Synthesis and Design Workshop: Principles for the equitable design of digitally-distributed, studio-based, STEM learning environments

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Participants gathered at UA's Biosphere 2 Feb. 25-28, 2019

Purpose

Studio-Based Learning Environments
(makerspaces, co-working spaces, innovation labs, fablabs)

+

Access, Equity & Inclusion
(Ways and means of carrying out inquiry through making contexts, cultures, and practices)

+

Digital/Virtual Learning Opportunities
(collaboration among participants, experts, community members, facilitators, and learning guides/mentors, facilitating bi-directional expertise)

Studio-based Makerspaces

Milwaukee Makerspace

Equity and Inclusion

Shared Knowledge Networks

www.pdx.edu/drc/

Connecting Face-to-Face and Virtually

Enhanced Access

xibo.org.uk

Digitally-Distributed Networking

Paving the way forward for <u>sustained efforts</u> that span <u>research & practice</u> communities

Participants & Location

Biosphere 2 February 25-28, 2019

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A Place of Vision

Conference Center
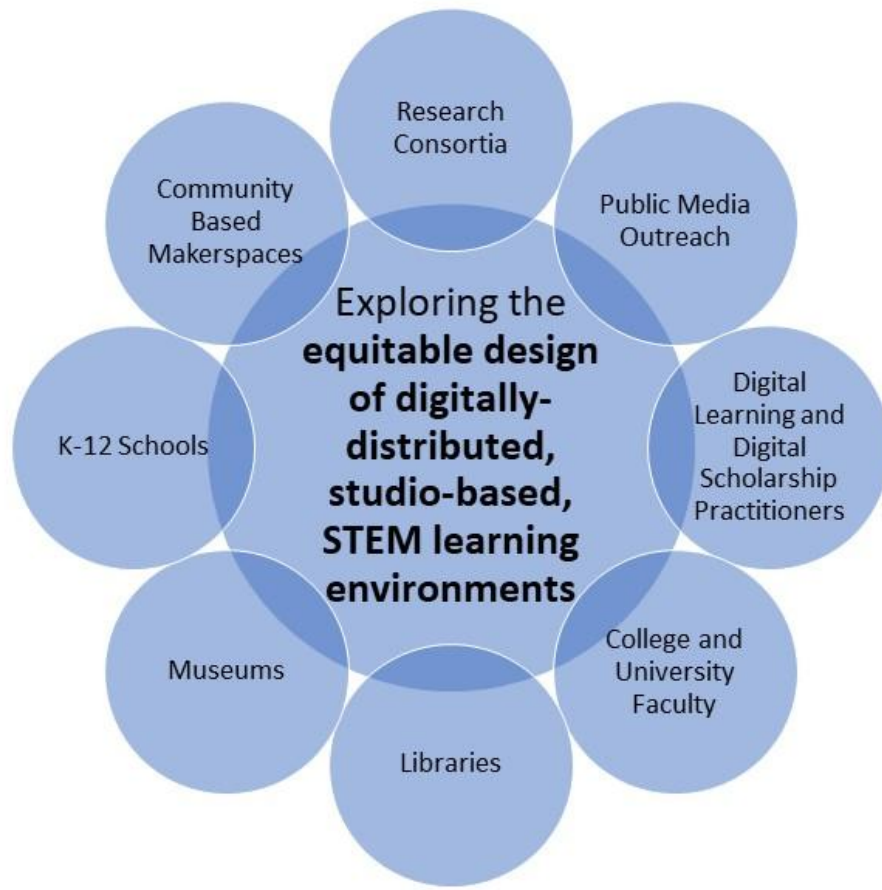
Iconic setting for formal and informal collaboration. *Location was a key feature that served to excite participants about state-of-the-art research, and create connections to the scientific community.*

Research Consortia

Community Based Makerspaces

Public Media Outreach

Exploring the **equitable design of digitally-distributed, studio-based, STEM learning environments**

K-12 Schools

Digital Learning and Digital Scholarship Practitioners

Museums

College and University Faculty

Libraries

Participants

- Libraries
- Museums
- K-12 Schools
- Community-based maker spaces
- STEM Learning Centers
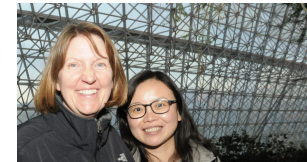
- SRI
- TERC

Educators

Research Organizations

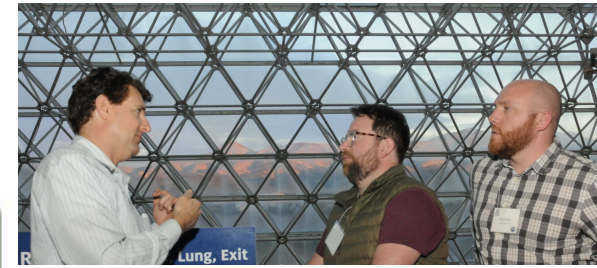**College and University**

Public Media and Non-Profit Organizations
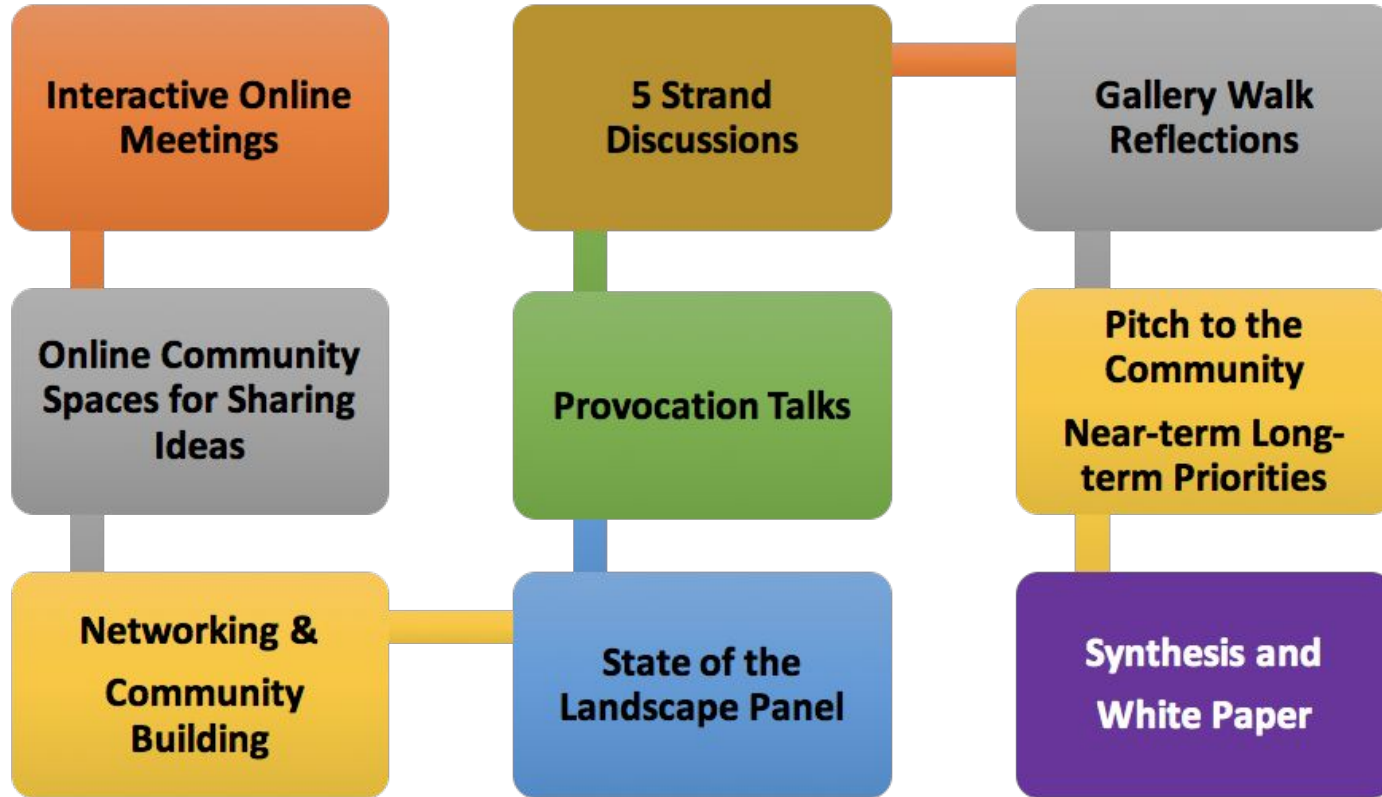
- Faculty
- Digital Learning and Scholarship

- KQED
- Techbridge Girls
- National Girls Collaborative
- Fab Foundation
- Maker Ed

Process

Biosphere 2: A Place of Inspiration and Innovation

Interactive Online Meetings

5 Strand Discussions

Gallery Walk Reflections

Online Community Spaces for Sharing Ideas

Provocation Talks

Pitch to the Community
Near-term Long-term Priorities

Networking & Community Building

State of the Landscape Panel

Synthesis and White Paper

Scavenger Hunt, Meal-time Conversations, Casita Time, Maker Night, Field Trips

Findings

Ecosystems Metaphor

- Iterative Processes & Complementary Assets
- Interdependent Relationships
- Benchmarks & Progress Markers
- Sustainability
- Atmosphere

Equitable practices create inclusive environments

Findings

| Learning Environment	Community	Capturing Learning	Pedagogy & Scaffolding	Digital Tools & Mediation
Learner Equity	Nurture Creative Communities of Practice	Learner interactions	Culturally Sustaining teaching and learning strategies	Contextual and Specific to Space and Users
Spaces and their evolution	Values, Cultures and Belonging	Instructional Routines	Studio-based learning practices of critique and cooperation	Designing for Change
Re-appropriate resources	Inquiry and Curiosity	Longitudinal Data		STEM and STEAM/Arts

Principles

Inclusive — draw from multiple perspectives, expertise areas, shared knowledge, and experiences to **eliminate barriers and broaden access**
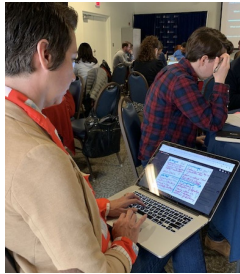
Intersectional — work collaboratively across communities where learners come together to **support mutually reinforcing knowledge and practices**
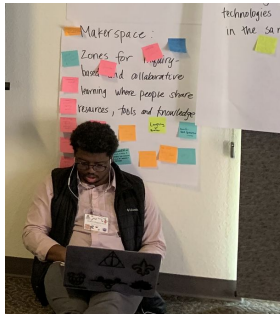
Innovative — use multiple technologies for learning, making, **sharing, and exchanging ideas flexibly and creatively**
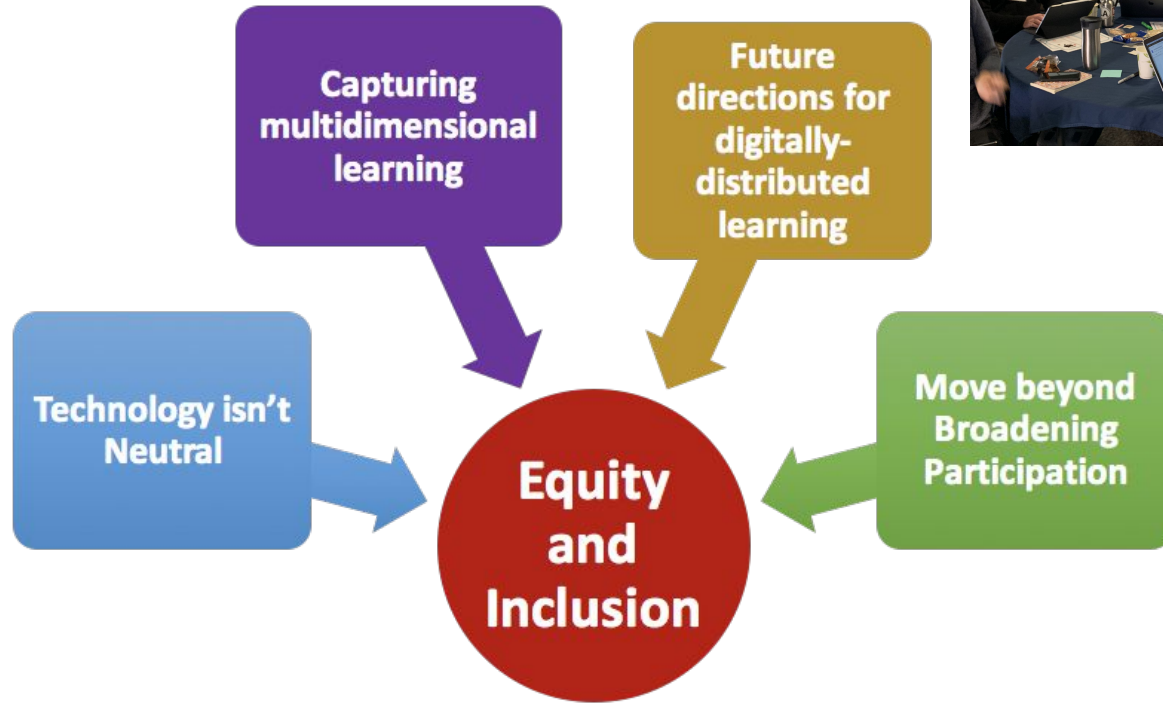
Responsive — plan forward for the **evolution of spaces in response to community needs**

Transformative — create purposes for learning that **provoke and respond to changing times**

Surprises & Tensions

Capturing multidimensional learning

Future directions for digitally-distributed learning

Technology isn't Neutral

Equity and Inclusion

Move beyond Broadening Participation

Practice "generous exclusion" that celebrates values of space instead of open inclusion that dilutes values (Melo, 2019).

Recommendations

Establish an Equity in Making Research Collaborative Network

Create/disseminate processes for capturing learning to examine longitudinal data

Connect research and practitioner voices to establish shared priorities

Expand implementation of different forms of digitally-distributed learning

Near Term 3-5 Years

Track what features/elements act as agents of change

Longitudinal Data Case Studies

Learning Theories and Models

Data to illustrate transitions in the learning ecosystems as they evolve

Longer Term 10+ Years

Thank you!

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We welcome continued conversations, connections and partnerships to push this work forward.