilson Center, the Consortium for Science, Policy and Outcomes at Arizona State University, the Loka Institute, Science Cheerleader, and the Museum of Science, Boston. This network is interested in producing participatory technology assessments (pTA) that have the potential to influence decisions about policy. They hope to address the importance of citizen consultation in thinking about strengths and weaknesses of new technologies before they are distributed, and in preparing for a wide array of technology futures rather than adapting to a decision after it is made (Guston, 2011). ECAST is coordinating US participation in the global WWViews on Biodiversity¹ citizen consultation.

ABOUT THE WORKSHOP

In 2011, the Museum of Science applied for funding from the National Science Foundation (NSF) to hold a workshop to strengthen and expand recent cross-sector network-building activities related to engaging the public in conversations and deliberations about the assessment of the societal implications of science and technology, such as the pTA work of ECAST. The *Workshop to Explore Engaging Broader Publics in Conversations about Assessment of the Societal Implications of New and Emerging Directions in Science and Technology (ECAST Workshop)* was designed to find models for leveraging this formal citizen consultation work in order to involve a broader public in the conversations and to gauge the interest of other informal science education institutions (ISIs) in participating in this work. As the workshop date approached, workshop organizers realized that they could focus their efforts around a specific upcoming project they were working on – World Wide Views (WWViews) on Biodiversity. Therefore, they decided to focus the workshop on generating ideas about how to extend WWViews on Biodiversity citizen consultation beyond the one-time formal event so that members of the public who will otherwise not be able to participate will have a chance to learn about and be part of a broader discussion about biodiversity.

On December 8-9, 2011, the *ECAST Workshop* brought together university scholars and non-partisan science policy organization professionals with informal science educators from small and large science museums. Workshop participants worked together to develop concepts for stimulating broader public conversation around the September 2012 WWViews on Biodiversity event in order to involve people who were either not selected or were not able to be a part of the formal citizen consultation event. During the one and a half day workshop, participants learned about public engagement techniques, including citizen consultation, as well as topics anticipated

¹ The WWViews on Biodiversity project (www.wwviews.org) will engage people around the world in a one-day global citizen consultation event with hopes of informing United Nations’ policymakers about citizens’ views on issues surrounding biodiversity. WWViews on Biodiversity is organized by the Danish Board of Technology, and will take place on September 15, 2012.

to be of significant scientific, governmental, and public interest in the next decade. Topics of significant future interest were chosen for the workshop based on the assumption that polarized opinions among the public were not already formed, allowing for open discussion. These types of topics are central in the practice of anticipatory governance, where it is important to understanding the strengths and weaknesses of technologies before they are used and anticipate an array of futures. During the workshop, participants were also given time to brainstorm ideas for potential outreach programs related to WWViews on Biodiversity as a large group and then split into four smaller groups to more fully develop four ideas from the original list. Participants were asked to brainstorm activities that they felt would leverage the work of ECAST to create an expanded, informed public discussion around biodiversity. A copy of the workshop agenda can be found in Appendix A.

ABOUT THE EVALUATION

The purpose of this summative evaluation was to understand the impact of the *ECAST Workshop* on participants. The questions guiding the evaluation included the following:

1. What did workshop participants learn about public engagement² methods and topics by attending the workshop?
2. How did the workshop impact participants' interests in implementing future public engagement activities that aligned with WWViews on Biodiversity?
3. How, if at all, did participation in the workshop impact the kinds of projects participants might implement at their own institutions?

The planning of this evaluation began in November 2011. Data collection from workshop participants took place immediately after the workshop in December 2011. The final report was released in July 2012.

² This project defines PES according to the definition presented in the Center for Advancement of Informal Science Education's (CAISE) inquiry group report, *Many Experts, Many Audiences: Public Engagement with Science*, as "activities, events, or interactions characterized by mutual learning...among people of varied backgrounds...who articulate and discuss their perspectives, ideas, knowledge and values" (McCallie et al, 2009, p. 18).

II. METHODS

The purpose of this summative evaluation was to determine whether the following project impacts were achieved by the workshop:

- *Awareness, knowledge, or understanding.* Workshop participants will feel more informed about public engagement activities.
- *Engagement or interest.* Workshop participants will have a renewed interest in implementing public engagement activities.
- *Behavior.* Workshop participants will brainstorm ways to implement workshop activity ideas at their own institutions.

Members of the Museum of Science Research & Evaluation Department created a workshop post-survey in order to measure the effectiveness of the workshop in achieving these impacts. The evaluation instrument is described in more detail below.

WORKSHOP POST-SURVEY

Members of the Museum of Science Research and Evaluation Department developed a post-survey that participants filled out after the completion of the workshop. Fourteen of 29 workshop participants filled out the survey for a response rate of 48%. This relatively low response rate may be attributed to the fact that some participants only attended the first day of the workshop and were therefore not administered the survey. Additionally, the participants consisted of a mixture of presenters, observers, and participants, so it is likely that some presenters and observers did not fill out the survey because they did not feel that it would be appropriate.

The survey included both open-ended and close-ended questions to measure the impacts of the workshop on participants. Seven open-ended questions looked at what participants learned from the workshop and their interest in implementing future projects that would stimulate a broader conversation about WWViews on Biodiversity. The open-ended questions included in this survey were the following:

- What, if anything, did you learn from this workshop that you didn't know before?
- What ideas do you have about ways you might apply what you heard at the workshop to your own work?
- For those projects you rated "Interested" or "Very interested," why are you interested in implementing them?
- For those projects you rated "Not at all interested" or "Somewhat interested," why aren't you interested in implementing them?
- What other project ideas not listed above are you interested in implementing? Why?
- How, if at all, have your plans for implementing public engagement activities changed because of attending this workshop?
- Is there anything else you would like to add?

The survey also included close-ended questions in order to gauge the extent to which the workshop impacted participants' interest, knowledge, and future behaviors. The first set of close-ended questions asked participants to rank their agreement with the following statements³:

- I feel more informed about public engagement methods.
- I feel more informed about possible public engagement activities.
- I feel a renewed enthusiasm for implementing public engagement activities.
- The workshop will inform my future work.
- We generated innovative public engagement ideas.
- We generated public engagement ideas that others will be interested in implementing.

The second set of close-ended questions asked participants to rate their interest in implementing the four public engagement ideas generated during the workshop⁴. The four public engagement ideas developed during the second day of the workshop were as follows:

- Infrastructure network/capacity building: This project would provide support and materials to institutions conducting outreach activities.
- Simple activities all can do: This would include low-cost programs that could be easily implemented by partners at any time. Examples include a Halloween biodiversity costume contest, scavenger hunts, and the distribution of already-existing biodiversity activities.
- Same-day events: This would include festival-type events that coincide with the formal WWViews on Biodiversity deliberations. Activities at these events could consist of many different types of formats, but all of these events would include real-time updates on the formal deliberations.
- Community-created content activities: This project would connect organizations within the community that are implementing activities around biodiversity. Stories about the activities would be shared within the community in a variety of ways, with hopes of reaching diverse audiences.

A copy of the workshop post-survey can be found in Appendix B.

DATA ANALYSIS

Data collected through the surveys were both qualitative and quantitative in nature. The quantitative data collected were analyzed through descriptive statistics such as counts, means, and standard deviations. Qualitative data were analyzed using inductive coding methods. Inductive coding analysis involves “immersion in the details and specifics of data to discover important patterns, themes, and interrelationships” (Patton, 2002, p.41). As a part of this process, one evaluator developed a draft code list for each open-ended question. After discussion and review with the lead evaluator, this code list was finalized and each response was recoded using the final agreed-upon list.

³ Participants were asked to rate their agreement on a four-point scale (“Strongly disagree,” “Disagree,” “Agree,” and “Strongly agree”).

⁴ Participants were asked to rate their interest on a four-point scale (“Not at all interested,” “Somewhat interested,” “Interested,” “Very interested”).

III. RESULTS AND DISCUSSION

The Results and Discussion section is split into three sub-sections based on the findings about the three workshop impacts. Those sections are the following:

1. Participants felt more informed about methods, topics, and others involved in public engagement at the end of the workshop.
2. Participants had renewed interest in implementing PES activities due to the workshop, with highest interest in those aligning with institutional missions and least interest in ideas requiring extensive resources.
3. Participants reported that the workshop would impact their future work by increasing the likelihood they would implement workshop activities.

Throughout this report, data collected through the *Dimensions of Public Engagement with Science's* summative evaluation (Iacovelli, Beyer, and Kollmann, 2012) were used to provide enriched insight into the *ECAST Workshop* findings. *Dimensions of PES* consisted of the compilation of a catalog of current PES projects from around the world as well as a workshop for ISE professionals to discuss future directions of the PES field. The findings for the two workshops are comparable because the purpose of both projects was to increase ISE professionals' interest and knowledge about PES as well as increase the likelihood that they would implement these kinds of activities at their institutions.

1. PARTICIPANTS FELT MORE INFORMED ABOUT METHODS, TOPICS, AND OTHERS INVOLVED IN PUBLIC ENGAGEMENT AT THE END OF THE WORKSHOP.

Findings from the workshop post-survey indicate that workshop participants increased their knowledge of public engagement with science because of attending the workshop. Two of the elements of public engagement that participants learned about through the workshop were public engagement methods and topics. Twelve (of 14) participants “agreed” or “strongly agreed” that they felt more informed about both public engagement methods and public engagement topics after the workshop (Table 1). Additionally, when answering an open-ended question about what they learned at the workshop that they did not know before, a few participants (3 of 14) reported learning about elements of public engagement projects from the workshop, such as the “importance of media connection when doing events” (Table 2).

TABLE 1. Participants’ rankings of their agreement with statements about public engagement methods and topics.⁵

| | N | Mean Rating | Standard Deviation | Number of Respondents Choosing “Agree” or “Strongly Agree” |
|---|----------|--------------------|---------------------------|---|
| I feel more informed about public engagement methods. | 14 | 3.14 | 0.663 | 12 |
| I feel more informed about possible public engagement topics. | 14 | 3.36 | 0.745 | 12 |

TABLE 2. Responses to the Workshop Post-Survey Open-ended Question: “What, if anything, did you learn from this workshop that you didn’t know before?” (N=14)⁶

| Code | Number of Respondents | Selected Quotes |
|--|------------------------------|---|
| I learned about other individuals and organizations involved in public engagement. | 7 | “Great to meet other Museum/higher ed. people who are doing this or are interested in doing this” |
| I learned about other current public engagement activities. | 3 | “Citizen science and ISE activities across U.S.” |
| I learned about elements that can be part of public engagement activities. | 3 | “New science topics-more depth and breadth. Same for formats” |
| Other | 3 | “...to get a better sense of ECAST’s plans for the future” |
| No response | 2 | -- |

Along with learning about public engagement methods and topics, participants also came away from the workshop having increased their awareness of others involved in PES. When asked what participants learned at the workshop, the most common response (7 of 14 respondents) was that participants learned about other organizations and individuals involved in public engagement activities. One participant said that s/he “met many people involved in this work” and considered it a “good networking opportunity.” Another participant thought it was “great to meet other museum/higher ed. people who are doing this or are interesting in doing this.” A few respondents (3 of 14) also recounted learning about current public engagement activities that their fellow participants were involved in (Table 2). One of these respondents “learned about specific initiatives” at the workshop, whereas another learned “more about [the] World Wide Views project in general.”

It is not surprising that the workshop led participants to feel more informed about public engagement methods, topics, and others involved in PES considering the workshop format and the diverse mix of professionals who attended the workshop. The workshop brought together both ISE professionals and university scholars, many of whom probably did not know each other before the workshop. During the workshop, participants discussed possible project ideas on the

⁵ Participants were asked to rate their agreement on a 4 point scale (1=“Strongly disagree,” 2=“Disagree,” 3=“Agree”, and 4=“Strongly agree”).

⁶ The total number of survey respondents is greater than 14 because multiple codes could be assigned to each participant response.

first day, followed by a more in depth small group discussion about one project idea on the second day. This structure gave participants time to get to know each other in a small group setting where they could learn more about the projects others were involved in. It is also not surprising that participants learned about PES methods through the workshop. Multiple workshop presentations covered the specifics of PES, including topics like anticipatory governance, participatory technology assessment, adapting citizen consensus conferences to museum forum programs, and WWViews on Biodiversity’s work.

These findings are similar to the findings of the *Dimensions of PES* workshop, which also found that by bringing together PES-interested professionals from a variety of fields and institutions, ISE professionals would increase their knowledge of other PES projects and practitioners. The *Dimensions of PES* summative evaluation also found that promoting discussion among these individuals and presenting them with new information about PES would increase their understanding of the practices and elements of PES. These similarities may indicate a need for further professional development and networking among PES practitioners to increase knowledge about PES through sharing their experiences.

2. PARTICIPANTS HAD A RENEWED INTEREST IN IMPLEMENTING PES ACTIVITIES, WITH HIGHEST INTEREST IN THOSE IDEAS ALIGNING WITH INSTITUTIONAL MISSIONS AND LEAST INTEREST IN IDEAS REQUIRING EXTENSIVE RESOURCES.

Not only did participants report learning about PES through the workshop, they also showed renewed interest in implementing public engagement activities. When asked to rate their agreement, 13 (of 14) participants “agreed” or “strongly agreed” that they felt a renewed enthusiasm for implementing public engagement activities at their institutions after attending the workshop (Table 3). This indicates that the workshop did cause the participants to become more interested in applying PES practices to their own work.

TABLE 3. Participants’ rankings of their agreement with the statement that they felt a renewed enthusiasm for implementing public engagement activities.⁷

| N | Mean Rating | Standard Deviation | Number of Respondents Choosing “Agree” or “Strongly Agree” |
|----|-------------|--------------------|--|
| 14 | 3.64 | 0.633 | 13 |

Along with reporting a general renewed interest in implementing projects, participants were asked to identify which of the specific activity ideas generated during the workshop they were interested in implementing. A substantial portion of the workshop focused on developing ideas for public engagement activities that could be implemented to extend the WWViews on Biodiversity deliberation. Participants were asked to rate their interest in implementing four of the ideas generated. Those four ideas included the following: infrastructure network/ capacity

⁷ Participants were asked to rate their agreement on a 4 point scale (1=“Strongly disagree,” 2=“Disagree,” “3=“Agree,” and 4=“Strongly agree”).

building, community-created content, simple activities, and same-day events. According to the evaluation data, participants were more interested in implementing some of the project ideas than others. There was highest interest in implementing the infrastructure network/ capacity building project. Four (of 14) participants reported that they were “interested,” and nine (of 14) reported that they were “very interested” in implementing this activity. Participants were also generally interested in community-created content projects and simple activities all can do. Participants were least interested in implementing same-day events, with five (of 14) survey respondents being “somewhat interested” and two (of 14) being “not at all interested” in implementing this activity (Table 4).

TABLE 4. Participants’ rankings of their interest in implementing the four ideas further developed at the workshop.⁸

| | N | Mean Rating | Standard Deviation | Number of Respondents Choosing “Interested” or “Very Interested” |
|---|----------|--------------------|---------------------------|---|
| Infrastructure network/ capacity building | 14 | 3.50 | 0.855 | 13 |
| Community-created content activities | 14 | 3.21 | 0.802 | 11 |
| Simple activities all can do | 14 | 3.07 | 0.828 | 10 |
| Same-day activities | 14 | 2.57 | 1.016 | 7 |

The reasons for participants’ interests in these activities were explored in an open-ended question that asked them why they were “interested” or “very interested” in implementing an idea. Participants most commonly reported (5 of 14 respondents) that they were interested in activities that aligned with their institutions’ missions. As one of these participants said, “This is highly related to our mission.” Some participants (3 of 14) were also interested in implementing projects that were of personal or professional interest to them, and a few participants (3 of 14) reported being interested in projects that were easy to implement. These participants mentioned “practicality” and having “flexible programming.” Finally, three (of 14) participants were interested in activities that they believed would positively impact their community. One participant believed that “people need personal/local connection,” while another thought that their “community partnerships would benefit” from the projects s/he ranked most interested in implementing (Table 5).

Looking more closely at the project ideas associated with the different interest codes gave further insight as to why participants were interested in each of the four activity ideas. As mentioned previously, implementing same-day events was of least interest among participants. However, for those participants who were interested in implementing same-day events, most were interested because it aligned with their institution’s mission. Others were interested because of a personal/professional interest, and one participant was interested because s/he thought that the

⁸ Participants were asked to rate their interest on a 4 point scale (1= “Not at all interested,” 2=“Somewhat interested,” 3=“Interested,” and 4=“Very interested”).

activity seemed easy to implement. Workshop participants were most interested in implementing community-created content activities because they believed that this project idea supported their mission. Other reasons that participants were interested in implementing this kind of activity included their own personal/professional interest, the ease in implementing the activity, and the fact that it provided a research opportunity. Participants who responded that they were “interested” or “very interested” in implementing the infrastructure network/ capacity building seemed to be interested because of personal/professional reasons and/or because they felt this activity would increase the field’s capacity. One participant reported that s/he “like[s] learning about how [infrastructure network/capacity building] is done.” Another participant said that “we need more capacity to help folks appreciate the value of biodiversity.” Finally, participants were interested in implementing simple activities because they required little resources and were easy for the institution to carry out. One participant noted the “practicality” of simple activities while another said that s/he felt “best positioned to contribute and support” implementation of simple activities (Table 5).

Taken together, these data indicate that the workshop participants were most interested in implementing activities that they felt aligned with their institutional missions. In fact, participants felt that each of the four activity ideas generated at the workshop aligned with institutional missions to some extent. Participants also felt that all of the activity ideas were of personal or professional interest to them. In addition to supporting their mission and personal interests, infrastructure network/ capacity building was interesting to participants because they thought it would increase the capacity of the ISE field. Simple activities were interesting because of the alignment with their institutions’ missions and their personal interest as well as the fact that participants felt that they were easy to implement.

TABLE 5. Responses to the Workshop Post-Survey Open-ended Question: “For those projects you rated “interested” or “very interested,” why are you interested in implementing them?” (N=14)⁹

| Code | Project Ideas Associated with Code | Number of Respondents | Selected Quotes |
|--|---|-----------------------|--|
| It aligns with my institution’s goals or mission. | <ul style="list-style-type: none"> • Infrastructure network/capacity building • Community-created content • Simple activities • Same-day activities | 5 | “...to serve our mission” |
| It aligns with my personal/professional interests. | <ul style="list-style-type: none"> • Infrastructure network/capacity building • Community-created content • Simple activities • Same-day activities | 3 | “Community-created content- it relates to my research interests; Infrastructure/capacity building- I like learning about how this is done” |
| I will be able to easily implement this activity. | <ul style="list-style-type: none"> • Infrastructure network/capacity building • Community-created content • Simple activities • Same-day activities | 3 | “Practicality” |
| It will impact the community. | <ul style="list-style-type: none"> • Infrastructure network/capacity building • Community-created content • Simple activities • Same-day activities | 3 | “Community- people need personal/local connection” |
| It will increase the capacity of the field. | <ul style="list-style-type: none"> • Infrastructure network/capacity building | 3 | “We need more capacity to help folks appreciate the value of biodiversity...” |
| It will provide a research opportunity. | <ul style="list-style-type: none"> • Infrastructure network/capacity building • Community-created content • Simple activities • Same-day activities | 2 | “To test concepts for the field...” |
| Other | <ul style="list-style-type: none"> • Community-created content | 1 | “...innovative and cool” |

⁹ The total number of survey respondents is greater than 14 because multiple codes could be assigned to each participant response.

As seen in Table 4, very few participants reported that they were “not at all interested” or “somewhat interested” in implementing the activity ideas brainstormed during the workshop. However, for the few participants who were not interested in one or more of the activity ideas, evaluators asked an open-ended question to better understand why they were not interested in implementing them. When participants were asked this question, they most commonly reported (4 of 14 respondents) that they did not have sufficient resources to carry out these projects. One participant reported that the projects s/he ranked with lower interest were “interesting, but they require funding to do (at all or well), so they’re second priority.” Another participant reported that s/he was not interested because s/he has “too many other things to do.” The only other response that the participants (2 of 14 respondents) gave was that they were not interested in implementing the project ideas because they did not align with their institutions’ missions (Table 6). Requiring extensive resources was associated with all four project ideas. However, misalignment with institutional mission was associated with only three of the activity ideas – simple activities all can do, same day events, and community-created content activities.

These data indicate that for the few participants who indicated a lack of interest in implementing the workshop ideas, the reasons for this lack of interest were that participants felt that the activity did not link to their institutions’ missions or that they did not have the resources to carry out the activity. These responses may be a reflection of the fact that many of the proposed activities were focused on public outreach and some of the participants did not come from ISE institutions. Therefore, it might not have been a part of their mission or capacity to hold outreach activities. It is also possible that participants showed a lack of interest because they knew that they did not have the monetary or staffing resources to implement the activity. For example, some participants may have felt that they would not be able to do the same day activity because they did not have the staffing necessary to hold both the formal WWViews on Biodiversity deliberations and another event on the same day. During brainstorming about the same day activity, participants also discussed using a live feed to allow visitors to view the deliberations as they were happening around the world. Some participants may have felt that it would be difficult to pull this off because they did not have the technological resources necessary.

TABLE 6. Responses to the Workshop Post-Survey Open-ended Question: “For those projects you rated ‘not interested’ or ‘somewhat interested,’ why aren’t you interested in implementing them?” (N=14)

| Code | Project Ideas Associated with Code | Number of Respondents | Selected Quotes |
|--|---|-----------------------|---|
| I lack resources to implement this project. | <ul style="list-style-type: none"> • Infrastructure network/capacity building • Community-created content • Simple activities • Same-day activities | 4 | “...don’t have the energy to lead on this...” |
| They are not part of my institutional goals/mission. | <ul style="list-style-type: none"> • Community-created content • Simple activities • Same-day activities | 2 | “Institutional mission” |
| Other | <ul style="list-style-type: none"> • Infrastructure network/capacity building • Same-day activities | 2 | “...not as long-lasting” |
| No response | | 6 | -- |

There were some parallels between the *ECAST Workshop* and the *Dimensions of PES* workshop summative evaluations in terms of impact on participants’ interest in implementing PES activities at their institutions. Similar to this project, findings from the *Dimensions of PES* summative evaluation also showed that participation in a PES workshop renewed participants’ interest in adding PES elements to their projects. In both cases, participants’ renewed interest in implementing public engagement activities shows that attending a workshop prompts participants to think about adding PES elements to their work and pursuing PES further.

3. PARTICIPANTS REPORTED THAT THE WORKSHOP IMPACTED THEIR FUTURE WORK BY INCREASING THE LIKELIHOOD THEY WOULD IMPLEMENT WORKSHOP ACTIVITIES.

When participants were asked to rate their agreement with the statement “The workshop will inform my future work,” 12 (of 14) participants “agreed” or “strongly agreed” (Table 7). Data from the open-ended question asking participants how they might apply what they heard at the workshop to their future work gave some insight as to how exactly participants thought that the workshop would impact them. Some participants (3 of 14) indicated that the workshop influenced their future work by leading them to plan on implementing one or more of the activities discussed during the workshop. One participant expected to implement “biodiversity hikes/activities,” while another was planning to implement “practical activities that could be implemented at a local botanical garden at a low cost.” Some others (3 of 14) reported that the workshop influenced their future work because they now anticipated using elements of citizen consultation. One participant reported that s/he “might try developing mock pTA forums in the classroom,” and another participant was “interested to try more consensus-type conferences to influence policy.” Finally, some participants (3 of 14) reported that they planned to apply what

they heard to increase the size and capabilities of public engagement by “increasing capacity of the network to do pTA projects,” or bringing other “ISIs into the conversation” (Table 8).

TABLE 7. Participants’ rankings of their agreement that the workshop would inform their future work.¹⁰

| N | Mean Rating | Standard Deviation | Number of Respondents Choosing “Agree” or “Strongly Agree” |
|----------|--------------------|---------------------------|---|
| 14 | 3.5 | 0.76 | 12 |

Table 8. Responses to the Workshop Post-Survey Open-ended Question: “What ideas do you have about how you might apply what you heard at the workshop to your own work?” (N=14)¹¹

| Code | Number of Respondents | Selected Quotes |
|---|------------------------------|--|
| I plan on implementing activities we discussed. | 3 | “Implement ideas generated in discussion for site work in WWViews biodiversity...” |
| I plan on using elements of citizen consultation in my future work. | 3 | “I might try to develop mock pTA forums in the classroom” |
| I plan on increasing the public engagement capacity of others. | 3 | “Bring my fellow ISIs into the conversation...” |
| Other | 2 | “... would love to observe in a host city; webinar with other cities if that happens...” |
| No response | 6 | -- |

Along with being asked how they might apply what they learned at the workshop, participants were also asked how their plans for implementing public engagement activities changed because of the workshop. In response to this question, three (of 14) participants wanted to incorporate more citizen consultation-type discussions and three (of 14) other participants planned to apply what they learned about public engagement activities to their work. Among those interested in public engagement activities more broadly, one participant said s/he gained “more awareness of topics/formats, better understanding/ideas for targeting policy makers as an audience.” One participant hoped to “take on programs/events that are linked with a national or international face like [World Wide Views].” A couple of participants also reported an interest in being part of WWViews on Biodiversity forum in September 2012 (Table 9).

¹⁰ Participants were asked to rate their agreement on a 4 point scale (1=“Strongly disagree,” 2=“Disagree,” “3=“Agree,” and 4=“Strongly agree”).

¹¹ The total number of survey respondents is greater than 14 because multiple codes could be assigned to each participant response.

TABLE 9. Responses to the Workshop Post-Survey Open-ended Question: “How, if at all, have your plans for implementing public engagement activities changed because of attending this workshop?” (N=14)¹²

| Code | Number of Respondents | Selected Quotes |
|---|-----------------------|---|
| I now plan to incorporate larger discussions like consensus conferences into my work. | 3 | “More interested in taking on programs/events that are linked with a national or international face like WWV” |
| I plan to use what I learned about public engagement activities. | 3 | “... I will work more of this information into my courses and research” |
| I plan to be involved in World Wide Views work. | 2 | “I am thinking about how and whether we can do this at my organization and how/whether I can be part of the planning effort (I would like to be)” |
| Other | 4 | “Identify new points of leverage within the network” |
| No response | 3 | -- |

The results showed that participants planned to apply what they learned at the workshop by implementing activities, which is not surprising considering that prior to the workshop participants expressed interest in supporting and implementing PES-related activities. Moreover, the brainstorming period on the first day of the workshop gave participants ideas for activities that they could implement at their institutions. This structure could have possibly contributed to some participants reporting that they planned to implement an activity discussed during the workshop. Part of the workshop involved discussions about different types of citizen consultation, which some museum participants may not have been aware of prior to the workshop; this may be one reason that some workshop participants wanted to take part in future citizen consensus conferences. A desire to increase the capacity of public engagement practices may be attributed to the contingent of participants who wanted to increase the use of citizen consultation in informal science settings.

Similar to the *ECAST Workshop* findings, the *Dimensions of PES* findings showed participants being likely to implement PES activities at their own institutions and reporting that their plans had changed in regards to implementing PES-related activities. The fact that participants at both workshops were highly likely to implement PES activities shows that professionals consider PES to be an important practice that is worthy of their time and efforts.

¹² The total number of survey respondents is greater than 14 because multiple codes could be assigned to each participant response.

IV. CONCLUSION

The *Workshop to Explore Engaging Broader Publics in Conversations about Assessment of the Societal Implications of New and Emerging Directions in Science and Technology (ECAST Workshop)* set out to explore and brainstorm ways expand the work of WWViews on Biodiversity, a day of deliberations in countries around the globe, by developing models for leveraging formal citizen consultation to increase participation and awareness of this event in the US. This workshop brought together non-partisan policy makers, informal science professionals, and university scholars for a day and a half workshop in December 2011 to discuss potential activities that would broaden the reach of the 2012 WWViews on Biodiversity event.

The purpose of this summative evaluation was to measure the impact of the workshop on the ISE professionals who attended. Data were collected from participants directly after the workshop via a workshop post-survey containing a series of open-ended and close-ended questions. The survey questions were designed to understand the extent to which the following project impacts were achieved:

- *Awareness, knowledge, or understanding.* Workshop participants will feel more informed about public engagement activities.
- *Engagement or interest.* Workshop participants will have a renewed interest in implementing public engagement activities.
- *Behavior.* Workshop participants will brainstorm ways to implement workshop activity ideas at their own institutions.

The evaluation findings give insight as to whether the project impacts were achieved. These findings indicate that after the workshop participants felt more informed about public engagement methods, topics, and others involved in public engagement projects. Participants not only learned about elements of PES through the workshop, but also learned about other PES practitioners and their current projects and involvement in PES. The information from the workshop presentations was likely one source of learning about public engagement activities for participants. Along with these presentations, the workshop format focused on small group discussions, which could have led to participants learning about each other's projects and interests in public engagement. Lastly, the mixed professions of the participants could have been another reason that participants became more knowledgeable about PES through the workshop. The science museum professionals invited may not have been familiar with the PES scholars prior to the workshop, and vice versa. These findings are evidence that workshop participants increased their understanding of public engagement activities through the workshop.

The second goal of the workshop was to renew participants' interests in implementing PES activities. Findings from the evaluation indicate that this impact was also achieved. The results that support this finding include participants' high ratings of a statement which asked them if they had renewed interest in implementing PES activities. Additionally, workshop participants expressed interest in implementing the ideas that were brainstormed on the first day of the workshop and further developed in small groups on the second day. The workshop participants were asked further questions as a part of the evaluation to understand what about these activity ideas made them appealing. In general, participants reported that they were interested in

implementing activities aligned with their institution's mission such as infrastructure network/capacity building, community-created content, and simple activities all can do. Participants were not as interested in implementing an activity that required extensive resources such as the same-day events.

The third goal of the workshop was for participants to brainstorm ways to implement activities developed during the workshop at their own institutions. In order to determine if this goal was achieved, participants were asked various questions to understand if what they heard during the workshop would impact their future work. Answers to this question were an indication that participants had thought about ways to incorporate activities and ideas from the workshop into their institutions' projects. As with the previous two impacts, there is evidence that this impact was achieved. Participants reported that the workshop would inform their future work. Ideas that participants had for incorporating what they heard into their work included implementing the ideas discussed, adding elements of citizen consensus conferences, or informing others about public engagement and citizen consultation in order to increase the field's capacity. These findings indicate that participants not only brainstormed ideas to regionalize the efforts of WWViews on Biodiversity, but they also thought about ways to use what they learned at the workshop in their future work.

There are multiple similarities between the evaluation findings of the *ECAST Workshop* and the *Dimensions of PES* workshop, which indicate that workshops like these can increase the capacity and interest of the ISE field in PES activities. Participants of both workshops showed an increase in knowledge of PES elements, methods, and topics. The participants of these workshops also learned about other PES projects and practitioners through their attendance. Additionally, in both cases workshop participants showed a renewed interest in implementing PES activities and thought about future plans to actually materialize this interest. These findings about PES-related professional development workshops indicate that workshops such as these have the potential to strengthen the PES field. Therefore, as PES activities continue to spread throughout the ISE field, workshops should be thought of as a method through which to create a robust and unified PES community of practice.

REFERENCES

- Expert & Citizen Assessment of Science and Technology. (n.d.). ECAST. *ECAST Network*. Retrieved July 2012, from <http://www.ecastnetwork.org/>.
- Iacovelli, S., Beyer, M., & Kollmann, E.K. (2012). *Dimensions of Public Engagement with Science Summative Evaluation* (Research report No. 2012-4). Museum of Science, Boston, MA.
- Guston, D. (2011). *Participatory Technology Assessment and Emerging Technologies*. Retrieved May 2012, from <http://www.youtube.com/watch?v=X-tOo4L- TA>.
- McCallie, E. L., Bell, L., Lohwater, T., Falk, J. H., Lehr, J. L., Lewenstein, B., et al. (2009). *Many experts, many audiences: Public engagement with science and informal science education. A CAISE Inquiry Group report*. Washington, D.C: Center for the Advancement of Informal Science Education.
- Patton, M. Q. (2002) *Qualitative research and evaluation methods*. Thousand Oaks, CA: Sage Publications, Inc.
- Sittenfeld, D. & Gano, G. (2011). *Plans for WWViews and Participatory Technology Assessment*. Retrieved May 2012 from http://www.youtube.com/watch?v=eB0XTtIUB_o

APPENDIX A: WORKSHOP AGENDA

Thursday, December 8th, 2011

| | |
|----------|--|
| 8:30 AM | Check-in (Museum Lobby) Breakfast (D'Arbeloff Suite) |
| 9:00 AM | Welcome and Overview of ECAST Larry Bell & David Sittenfeld, Museum of Science |
| 9:15 AM | Topics anticipated to be of significant scientific, governmental, and public interest in the next decade David Guston, Arizona State University |
| 10:00 AM | Participatory Technology Assessment World-wide activities and techniques Rick Worthington, Pomona College |
| 10:45 AM | Break |
| 11:00 AM | World-Wide Views on Biodiversity- Global, National, and Local Plans Rick Worthington, Pomona College, Darlene Cavalier, Science for Citizens, Gretchen Gano, Amherst College, & David Sittenfeld, Museum of Science |
| 12:00 PM | Using online environments to connect public audiences to formal deliberations Darlene Cavalier, Science for Citizens Adapting formal processes for museum programs – from Citizen Consensus Conferences to Forum for Dialogue and Deliberation - Bell |
| 12:15 PM | Lunch and exploration of NCDD 22 dialogue processes - all |
| 1:30 PM | Participants share experience with PES methods for connecting to formal participatory activities - all |
| 2:45 PM | Break |
| 3:00 PM | Brainstorm ideas for outreach programs around WWViews- small groups |
| 4:00 PM | Report and sort |
| 5:00 PM | End for the day |
| 6:00 PM | Dinner at Dante, Royal Sonesta Hotel |

Friday, December 9th, 2011

| | |
|----------|---|
| 8:30 AM | Breakfast (D'Arbeloff Suite) |
| 9:00 AM | Review brainstormed ideas from Thursday with advocacy - all |
| 9:30 AM | Select ideas to develop further – break out into groups and develop them- small groups |
| 10:45 AM | Break |
| 11:00 AM | Report out from small groups |
| 12:00 PM | Lunch in interest groups to develop action plans |
| 1:00 PM | Workshop concludes |
| 1:30 PM | Optional working group meetings |

APPENDIX B: WORKSHOP SURVEY

Help us by providing feedback about the ECAST Workshop. Your responses to this survey are anonymous, and you may skip questions or stop taking this survey at any time. Thank you!

1. Rate your agreement with the following statements about your experience at the workshop.

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| I feel more informed about public engagement methods. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| I feel more informed about possible public engagement topics. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| I feel a renewed enthusiasm for implementing public engagement activities. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| The workshop will inform my future work. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| We generated innovative public engagement ideas. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| We generated public engagement ideas that others will be interested in implementing. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- 2. What, if anything, did you learn from this workshop that you didn't know before?
- 3. What ideas do you have about ways you might apply what you heard at the workshop to your own work?
- 4. Please rate your level of interest in implementing the following project ideas.

| | Not at all Interested | Somewhat Interested | Interested | Very Interested |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| Infrastructure network / capacity building | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Simple activities all can do | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Same day events | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Community-created content activities | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- 5. For those projects you rated "Interested" or "Very interested," why are you interested in implementing them?
- 6. For those projects you rated "Not at all interested" or "Somewhat interested," why aren't you interested in implementing them?
- 7. What other project ideas not listed above are you interested in implementing? Why?
- 8. How, if at all, have your plans for implementing public engagement activities changed because of attending the workshop?
- 9. Is there anything else you'd like to add?

APPENDIX C: OTHER SURVEY DATA

TABLE C1. Participants' rankings of their agreement of statements about generating innovative ideas that others would be interested in implementing.

| | N | Mean | SD | Number of Respondents Choosing "Agree" or "Strongly Agree" |
|--|----|------|-------|--|
| We generated innovative public engagement ideas. | 14 | 3.21 | 0.579 | 13 |
| We generated public engagement ideas that others will be interested in implementing. | 13 | 3.25 | 0.577 | 12 |

TABLE C2. Responses to the Workshop Post-Survey Open-ended Question: "What other project ideas not listed above are you interested in implementing?" (N=14)

| Code | Number of respondents | Selected Quotes |
|--|-----------------------|---|
| I am interested in implementing research projects. | 2 | "Research on WWViews" |
| Other | 3 | "Theater- this was discussed some in the "community" group, but theater could be used for this project in other ways" |
| No response | 9 | -- |

TABLE C3. Responses to the Workshop Post-Survey Open-ended Question: "Is there anything else you would like to add?" (N=14)

| Code | Number of respondents | Selected Quotes |
|--------------------------|-----------------------|--|
| The workshop was great. | 3 | "Great workshop. Thank you." |
| I valued the discussion. | 2 | "Thank you for the thinking space" |
| Other | 5 | "...I met a lot of interesting people in fields I don't usually interact with" |
| No response | 5 | -- |