Where should the sprinkles go?

Co-design strategies for baking equity into public engagement experiences

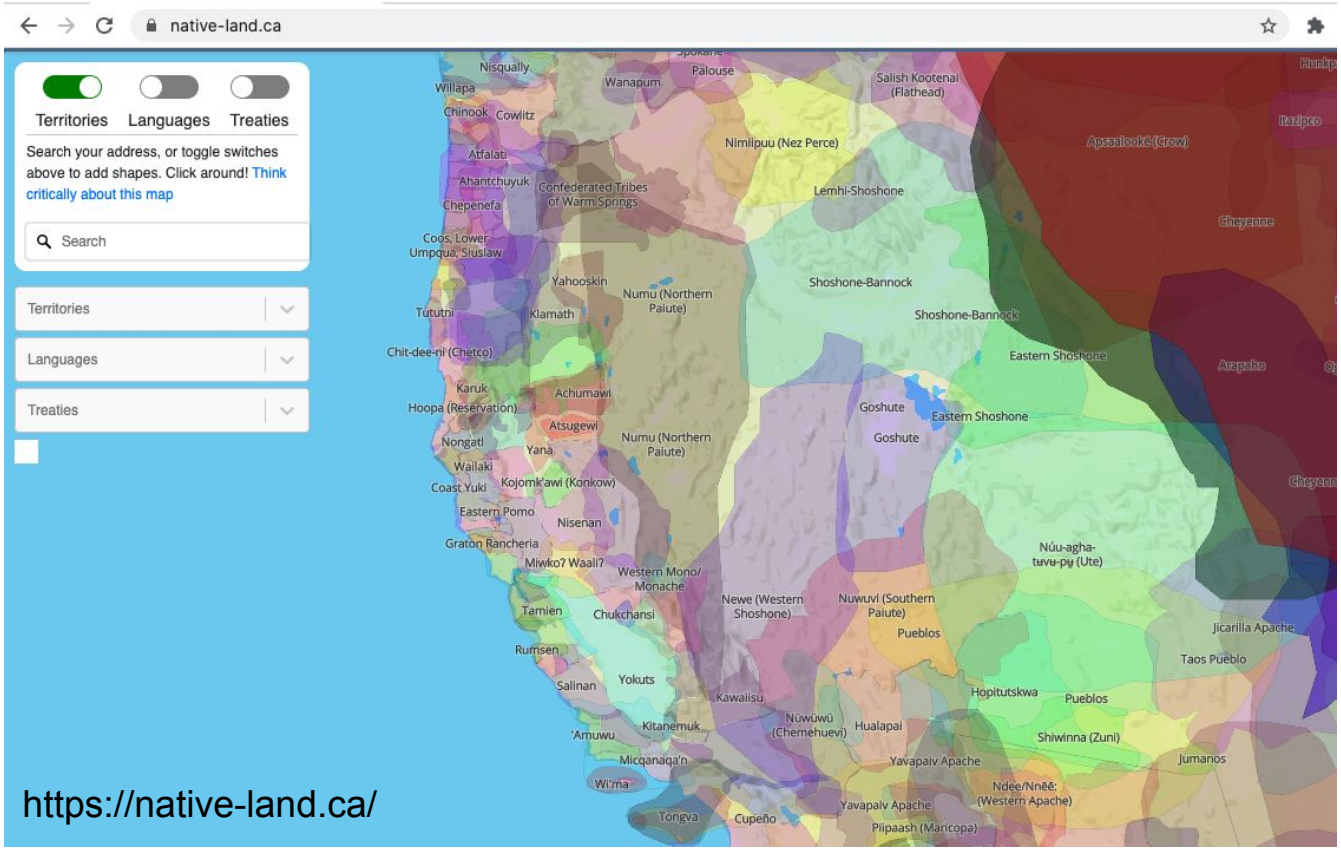
ASTC 2021 - Thursday, October 7th

Facilitators: Sherry Hsi & Darrell Porcello

BSCS Science Learning | Children's Creativity Museum

Land Acknowledgement

The land I live and work on in California is the traditional territory of the Muwekma Ohlone and Chochenyo Tribes.



Focusing question

How can we co-design for equity in learning and public engagement experiences in our institutions and for our audiences?

Co-design

A process to bring diverse stakeholders with diverse perspectives to work together to create something that meets their shared needs.

- All relevant stakeholders are involved in the design
- Active collaboration between users and designers
- Users are the experts of their own experiences

- Boosts collaboration
- Increases openness to innovation and change
- Leads to more credible and equitable solutions

Session Resources:
bit.ly/cupcaksastc

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Programs & Presenters

Making Waves with Radio

- Colin Dixon, BSCS Science Learning
- Gustavo Hernandez, Watsonville Environmental Science Workshop

Community STEM Initiative

- Ali Jackson, Sciencenter

Science Together

- Max Cawley, Museum of Life & Science
- Imani Vincent, Families Moving Forward

NISE Network

- Darrell Porcello, NISE Network / Children's Creativity Museum

MAKING WAVES
with radio

Putting Shared Values "in the Batter"

Building a Foundation of Values for Design

This work is supported by the National Science Foundation under grant DRL - # 2053160

How can we engage in meaningful, equity-oriented and participatory design with community members, when many institutions, many products - many communities - are involved (and timelines are short)?

VALUE SENSITIVE DESIGN

SHAPING TECHNOLOGY WITH MORAL IMAGINATION

BATYA FRIEDMAN
DAVID G. HENDRY

CS for What?

Diverse Visions of Computer Science Education in Practice

Rafi Santo, Sara Vogel & Dixie Ching

CsforALL

we should teach radio...

...because people need to understand and feel empowered to use and modify the technologies flooding into life and society. [A]

...because radio bridges the divide between invisible and tangible aspects of digital communication. [P]

...because radio provides a hands-on, relevant way to engage the public in technology-related social issues. [G]

...because future jobs depend on understanding them. [M]

...because the ubiquity of radio is a resource for scalable yet responsive learning experiences. [F]

Thinking of something that's not here? Add a green sticky!

...because everybody should have a voice in deciding how radical technologies get developed and regulated. [L]

...because radio concepts can help educators engage students in a wide range of other STEM concepts and practices. [H]

...because it's fun to learn about invisible phenomena that surround us everyday. [B]

...because everybody uses radio in some way, so radio can help youth bring their experiences and interests to museums. [D]

...because radio technologies can be used to solve current and future problems. [O]

...because radio technology is more common than people realize. (most people don't know bluetooth is radio!)

...because radio technologies like mobile phones, are common, so they can make participation in learning more accessible and equitable. [K]

...because everyone regardless of background, should have knowledge, access, and capacity to be producers of and with radio technologies. [I]

...because we want people to become innovators. [C]

...because radio technologies will expand possibilities for our lives and society. [N]

...because the benefits and harms of radio technologies aren't distributed equitably and have the potential to perpetuate economic and environmental injustices. [J]

...because it gives educators the chance to critically engage with the blackboxes of science and technology. [E]

Radio4What Workshops

1. **Introduction** to project, design process and radio frequency technologies today

2. “**Envisioning**” exercise

3. Values “**heatmapping**” and discussion (in 2 rounds)

    - Round 1: 5 cards on the table
    - Round 2: 2 cards with stars

Round 1 Workshops

Workshop	Organization Type	# adults	# youth
1.	Science Center	5	0
2.	Science Center	5	0
3.	Community-Based Science Program	3	0
4.	Community-Based Science Program	0	5
5.	Project Team	12	0
6.	Science Center	6	0
7.	Science Center	2	0
8.	Community-Based CS Program	2	8
9.	Community-Based Education Program	0	6
Total		**35**	**19**

Vote for 2

...because people need to understand and feel empowered to use and modify the technologies flooding into life and society. [A]

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(nominated cards here)

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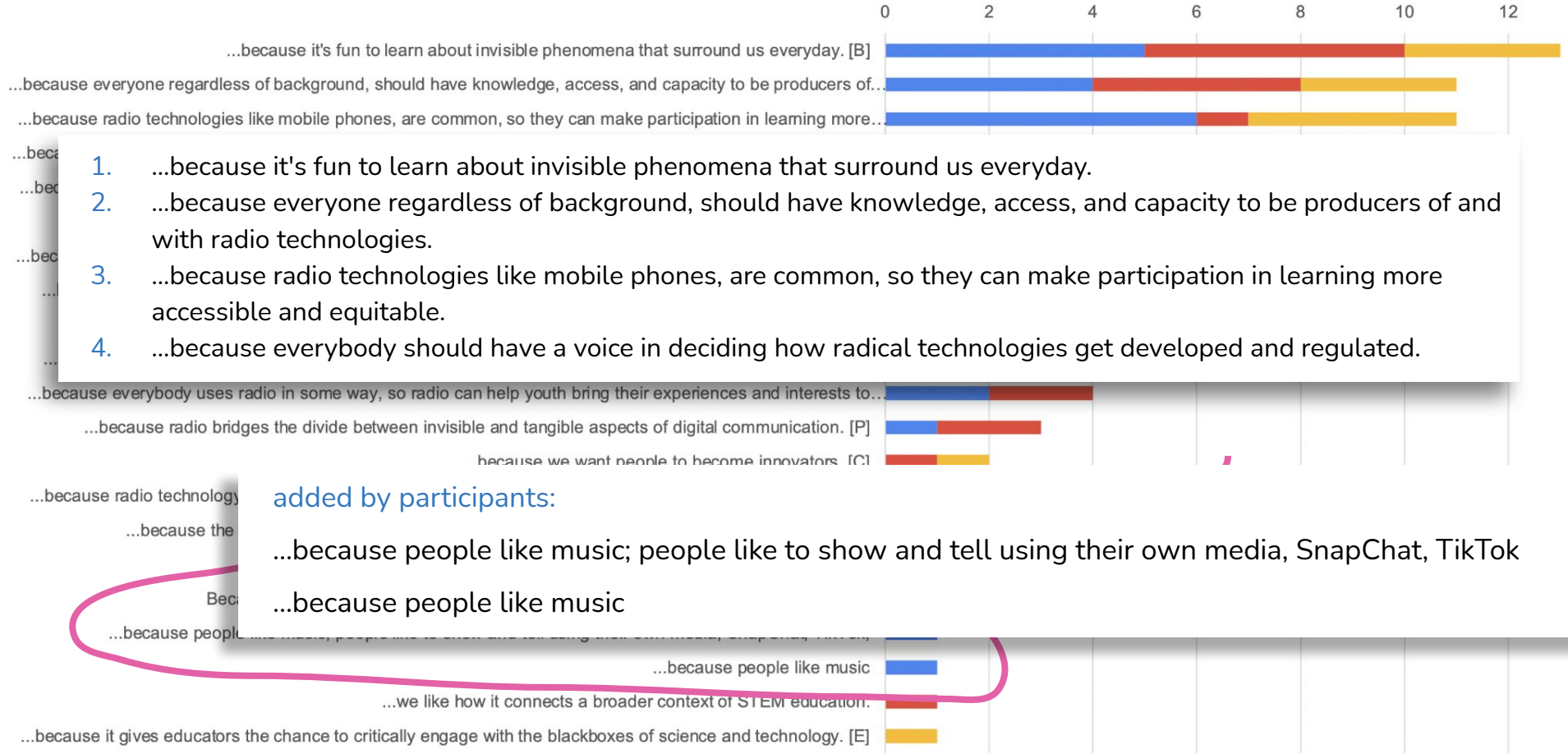
Cards on the Table - Rationale



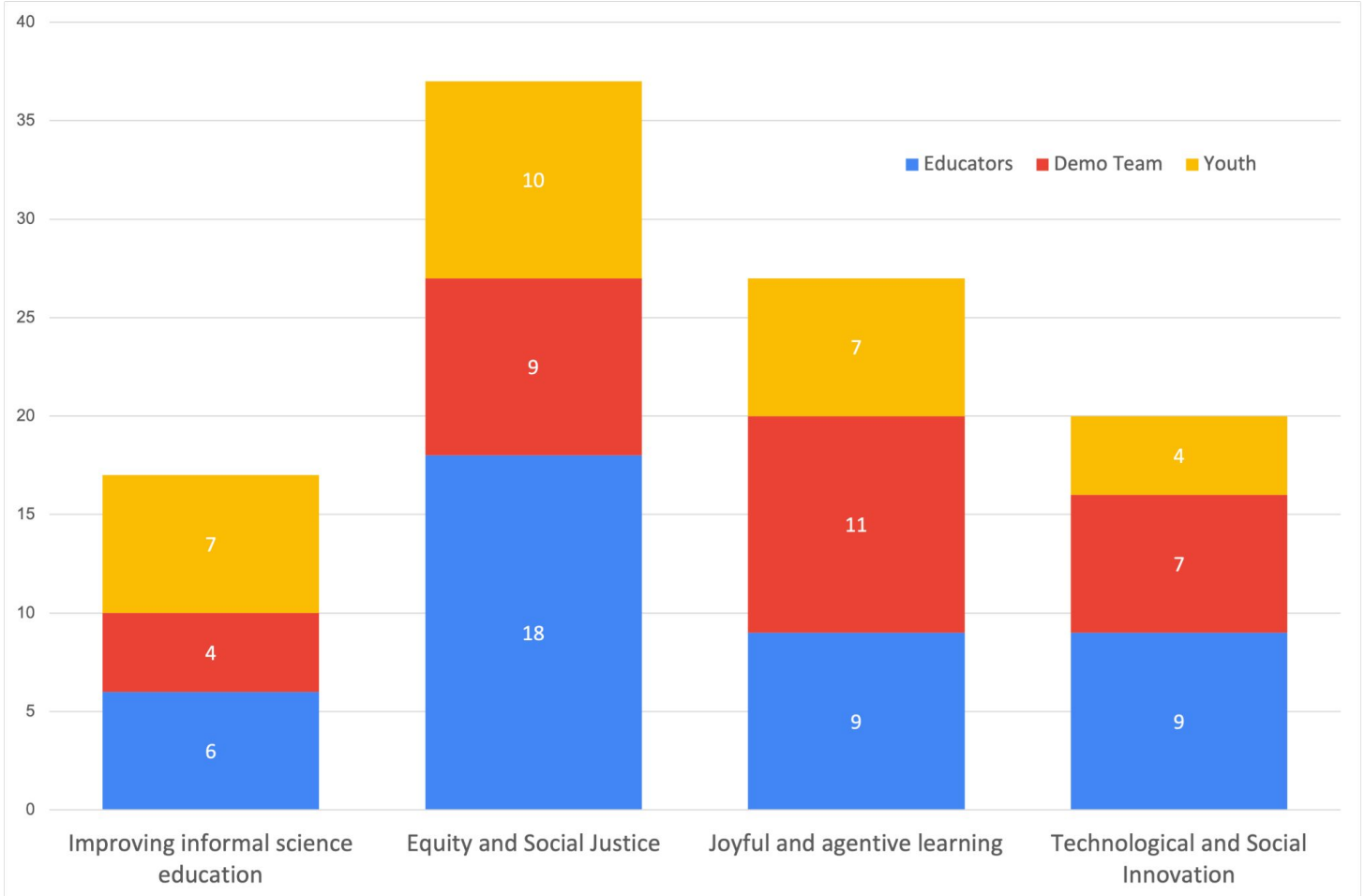
1. ...because it's fun to learn about invisible phenomena that surround us everyday.
2. ...because everyone regardless of background, should have knowledge, access, and capacity to be producers of and with radio technologies.
3. ...because radio technologies like mobile phones, are common, so they can make participation in learning more accessible and equitable.
4. ...because everybody should have a voice in deciding how radical technologies get developed and regulated.

added by participants:

...because people like music; people like to show and tell using their own media, SnapChat, TikTok

...because people like music

Cards on the Table - Values



Making Waves Design Values

ISE Reform & Improvement

We believe we can improve informal science education by….

- cultivating mutual learning and empowering ISE leaders, designers and educators to adapt resources to their communities and goals
- supporting informal science education with teaching strategies and just-in-time supports to build capacity in new socioscientific topics
- building capacity to create interactive learning experiences connected to real-life issues and phenomena

Equity & Social Justice

We believe we can work to make society more just and equitable by...

- meaningfully engaging with people and perspectives that have been historically marginalized from educational institutions
- explicitly countering stereotypes about who is capable of technological innovation
- showing connections between STEM concepts and technologies and community life
- making visible ways that benefits and harms of technology are unfairly distributed across society

Joyful & Agentive Learning

We aim to foster joyful & agentive learning that...

- sparks curiosity and motivates continued learning
- feels rich and relevant to learners
- fosters a sense of ownership - a feeling that one can use, modify or produce technology for one's own purposes
- inspires learners to share learning with family and friends

Technological & Scientific Innovation

We hope to foster technological and societal innovations by...

- demonstrating that technology and society shape each other and that everyone plays a role in our socio-technological futures
- making more transparent the technologies we encounter in our day to day lives
- helping young people become innovators prepared to participate in technological development and workplaces

MAKING WAVES
with radio

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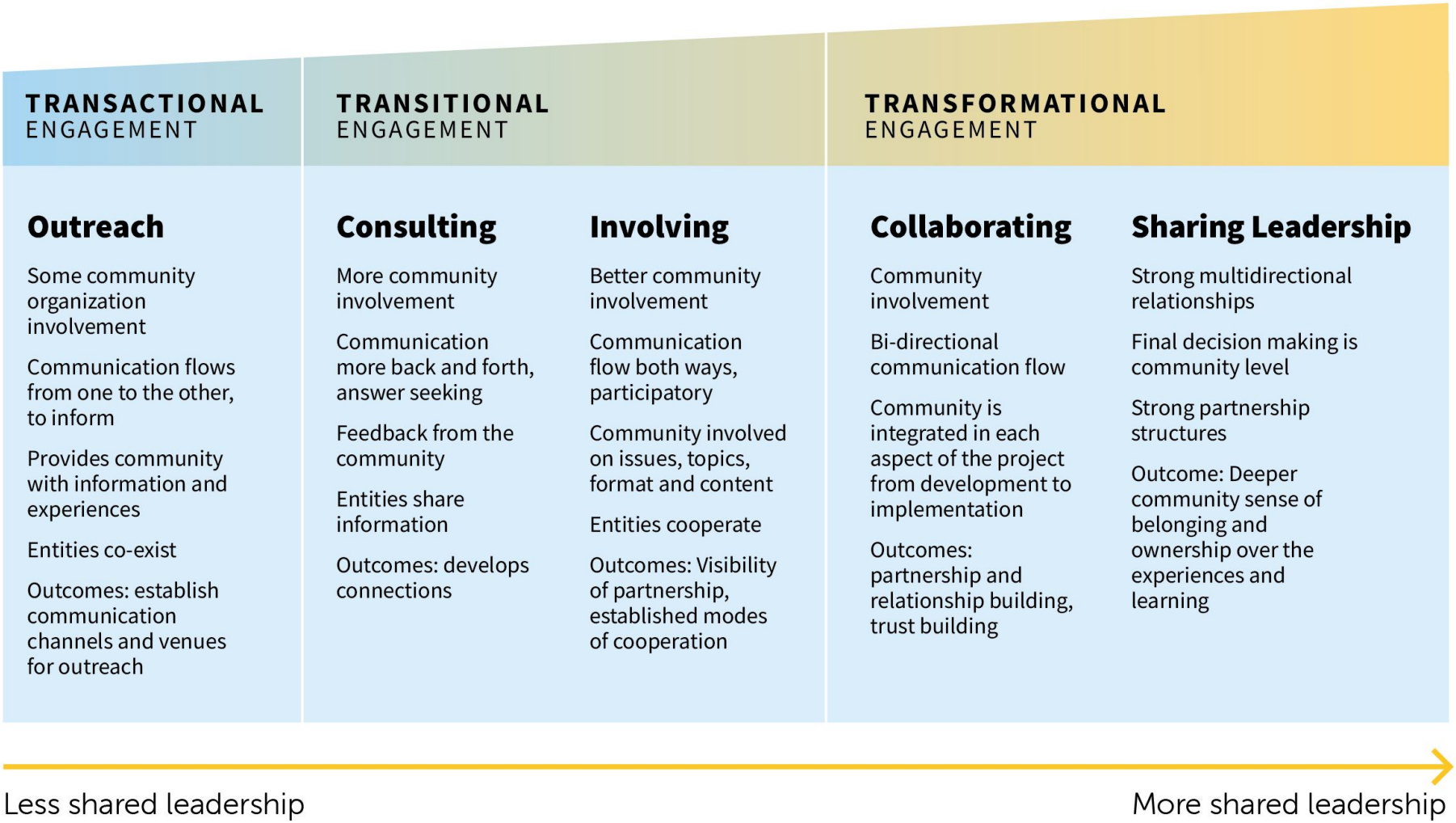
From Accessibility toward Belonging: Collaborative Development for Community STEM

Sciencenter


TRANSACTIONAL ENGAGEMENT
TRANSITIONAL ENGAGEMENT
TRANSFORMATIONAL ENGAGEMENT
Outreach
Some community organization involvement
Communication flows from one to the other, to inform
Provides community with information and experiences
Entities co-exist
Outcomes: establish communication channels and venues for outreach
Consulting
More community involvement
Communication more back and forth, answer seeking
Feedback from the community
Entities share information
Outcomes: develops connections
Involving
Better community involvement
Communication flow both ways, participatory
Community involved on issues, topics, format and content
Entities cooperate
Outcomes: Visibility of partnership, established modes of cooperation
Collaborating
Community involvement
Bi-directional communication flow
Community is integrated in each aspect of the project from development to implementation
Outcomes: partnership and relationship building, trust building
Sharing Leadership
Strong multidirectional relationships
Final decision making is community level
Strong partnership structures
Outcome: Deeper community sense of belonging and ownership over the experiences and learning
Less shared leadership
More shared leadership

Try this,

Think about where you most often fall in terms of outreach, consulting, involving, collaborating, and sharing leadership in your program development. Quickly, try to generate a specific example of programming at your organization for each of these categories.

Outreach *Example:*	**Consulting** *Example:*	**Involving** *Example:*	**Collaborating** *Example:*	**Sharing Leadership** *Example:*

Cohort-based STEaM Program

- Project-based learning
- Staff mentors
- Participants leads learning
- Family engagement
- Participant experts

Reflect: How can you authentically involve community partners and participants in planning, implementing, and sustaining your program?

INSTITUTE of Museum and Library SERVICES

Community Foundation TOMPKINS COUNTY

Ali Jackson, Director of Programs & Partnerships
ajackson@sciencenter.org


SCIENCETOGETHER

INVESTMENT

ASK

ASSESS

RECIPROCITY

TRUST-BUILDING

MEET PEOPLE WHERE THEY ARE

ACCESSIBILITY

DISCOMFORT

SUSTAINABILITY

Similarities and Connections to Science & Society Products within the NISE Network

Nanotechnology and Society:

A Practical Guide to Engaging Museum Visitors in Conversations

By Jameson Wetmore, Ira Bennett, Ali Jackson, and Brad Herring

Session Resources:
bit.ly/cupcakeastc

VALUES

Values shape how technologies are both developed and adopted

RELATIONSHIPS

Technologies affect social relationships

SYSTEMS

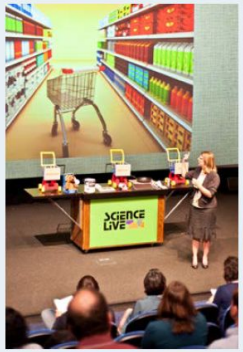
Technologies work because they are part of larger systems

Values are a great place to start when building a relation with participating audiences and experts you might want to involve in co-design projects.

Encouraging conversations helps us carefully think through our values as individuals and as larger communities to make better decisions about the technologies we research, buy, and use.

Museum conversations can help visitors see links between their values and the technological systems they encounter and encourage them to think about where we are and where we want to go as a society.

Two Approaches to Engaging Visitors



Demonstration:

- Scientist/educator has knowledge and expertise to share
- Visitors discover phenomena and laws of nature
- Facilitator communicates facts
- Visitors ask questions and receive answers
- Promotes basic goal of public understanding

Conversation:

- Everyone has their own values and perspectives to share
- Facilitators and visitors consider facts and values
- Facilitators and visitors ask questions and receive responses
- Visitors form opinions and explore ideas
- Promotes basic goal of public engagement

Scribble Bot

Are you still you? Sit down when you aren't sure.

A. You are fitted with a prosthetic arm with fine control through nerve impulses.

B. You are implanted with a deep brain stimulation system that stops tremors but also causes a personality change.

C. You use a neuroenhancement device that dramatically boosts your memory well beyond human capacity.

D. You are in a coma on life support and can only only communicate through a neuroimaging device that interprets live data through a population-level dataset.

E. Your tissue is used to grow a human brain organoid that to be implanted in a host animal for long-term observation.

NISE NETWORK CHANGING BRAINS

Stand Up Sit Down Icebreaker

Nano Around the World card game

Exploring the Solar System: Asteroid Mining

Scribble Bot

Imagination, Creativity, Reflection

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NISE NETWORK CHANGING BRAINS

Stand Up Sit Down Icebreaker

Imagination, Peer pressure

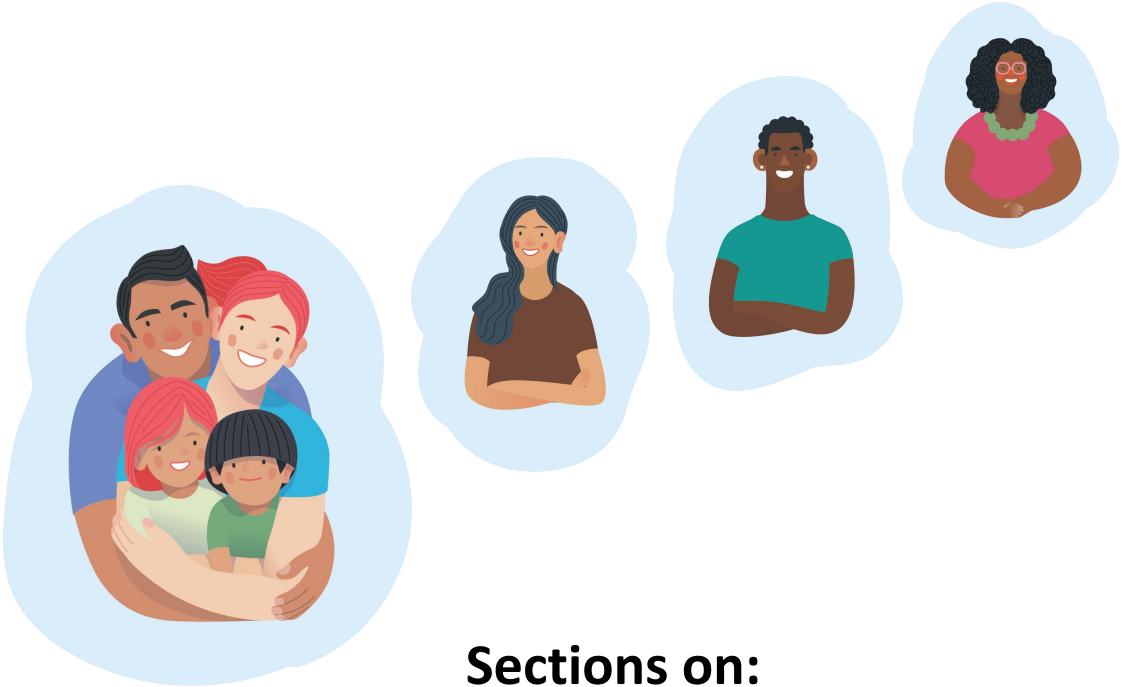
CONVERSATION

Role Playing

Nano Around the World card game

Drawing, Role Playing

Exploring the Solar System: Asteroid Mining



Diversity, Equity, Accessibility, and Inclusion Toolkit

Coming soon from the NISE Network

Sections on:

- Equity and Inclusion in Community Engagement
- Culturally Responsive Programs
- Collaborative Program Development

Thank you to our Funders

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Session Resources:
bit.ly/cupcakeastc

Relfection questions for everyone

- Where have you seen co-design work well?
- How do we place values at the center?
- How do we resettle our intentions when designing towards equitable public engagement experiences?
- How might we distribute power across institutions?

Please join us in the Roundtable!