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NSF Advancing Informal STEM Learning Program

PRINCIPAL INVESTIGATOR MEETING

FEBRUARY 11-13, 2019

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Summaries of the Concurrent Sessions

2019 NSF ADVANCING INFORMAL STEM LEARNING PROGRAM PRINCIPAL INVESTIGATOR MEETING

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About the Sessions

Concurrent sessions were intended to catalyze thinking and discussions that can continue beyond the PI meeting and generate new ideas for future work and collaborations. The 16 topics were identified through a questionnaire of AISL PIs, a review of the current AISL program portfolio, and input from NSF program directors.

In this document, session organizers describe their main takeaways and top resources.

Please email caise@informalscience.org if you have any follow-up questions or comments about these sessions.

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Addressing Current Socio-Scientific Issues #1: Implications for Science Literacy

Organizer: Billy Spitzer, *New England Aquarium*

Co-Facilitators:

1. Bruce Lewenstein, *Cornell University*
2. John Fraser, *New Knowledge*

Session Description

The need for asset- and need-based approaches to science communication and literacy have been identified and articulated in two reports from the National Academies: *Communicating Science Effectively* (2017) and *Science Science Literacy: Concepts, Contexts and Consequences* (2016).

In light of these developments, how are institutions and individuals in ISE and science communication dealing with controversial or socio-scientific topics? How are we thinking about our roles and professional identities, given the finding that more and better information alone is not sufficient to facilitate societal dialogue? In this session, participants will have the opportunity to hear about some examples of evidence-informed practice, and to discuss and consider the relevance to their own work.

Takeaways

1. We need to better understand the conditions (e.g., existing organizations, assets, change agents) that enable communities to access and use expertise (including science)
2. How do we foster these conditions, absent a crisis that brings people together? What is the role of informal science centers?
3. How do we measure “community science literacy” as a system level asset (e.g, family system measures, [7 types of community capital](#), resilience measures)?

Resources Shared

1. [Communicating Science Effectively \(2017\)](#)
 - Moves beyond “deficit model” for science communication and sets research agenda
2. [Science Literacy: Concepts, Contexts and Consequences \(2016\)](#)
 - Introduces concept of “community science literacy” (vs. individual) and frames research needs

Addressing Current Socio-Scientific Issues #2: Climate Change

Organizer: Billy Spitzer, *New England Aquarium*

Co-Facilitators:

1. Bernadette Placky, *Climate Central*
2. Victoria Coats, *Oregon Museum of Science and Industry*

Session Description

The challenges of engaging the public with socio-scientific or controversial topics vary depending on the issues and the audiences being addressed. Using the specific lens of climate change, how can cognitive and social science research inform the practice in ISE and science communication?

In this session, participants will have the opportunity to learn about some of the key cognitive/social science research findings relevant to public engagement in climate change; hear how this research has been put into practice in diverse ISL settings; reflect and discuss how this knowledge could be applied in their own work; and identify potential future research needs.

Takeaways

1. There is an abundance of climate communications research. Need practical ways to apply it to enable messengers to be comfortable and confident.
2. Need simple messages, repeated often, by trusted messengers.
3. Communicating about solutions is a big challenge -- Need to connect local collective action to larger changes. Need to enable scientists to point to existing solutions resources.
4. What is NSF's role in sustainability and climate change? Not included in NSF's 10 Big Ideas!

Resources Shared

Climate communications research

- frameworksinstitute.org/climate-change-and-the-ocean.html
- climatecommunication.yale.edu

Research-based climate communication resources

- climateinterpreter.org/about/projects/NNOCCI
- www.vischange.org
- medialibrary.climatecentral.org

Resources Shared

[Climate adaptation knowledge exchange](#)

- Database of climate adaptation solutions

American Geophysical Union's [Thriving Earth Exchange](#)

- Links scientists with community groups

Building Institutional Capacity and Change

Organizer: Bronwyn Bevan, *University of Washington*

Co-Facilitators:

1. Marjorie Bequette, *Science Museum of Minnesota*
2. Liesl Chatman, *Science Museum of Minnesota*
3. Laura Conner, *University of Alaska Fairbanks*
4. Ru Mahoney, *Jackson Hole WILD*
5. Lesley Markham, *Association of Science-Technology Centers*

Session Description

Many ISE and science communication organizations are seeking to broaden and deepen their impact, especially with respect to equity and inclusion. Innovative and inspiring projects have been developed over the years, but many come and go with funding.

Recently, NSF has invested in several long-term capacity-building efforts meant to effect change at the institutional and leadership levels in ways that can advance sustainable progress in broadening participation.

In this session, we discuss capacity building needs *within* ISE institutions, *among* collaborating ISE institutions, and *beyond the walls* of ISE institutions. In group discussions, we will identify additional capacity-building issues and needs that remain unaddressed.

Takeaways

1. There is a need to focus on staff development, developing a common vision of (if differentiated strategies for) what high quality equity looks like in our work.
2. There is a need to develop institutional cultures that embrace and prioritize equity as foundational to the mission of ISE.
3. We need to rethink what scale, spread, and sustainability can mean for our efforts towards equity. Community partnerships can help us shift such goals outside of our organizations and specific funding needs.

Designing for Computational Thinking in Informal STEM Learning Settings, Activities, and Experiences

Organizer: Mike Horn, *Northwestern University*

Co-Facilitators:

1. Brian Magerko, *Georgia Tech / EarSketch*
2. Gillian Smith, *Worcester Polytechnic Institute*
3. Anne Sullivan, *Georgia Institute of Technology*

Session Description

Computational thinking is being fostered in informal STEM learning settings, activities, and experiences. Questions and issues that may arise in the process include broadening participation in computing through informal learning experiences; creating novel forms of engagement and exploration; conceptualizing computational thinking / literacy in out-of-school spaces; and thinking about the intersection of computing and arts, science, and humanities in informal learning.

This panel will discuss goals, challenges, and opportunities in fostering computational literacy and computational thinking across a variety of informal learning settings and experiences.

Designing for Equitable Early and Family STEM Learning

Organizer: Carrie Tzou, *University of Washington - Bothel*

Co-Facilitators:

1. Andrew Manches *University of Edinburgh*
2. Tsivia Cohen, *Chicago Children's Museum*
3. Scott Pattison, *TERC*

Session Description

What is the current state of research and practice around early and family STEM learning, and what are the compelling and challenging issues that those working with these audiences are facing? What conversations should we be having across early STEM learning and family STEM learning?

In this session, we will explore what new types of partnerships, theories of learning, and modes and models of we need in order to design just and equitable experiences and environments for all learners.

Designing for Science in Natural Settings

Organizer: Martha Merson, *TERC*

Co-Facilitators:

1. Sarah Garlick, *Hubbard Brook Research Foundation*
2. Joe Heimlich, *COSI*
3. Marc Stern, *Virginia Polytechnic Institute and State University*
4. Rhonda Struminger, *Texas A&M University*

Session Description

The possibilities for engaging public audiences in STEM learning in natural settings are numerous, with potential impacts on interest, curiosity, awe, knowledge gain, stewardship, and STEM identity. However, these effects are often difficult to quantify. What do we know about learning in and from authentic settings for scientific research, such as parks, field stations, and marine labs?

Participants in this session will:

1. Meet others, exchanging recommendations for existing resources
2. Describe how individual projects contribute to the knowledge base
3. Envision how findings will accrue and accumulate, affecting the sum total of what is known about learning in outdoor settings.

Takeaways

We identified areas where we struggle and feel the need for more research and resources.

1. Engaging and building trust with diverse audiences
2. Connecting cultural norms of communities with cultural norms of STEM (learning) in outdoor settings
3. What are meaningful outcomes and how do we measure them?

Resources Shared

On building trust:

- [Science Literacy: Concepts, Contexts, and Consequences](#)
 - A 2016 report from the National Academies of Science, Engineering, & Medicine
- [The Prism Rubric: Tools to Measure Partnership Strength](#)
- [Assessing Research-Practice Partnerships: Five Dimensions of Effectiveness](#)

Resources Shared

On cultural norms:

- [Who's Asking: Native Science, Western Science, and Science Education](#)
- [SACNAS](#), a professional organization working to foster success for Chicanos/Hispanics and Native Americans
- *Everybody's Outdoors* James Mitts, joytrip.com

Resources Shared

On outcomes:

- [DEVISE scales](#) (Cornell Lab of Ornithology)
 - Citizen science measures
- [New Directions](#) (American Evaluation Association)
 - Special issue on “Critical issues in ISE Evaluation”
- [iSWOOPparks.com](#)
 - Reports for a new interactive instrument to elicit interests
- Hidi, S. and Renninger, K. (2006). The Four-Phase Model of Interest Development. *Educational Psychologist* Vol. 42 (2), 111-127, DOI: 10.1207/s15326985ep4102_4
- [What is STEM Identity?](#) (CAISE)
- [Intentional Practice for Museums](#) (Randi Korn)

Equity and Inclusion Theory: Integrating STEM and Social Justice Perspective

Organizer: Edna Tan, *University of North Carolina at Greensboro*

Co-Facilitators:

1. Mike Barnett & Megan McKinley, *Boston College*
2. Jessie Conaway, *Wisconsin Nations Native Partnerships*
3. Shannon McManimon, *SUNY New Paltz*

Session Description

Theorizing science engagement through a justice-oriented perspective changes what we notice, design and document in science communication/ISE. What are the ways in which STEM education researchers across informal settings frame issues of equity and justice? What kinds of research methodologies and partnerships with communities attend to dynamics pertinent to research centered on equity, justice and STEM engagement?

This session invites participants to consider social justice-oriented perspectives in STEM research, including theoretical framing, methodological considerations, the nature of partnerships with communities, including tensions, conundrums, and considerations.

Takeaways

1. How do we make sure we do not inadvertently perpetuate inequities because of built-in oppressive structures into the research enterprise?
2. How do we build human-centered, not STEM-centered, programs at the intersection of STEM and social justice?
3. How do we build trust in communities that have good reason to distrust? How do we engage in broad discussions about STEM & social justice without perceptions of identity threat?

Resources Shared

Indigenous methodologies

- [Native-nations UW project website](#) with programmatic details for researchers looking for information on community engaged research partnerships

Learning about STEM in Rural Places

Organizer: Jan Mokros, *Science Education Solutions*

Co-Facilitators:

1. Susan Assouline, *University of Iowa*
2. Nicole Colston, *Oklahoma State University*
3. Keliann LaConte, *National Center for Interactive Learning,
Space Science Institute*

Session Description

Collaboration and knowledge sharing among projects engaged in rural STEM work can help us situate the work in an ecosystem perspective that encompasses informal and formal education; childhood through adult education; and economic development, as well as family and community education.

Panelists in this session will share effective ways of building on rural communities' strengths and addressing their challenges and will facilitate a discussion about the diversity of rural communities and the places in these communities where STEM is taking root.

Takeaways

1. Build on existing resources and strengths in the community, wherever they might be.
2. Work with libraries, because they are ubiquitous in rural areas and hungry for STEM programming.
3. Rural places are “steeped in the incredible” but it takes time to figure out what is special and who the right partners might be.

Resources Shared

- [Forgotten Places: Critical Studies in Rural Education](#) (2017)
 - Edited by William M. Reynolds
 - Overview of rural places and audiences.
- [STEM in rural libraries](#)
- [Rural Informal STEM Conference](#) (September 2018)
 - Complete report forthcoming.

Public Participation In Scientific Research / Citizen Science as a Force for Change

Organizer: Heidi Ballard, *University of California - Davis*

Co-Facilitators:

1. Lucy Robinson, *Natural History Museum London*
2. Karen Purcell, *Cornell Lab of Ornithology*
3. Monica Ramirez-Andreotta, *University of Arizona*
4. Julia Parrish, *University of Washington*

Session Description

PPSR / “citizen science” presents opportunities for authentic science engagement and science learning. Employing this approach in a more than cursory way raises fundamental questions about who determines what science is being done and for what purpose.

How can addressing these questions, and engaging communities at the outset, create opportunities for new forms of science learning and new models of scientific research? This session will involve a discussion of these questions and others.

Reaching New Audiences in Unexpected Places

Organizer: Mark Rosin, *Guerilla Science*

Co-Facilitators:

1. Asheley Landrum, *Texas Tech University*
2. Josh Gutwill, *Exploratorium*

Session Description

Informal STEM learning continues to blossom and thrive in increasingly diverse settings. How can we present science in ways that capture the attention, time, and interest of people engaged in everyday and non-science activities, from muddy music festival fields and deaf discos to street installations, and unusual digital channels?

In this session we will lead a discussion of best practices, the challenges of defining and measuring impact, and defining a forward looking research agenda for the field.

Takeaways

1. There are LOTS of examples of how to do engagement in public spaces
2. How can actual impact be measured in these spaces?
3. How is success defined for these types of activities?
4. Research questions:
 - What are best practices for mediation/facilitation?
 - How is trust built/developed/negotiated?
 - What is evidence for benefits of co-created programs?

Supporting Gender Equity in STEM, ISE, and Science Communication

Organizer: Karen Peterson, *National Girls Collaborative Project*

Co-Facilitators:

Rita Karl, *Twin Cities PBS, SciGirls*

Dorothy Bennett, *New York Hall of Science*

Marcie Benne, *OMSI*

Session Description

Current models of gender inclusion—specifically those aimed at engaging girls and women in STEM—are breaking new ground. We'll look at the specific ways these models are contributing to advancing gender equity in ISE and how these strategies and program elements can be adapted by others.

Participants will engage in both discussion and visioning to identify how the AISL community can address gender imbalances in not only who participates, but who will ultimately lead STEM education and engagement in the future.

Takeaways

1. Do we encourage girls to take on more male characteristics to fit into STEM?
2. Importance of using female STEM role models to show girls they can have a variety of careers, identities, and personalities and still be involved in STEM.
3. The value of having key influencers interact with all youth in STEM.
4. Future Needs: Studying long-term impacts of OST programs and experiences, i.e. longitudinal studies.

Resources Shared

FabFems - www.fabfems.org

- Role Model database managed by NGCP, useful for programs and girls to learn more about who does STEM

SciGirls - pbskids.org/scigirls/home

- Multiple seasons of episodes, games, videos

A Progressive's Style Guide

- A style guide to assist with inclusive language - https://s3.amazonaws.com/s3.sumofus.org/images/SUMOFUS_PROGRESSIVE-STYLEGUIDE.pdf

Resources Shared (Benne)

[American Alliance of Museums Welcoming Guidelines](#)

GLAAD Media Reference Guide <https://www.glaad.org/reference>

International Pronouns Day: <https://pronounsday.org/>

[Issue 3: Woman/Trans/Femme in the Museum](#) in the *Journal of Museum Education*, Volume 43, 2018

Margaret Middleton & Alicia Greene (2018) Trans Narratives in Children's Museums, *Journal of Museum Education*, 43:3, 220-227, DOI: [10.1080/10598650.2018.1495984](https://doi.org/10.1080/10598650.2018.1495984)

Margaret Middleton: <https://www.margaretmiddleton.com/articles>

Scott Pattison, Ivel Gontan, Smirla Ramos-Montañez, & Lauren Moreno. (2018). Identity negotiation within peer groups during an informal engineering education program: The central role of leadership-oriented youth. *Science Education* ;1-29. <https://doi.org/10.1002/sce.21459>

Resources Shared (Bennett)

Narrative in Exhibits and Programs

Allen, S. (2004a). Designs for learning: Studying science museum exhibits that do more than entertain. *Science Education*, 88 (Supplement 1), S17-S33.

Allen, S. (2004b). *Finding significance*. San Francisco: Exploratorium.

Buechley, L. (2013). Thinking about Making. Talk presented at FabLearn Conference, Stanford University, Palo Alto, CA. Available to stream at: <https://inventtolearn.com/event/fablearn-2013/>

Buechley, L. & Eisenberg, M. (2008). The LilyPad Arduino: Toward wearable engineering for everyone. *IEEE Pervasive Computing*, 7(2), 12-15.

Buechley, L., & Hill, B. M. (2010, August). LilyPad in the wild: how hardware's long tail is supporting new engineering and design communities. In *Proceedings of the 8th ACM Conference on Designing Interactive Systems* (pp. 199-207). ACM.

Buechley, L., Peppler, K. A., Eisenberg, M., & Kafai, Y. B. (Eds.). (2013). *Textile Messages: Dispatches from the world of e-textiles and education*. New York, NY: Peter Lang.

Resources Shared (Bennett)

Narrative in Exhibits and Programs, cont.

Note: Next two are NYSCI's work on Engineering Design (with some references to role of narrative in design activities, particularly first one and video interviews at nysci.org)

Bennett, D. & Monahan, P. (2013). NYSCI Design Lab: No bored kids! In M. Honey & D. Kanter (Eds.), *Design, make, play: Growing the next generation of stem innovators*. New York: Routledge.

Bennett, D., Monahan, P., & Honey, M. (2016). Museum design experiences that recognize new ways to be smart. In L. Annetta & J. Minogue (Eds.), *Connecting Science and Engineering Education Practices in Meaningful Ways*.(39-57). New York: Springer Publishing.

Resources Shared (Bennett)

Empathy in Engineering

Walther, J., Miller, S.D., & Sochacka, N.W. (2017, January). A model of empathy in engineering as a core skill, practice orientation, and professional way of being. *Journal of Engineering Education*, 106 (1) 123-128.

Walther, J., Miller, S.E., & Keller, N.N. (2012). Exploring the role of empathy in engineering communication through a transdisciplinary dialogue. In 119th American Society for Engineering Education Annual Conference and Exposition, AC-2012-4670.

Walther, J., Miller, S.E., & Sochacka, N.W. (2016). Fostering empathy in an undergraduate mechanical engineering course. Paper presented at the American Society for Engineering Education (ASEE) Annual Conference and Exposition, New Orleans, LA.

Resources Shared (Karl)

Bonner D., & Dorneich, M. (2016). *Developing game-based learning requirements to increase female middle school students' interest in computer science*. Proceedings of the Human Factors and Ergonomics Society 2016 Annual Meeting.

Brown, J.C. (2017). A metasynthesis of the complementarity of culturally responsive and inquiry-based science education in K-12 settings: Implications for advancing equitable science teaching and learning. *Journal of Research in Science Teaching*, 54(9), 1143-1173.

Carlone, H.B., Scott, C.M., & Lowder, C. (2014). Becoming (less) scientific: A longitudinal study of students' identity work from elementary to middle school science. *Journal of Research in Science Teaching*, 51,836-869.

Kim, A.Y., Sinatra, G.M., & Seyranian, V. (2018). Developing a STEM identity among young women: A social identity perspective. *Review of Educational Research*, 88(4), 589-625.

Ladson-Billings, G. (2014). Culturally relevant pedagogy 2.0: aka the remix. *Harvard Educational Review*, 84(1), 74-84.

Supporting Scientists in Outreach and Engagement through Their Broader Impacts Work

Organizer: Susan Renoe, *University of Missouri*

Co-Facilitators:

1. Eve Klein, *Institute for Learning Innovation*
2. Nalini Nadkarni, *University of Utah*
3. Kevin Niemi, *University of Wisconsin-Madison*
4. Dennis Schatz, *Pacific Science Center*
5. Linda Shore, *Astronomical Society Of The Pacific*

Session Description

Scientists are increasingly expected to include the public in their research, in part to fulfill the NSF Broader Impacts criterion but also to serve as a first contact and authentic voice for science.

This session will explore how the ISE community works with established and emerging scientists to develop their public engagement skills—including how institutions incentivize public engagement by researchers—and will highlight programs and resources available to researchers.

The interactive session will also discuss how scientists can develop and articulate an “impact identity” that encompasses both their research topics and personal characteristics/experiences that will make their public engagement more authentic.

Takeaways (Part 1)

What are the three biggest challenges to creating a cadre of scientists who are good communicators and/or getting scientists into science communication?

1. Lack of venues for engagement and/or lack of access to audiences
2. Cultural barriers to valuing engagement by scientist and institutions
3. Evaluation needs be formative, summative, and show impact

Takeaways (Part 2)

What are the biggest needs/areas of funding for the AISL community

- Alternatives to the deficit model of science education.
- How to put community partners first to be more inclusive of underrepresented audiences?
- How does participating in engagement activities support healthy mental health outcomes for practitioners?
- How do we further connect the ISE community with the higher education community?

Technology Enhanced Informal STEM Learning

Organizer: H. Chad Lane, *University of Illinois, Urbana-Champaign*

Co-Facilitators:

1. Jennifer Frazier, *Exploratorium*
2. Becky Rother, *Zooniverse, Adler Planetarium*
3. Katie Stofer, *University of Florida*

Session Description

The use of advanced technologies (AR/VR, visualization, AI, games, etc.) in informal learning contexts can greatly enhance learning experiences, but it also brings new challenges. This session will address questions related to the design, deployment, and study of technology use by practitioners and researchers across various informal learning contexts. How are these approaches being used, with which topics, and for which audiences? What are the opportunities for practice and research going forward?

Panelists will focus on the potential of advanced learning technologies to improve informal STEM learning, research and evaluation, and the unique challenges that technology-based solutions present.

Takeaways

1. Technology should *amplify, enhance, or enable* informal STEM learning.
2. How informal learners interpret what they see (e.g., visualizations) is fundamental
3. Continuing hope and interest for AR/MR/VR in informal STEM learning
4. New ideas: tech to see the unseen; tangible interfaces; diverse dev; narrative-based tech

Attendee Info and Feedback

What best describes your current profession or role? (check all that apply)

27 👤

Educator (facilitator, teacher, etc.)

15%

Academic researcher (professor, scientist, etc)

63%

Research and Evaluation (at a museum or company)

19%

Exhibit designer/developer

7%

Administrator, manager, supervisor

15%

Government (program officer, congressional staff)

4%

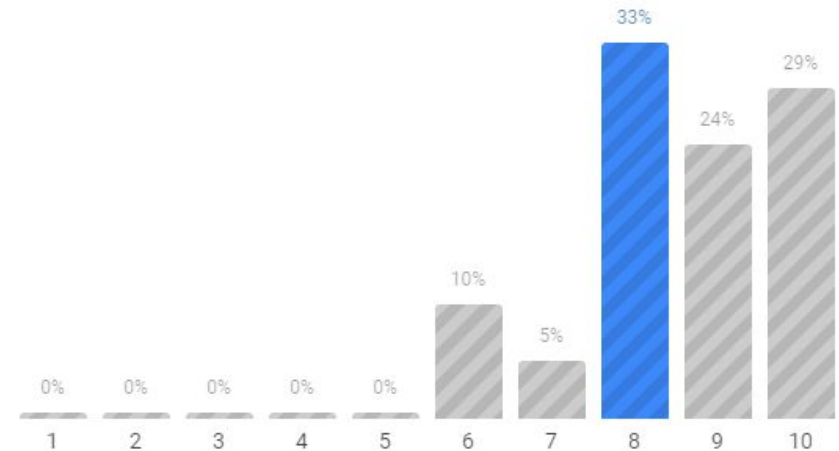
other

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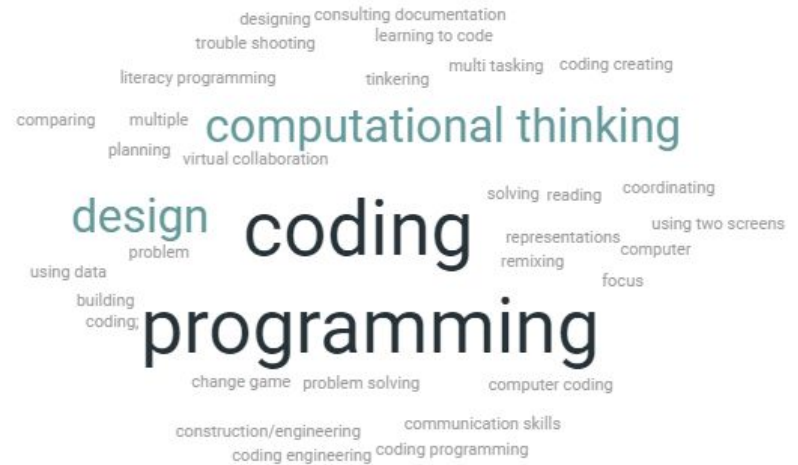
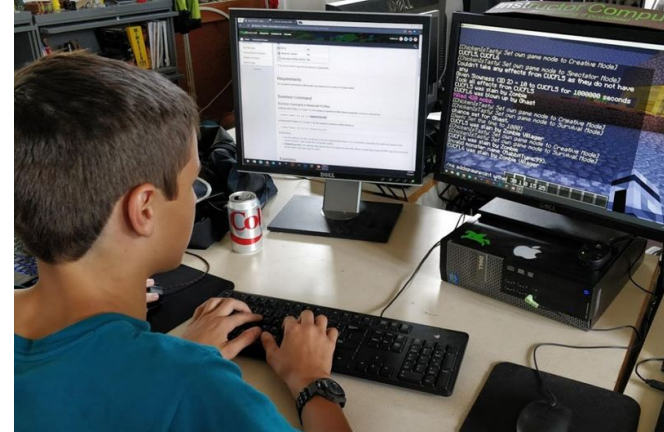
"To what extent" did you enjoy this session?

21 👤

Score: 8.6 ★



Word Clouds



Resources Shared

1. [App Inventor 2](#)
 - System for creating apps by MIT for non-programmers
2. [Visualise Conference](#)
 - Visualization for informal science learning
3. [Virtual Reality Resource list](#)
 - Extensive list of tools, resources, and content for VR-based science learning

Teens and Community Engagement: Reimagining the Future

Organizer: Angela Calabrese Barton, *Michigan State University*

Co-Facilitators:

1. Karen Tingley, *Wildlife Conservation Society*
2. Minjung Ryu, *Purdue University*

Session Description

Teens from historically underrepresented groups engage with STEM across a variety of programs as they explore, understand, and transform their local communities in equitable and consequential ways. What are teens learning in these STEM programs, and are they able to transform that knowledge into something of personal value and use?

Researchers and practitioners working in both community-based and design-based informal science learning settings, will share insights and tools from their AISL projects to foster dialogue on these questions.

Takeaways, part 1

- Teens should be supported in leveraging their own funds of knowledge, discourses and experiences towards engaging in STEM in ways that allow them to take action on the things they care about (“Agency”)
- Broking connections between/across experiences towards building unique STEM Pathways is important for teens as they explore their growing independence, and seek to imagine their futures (“Pathways”).

Takeaways, part 2

- However, thinking about Agency and Pathways as only about “access” and “opportunity” is limiting because a) there are many immaterial barriers that prevent opportunities from being equitable and consequential; b) these immaterial barriers are related to both the cultural norms of STEM and broader societal discourses around race, class and gender, all of which need to be disrupted/re-structured.
- Broadening participation should be studied in terms of its justice-oriented outcomes; that is, how are youth opportunities for STEM learning/engagement supportive of who youth are and want to be, and what norms/routines/expectations/ways of being legitimized in spaces need to be challenged?

Resources Shared

1. Tan, E. & Calabrese Barton, A. (in press). Hacking a path in and through STEM: How Youth navigate and transform the landscapes of STEM. *Teachers College Record*.
 - This paper introduces the idea of “pathhacking”, where minoritized youth had to create their own pathways into STEM, often with improvised tools and in treacherous territory, because there were no pre-laid paths.
2. CAISE briefs on Community Engaged Science and Community Design Research
 - These R+P briefs describe key ideas in community-engaged programs and research for youth
3. Penuel, W. R., Clark, T. L., & Bevan, B. (2016). Infrastructures to Support Equitable STEM Learning across Settings. *Afterschool Matters*, 24, 12-20.
 - This paper describes five design principles for translating ideas about equitable STEM learning ecosystems into program structures.

Understanding Interest and Identity as Outcomes in Informal Science Learning and Science Communication

Organizer: Martin Storksdieck, *Oregon State University*

Co-Facilitators:

1. John Besley, *Michigan State University*
2. Matthew Cannady, *Lawrence Hall of Science*
3. Michelle Choi, *CAISE*
4. Kelly Reidinger, *Oregon State University*

Session Description

Over the last 18 months, the CAISE Evaluation and Measurement Task Force has met to explore key constructs that ISE and science communication practitioners and researchers have identified as goals for learning and measuring in settings and experiences. This session will provide an overview of multiple perspectives on STEM identity and interest and share resources that are useful for developing projects and designing measurement strategies.

Takeaways*

**From feedback shared in session exit cards*

1. **NEW DEFINITIONS:** The concepts of identity and interest are messy, complex, and ever-evolving, and we need to learn to live (and work) with the ambiguity.
2. **NEW QUESTIONS:** How can we better think about bridging the disconnect between start and trait characteristics (e.g. interest, identity) in research and practice?
3. **NEW WORK:** This resource reminds us to take time to reconsider what we are really trying to assess, why, and how before considering which tools are relevant.

Resources Shared

What is STEM Identity?

- Here how 13 diverse experts think about, study, measure identity in their work in this interview series.
- <http://informalscience.org/identity>

What is STEM Interest?

- Here how 10 diverse experts think about, study, measure interest in their work in this interview series.
- <http://informalscience.org/interest>

What is STEM Engagement?

- Here how 12 diverse experts think about, study, measure engagement in this interview series.
- <http://informalscience.org/engagement>

What Do We Mean When We Talk About Transmedia?

Organizer: Ed Finn, *Arizona State University*

Co-Facilitators:

1. Kristen Bellisario, *Purdue University*
2. Pamela Rosenstein, *NOVA/WGBH Science*
3. Sue Ellen McCann, *KQED*

Session Description

Audiences today are increasingly conversant with entertainment, advertising, and games that jump across contextual and media boundaries. When informal STEM and science communication experts talk about transmedia, what are we really talking about?

This panel will establish a common language and baseline understanding of how social media, online communities, and public engagement intersect with transmedia. Panelists will share their experiences with transmedia research and engagement, discuss emerging opportunities and challenges, identify shared foundations and best practices, and explore promising directions for future research.

Takeaways

1. Higher facilitation leads to deeper and greater engagement and science curiosity
2. Think of transmedia as a ladder of engagement activities
3. Effective transmedia requires as much planning for engagement as for content development
4. How do we create long-term transmedia conversations and spaces?

Resources Shared

[NOVA Wonders](#)

- Exemplar transmedia project engaging diverse audiences, with science engagement + curiosity gains

[KQED Science Deep Look](#)

- Exemplar “evergreen” transmedia project leveraging YouTube that continues to drive a “long tail” of engagement

[Record the Earth](#)

- Citizen Science transmedia project engaging local communities in recording natural soundscapes