

Understanding Learning Impacts Breakout

- What we are talking about in terms of learning:
 - Knowledge
 - Metacognition
 - Attitudes/beliefs
 - Affective
 - Process skills
- Question: what is audience thinking when they first see the sphere? How do we deal with novelty?
 - There is a difference between first timers versus repeat visitors
- Are there fundamental impacts beyond the particular content? Can we measure this?
- Can we have a longitudinal study involving members?
 - Harsco has done follow-up studies with visitors; involved grad students
 - A number of institutions have access to graduate student assistance
- Would be helpful to have data on cross-age group learning impacts with the sphere.
- Can young children understand that this is a scale model. They come away spouting knowledge, but at what developmental point is true understanding taking place?
 - Susan: one dataset that stands out is the universe. Those are photos from Earth, not outside looking in.
 - Ka Chun: also shares concerns about this dataset.
 - Boonshoft wants to continue to show this content piece, but need to work make sure there are not scientific misconceptions being conveyed
- Are there particular datasets that are problematic with regards to misconceptions.
- Need to determine what content pieces are appropriate for which developmental stages of learning.
- Need to be careful with color choices for data visualizations as these can cause misconceptions
- To facilitate learning and avoid misconceptions, it would be good to engage audience to assess prior knowledge on their topic.
- Can there be an evaluation for each new content piece to piece to help in this area?
- Need to be sure to handle the evaluation with a wide variety of learners that represent the different audiences that will be reached by the Network.
- Would be helpful to have statement about target audience for new content pieces.
- Narrative sound tracks and poetic narrative with content seems to increase people's attention to the content and stimulate thinking. Can these be integrated into the docent presentations.
- Work on understanding how people understand animations states that you can make it too complicated. Robert Hurt of Spitzer gave a presentation in May where he showed clips from science fiction that showed how much information public can understand if it is presented in a way where sound and image enforce each other.
- What are the thresholds for learning?
- How much does have complimentary audio increase what is learned through the visual?
- How can sphere be enhanced by connections to other platforms? For what age groups are different media types appropriate?
- Would be helpful to look at learning impacts from facilitated vs. non-facilitated shows.
 - Lawrence Hall of Science is performing a study of impacts of different types of programming
- What are learning impacts of 2-D vs. 3-D visualizations? Which should come first

- Need to decide how you perform assessment in 2-D or #-D?
- What are people taking about how much of what is being presented is fact vs. conjecture.
 - Are there misconceptions or alternative conceptions here.
- What do people understand about the nature and process of making visualizations?
- Would be nice to see if experience with SOS led to change in attitudes, particularly long term interest in science?
 - Specifically, are women more attracted to science to when presented through the sphere due to the integration of the artistic component?
- Action outcomes – is there an increase in conservation behavior as a result of SOS experiences?
- If people become more comfortable with what a scientific model is, does it make people more likely to be willing to work with these type of technologies?
- Are there different scopes and sequences for content?
- What affects are had with different socio-economic groups?
- How does feedback work within Network? (specifically feedback with content developers)
 - Need to know what usage of content that is created is.
 - Would be good know which type of content has greatest impacts.
- Would be helpful to be able to convey cumulative impacts of the activities of the entire Network.
 - Would be nice to show that Network impacts are greater than any one institution working individually
- What is impact on broader field of ISE, especially with regard to data visualizations?
- To affect cumulative impact we need to link content guidelines with people presenting the content.