WORLDVIEWS NETWORK

www.worldviews.net

Initial Evaluation Results from Bioregional Community Dialogues

The Worldviews Network is a nationwide collaboration of scientists, artists, and educators developing best practices for using immersive virtual environments to increase ecological literacy using live presentations, interactive scientific visualizations, and community sustainability dialogues.

Ka Chun Yu
Denver Museum of Nature & Science
kcyu@dmns.org

Healy Hamilton
University of California, Berkeley
hhealyh@gmail.com

David McConville
The Elumenati
id@elumenati.com

Rachel Connolly
NOVA/WGBH
rachel_connolly@wgbh.org

Ned Gardiner
NOAA Climate Program Office
ned.gardiner@noaa.gov

Ryan Wyatt
California Academy of Sciences
rwyatt@calacademy.org

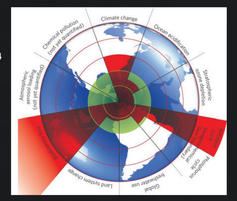
The Worldviews Network is funded by NOAA NA10SEC0080011 and NA10SEC0080017
Learn more at worldviews.net

SEE / KNOW / DO

1. Background and Goals

- Develop a unique approach to ecological literacy that enables informal science institutions (ISIs) to inspire audiences to visualize, comprehend, and address complex global change issues from a whole systems perspective.
- Train planetarium professionals in Earth systems science and the *Seeing-Knowing-Doing* approach to ecological literacy education.
  - **SEEING** : Harness the power of *Visual Thinking*, using 3D models, time-series satellite observations, and other scientific data to visualize the conditions that support life across cosmic, global, and bioregional scales
  - **KNOWING** : Utilize the depth of *Systems Thinking*, creating stories to help audiences comprehend the scientific principles underlying global change phenomena in culturally relevant ways
  - **DOING** : Engage with the practicality of *Design Thinking*, empowering ISIs, audiences, and local organizations with dialogue and design processes that lead to informed decisions and appropriate regional solutions.

2. Education Guiding Principles



- Climate literacy principles[3]
- Earth systems science education recommendations[2,4]
- Informal science education recommendations[1]
- Planetary boundaries: identifying the "safe operating space for humanity" for different Earth systems[5]
- Bioregional perspectives that connect participants cognitively and affectively with global issues

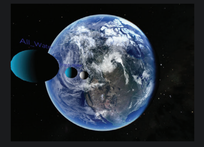
3. Technology

- The Worldviews Network uses digital fulldome planetariums that are increasingly prevalent in ISIs and schools (N>1000 worldwide).
- Portable GeoDomes™ are used for outreach and professional development.
- The *Uniview* visualization platform is employed across our network for showing data at multiple spatial scales using Open Geospatial Consortium (OGC) standards to share datasets.
- "Domecast" technology is used to simulcast presentations to partners.

DIALOGUES

4. Quarterly Bioregional Community Dialogues (BCDs)

- Each partner ISI works with researchers, the private sector, governmental / non-governmental organizations, and community based organizations to develop their own BCD.
- Each ISI develops strategies with their local partners for engaging local audiences with bioregionally relevant narratives.
- Public audiences can attend the BCD locally or remotely via domecasting technology.



- ***A Global Water Story***
  May 17, 2011
  Denver Museum of Nature & Science
  Denver, CO

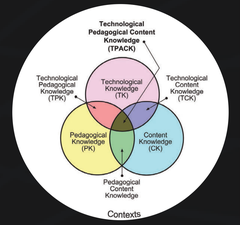
- ***Living Maps: From Cosmos to Community***
  September 29, 2011
  RENCI / NEMAC
  Asheville, NC

- ***Valley Oaks: An Ecological Journey through Time***
  December 8, 2011
  California Academy of Sciences
  San Francisco, CA

- ***Where Condor Meets Eagle***
  March 17, 2012
  Bell Museum & Phillips Indian Educators
  Minneapolis, MN
- June 2012: NASA Ames / NASA Goddard
- August 2012: NOAA's Climate Program Office, Asheville, NC
- October 2012: Exhibit Museum & Planetarium, Ann Arbor, MI
- November 2012: American Museum of Natural History, New York, NY
- March 2013: Journey Museum, Rapid City, SD
- June 2013: RENCI/NEMAC, Asheville, NC
- August 2013: Fort Worth Museum of Science and History, Fort Worth, TX
- September 2013: California Academy of Sciences, San Francisco, CA

PD & EVALUATION

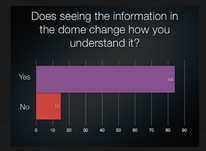
5. Professional Development



The Technological Pedagogical Content Knowledge (TPACK) framework is used for all Worldviews Network training activities.

Training products are available on the partners' professional development website, including roadmaps for producing BCDs, instructions for initiating collaborations with CBOs and NGOs, and guidance for incorporating multi-cultural perspectives into presentations.

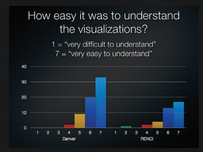
6. Evaluation



Evaluations include interviews with community partners, external advisors, and production staff. End-audience evaluation is accomplished through written surveys and focus groups to assess the impacts of the dome visualizations on their level of understanding of program content and their reaction to the presentation.

88% of 104 initial respondents felt that seeing information on the dome helped them to understand it better, with reasons including:

1. The visual nature of the information
2. The perspective and sense of scale possible in the visualization software
3. Being able to see datasets in context with one another as well as the cosmos and Earth as a whole



When asked what statements were most representative of their experience of the presentation, the top responses were:

1. It made me think about the complex interrelations in Earth systems
2. It helped me to visualize certain concepts of time and scale
3. The dome helped me to understand global processes
4. I felt a sense of how small the Earth is compared to the greater universe

7. Future Steps

We will adopt and adapt the *Science Café* outreach program[6] (WGBH/NOVA) as a model for guiding BCD dialogues. These Worldviews Network *Design Science Cafés* will be developed in partnership with the Buckminster Fuller Institute,[7] producing a toolkit that addresses the Worldviews Network objectives of engaging local communities in dialogues concerning whole systems design-oriented solutions to local and global challenges.

8. REFERENCES

[1] NOAA (2009a). *Climate Literacy: The Essential Principles of Climate Sciences*
[2] Hoffman & Barstow (2007). *Revolutionizing Earth System Science Education for the 21st Century*
[3] NOAA (2009b). *National Oceanic and Atmospheric Administration Education Strategic Plan 2009-2029*
[4] Bell et al. (Eds.) (2009). *Learning Science in Informal Environments: People, Places, and Pursuits*
[5] Rockstrom et al. (2009). "A safe operating space for humanity." *Nature*.
[6] www.sciencecafes.org
[7] www.bfi.org