Exhibiting Performances for Data Literacy and Climate Change Education

Leilah Lyons, Priscilla Jimenez, Brenda Lopez, & Brian Slattery
University of Illinois at Chicago
Learning challenge:

Making sense of climate change data in the zoo

Why climate change data is hard to understand:

- **Magnitude & rate** is unclear
  - What does Δ2-4° C *really* mean?
  - What is exponential change?
- **Variability** in data causes doubt about trend
Known challenges with making sense of data visualizations:

<table>
<thead>
<tr>
<th>Motivating</th>
<th>learners need motivation to <strong>engage and sustain</strong> decoding and interpretation “work”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decoding</td>
<td>learners lack familiarity with representational language: <strong>cannot connect representation to represented</strong></td>
</tr>
<tr>
<td>Interpreting</td>
<td>learners <strong>lack familiarity with content area</strong> to make sense of data</td>
</tr>
</tbody>
</table>
Embodied data generation: using calories burned as proxy for climate change

**Magnitude & Rate:** Connect affective, felt experience to climate-driven data trends
**Variability:** Collect caloric expenditures to illustrate variability across 1,000s of visitors

Calories Burned:

<table>
<thead>
<tr>
<th>Calories</th>
<th>2.6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>
After the game:
Data gathered from 1,000s of visitors

Global Land–Ocean Temperature Index

- Annual Mean
- 5–year Running Mean

Sea ice extent:
- 1975
- 2010
- 2045
How this addresses players’ challenges with making sense of data visualizations:

<table>
<thead>
<tr>
<th>Motivating</th>
<th>Visitors naturally curious about “their” performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decoding</td>
<td>Representation is grounded in visitor’s felt experience</td>
</tr>
<tr>
<td>Interpreting</td>
<td>Interpreters help build connection to climate change</td>
</tr>
</tbody>
</table>

What about the audience?
Social context of reflection

visitors expect to engage in shared activities

Complications:
- Central performer
- Peripheral audience
- Multigenerational

Assistance:
- Interpretive staff
- Technology
Temporal contexts of reflection

• Two timeframes for reflection activities:
  – After performance:
  – During performance:
    • What can audience members attend to?
      – Experts cannot accurately judge effort experienced by others
      – Thus, watching game alone is not terribly educational
Reflective resources during performance
Nature of the reflective activity

Interpreters could and did make use of the live performance data to engage spectators in reflection-in-action:

Child-Visitor  So where is he trying to go?

Interpreter  He’s trying to ... go to this red star which is a seal, so if the polar bear were to smell a seal, like up to like three feet of ice they can smell a seal underneath, they’d have to chase and follow it to where they could actually get it, so that’s what he’s simulating here

Interpreter  And as he goes we can kind of watch based on how far he’s going, how many calories he’s burning, and you’re gonna see this go way up, especially when he gets to these swimming areas, 'cuz its a lot harder for the polar bear to swim than it is to walk.
Conclusions & future work

• Best instances of facilitated reflection of the data representations occurred with the iPad
  – When using large display interpreters didn’t highlight components of the data representations
  – But iPad only usable with 2-3 audience members, while large screen can serve 10-20

• Ongoing work extends iPad functionality with on-screen “finger-drawing”
  – These can be shown on large screen
For more:

*How Interpreters make use of technological supports in an interactive zoo exhibit*

Brian Slattery, Leilah Lyons, Priscilla Jimenez-Pazmino, Brenda Lopez-Silva, Tom Moher

Thursday, 10:15

ECCR 200

Learning and Becoming in Informal Science Learning