Data Modeling with Young Learners and their Families (Big Data for Little Kids)

Visualizing STEAM Data in Support of Smart Decision Making
Research: Questions

Design and develop a 6-week workshop curriculum that will deepen our understanding of:

- How do 5-8 year-olds define, collect, represent, interpret data?
- How do parents engage with children in data inquiry activities?

...in an informal learning environment
Research:
Goals

- Create a meaningful learning experience through scientific inquiry that centers on key concepts of data modeling
- Observe how families support young children’s emergent thinking about why and how to gather and use data
Museum Makers: Designing with Data

- 8 families, 4 Spanish-speaking
- 12 children
- 6 workshops, each 2 hours, once a week for 6 weeks
- “Make your own museum exhibit”
Museum Makers: Designing with Data

<table>
<thead>
<tr>
<th>Workshop</th>
<th>Theme Questions</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Introduction</td>
<td>What your exhibit should be about?</td>
<td>Exploring two exhibitions in the museum. Ask children to find one favorite exhibit and one that taught them the most.</td>
</tr>
<tr>
<td>2 Measurement (Size)</td>
<td>How big your exhibit should be?</td>
<td>Measuring sizes. Families use different measurement tools to measure size of exhibits on museum floors.</td>
</tr>
<tr>
<td>3 Measurement (Time)</td>
<td>How long will people stay at your exhibit?</td>
<td>Timing activities. Families use stopwatch to time how long people stay or interact with exhibits.</td>
</tr>
<tr>
<td>4 Feature</td>
<td>How does your exhibit work?</td>
<td>Identifying features. Families identify different features included in exhibits (e.g., buttons, switches, lights, etc.).</td>
</tr>
<tr>
<td>5 Making</td>
<td>How to design your exhibit?</td>
<td>Designing and making exhibits. Families plan their exhibits and use materials provided to create them together.</td>
</tr>
<tr>
<td>6 Presentation</td>
<td></td>
<td>Children present their exhibits on the museum floor.</td>
</tr>
</tbody>
</table>
Museum Makers: Designing With Data

Data cycle:
- Start with asking a question!
- Collect
- Analyze
- Organize
- Interpret
Research: Data Collection

Data collection:
- Observations
- Field notes
- Video recordings
- Audio recordings
- Interviews
- Artifacts
Research: Data Analysis

Qualitative, content analysis & inductive

- “Moments of engagement”
- Conversations
- Parent-child interactions
- Emerging themes
Research: Findings

- Sustained family engagement.
- Workshop environment was valuable.
- Activities were authentic.
- Parents actively supported learning.
- Parents supported autonomous learning.
Artifacts

Tabular data

<table>
<thead>
<tr>
<th>Range</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-8</td>
<td>0 for lights (most from humans)</td>
</tr>
<tr>
<td>1-0</td>
<td>0 for buttons</td>
</tr>
<tr>
<td>4-1</td>
<td>1 for text</td>
</tr>
<tr>
<td>2-0</td>
<td>0 for sound</td>
</tr>
<tr>
<td>11-0</td>
<td>0 for movable parts</td>
</tr>
<tr>
<td>12-0</td>
<td>0 for screen</td>
</tr>
<tr>
<td>11-0</td>
<td>0 for seats</td>
</tr>
<tr>
<td>11-0</td>
<td>0 for pictures</td>
</tr>
<tr>
<td>0-0</td>
<td>0 for switches</td>
</tr>
<tr>
<td>10-0</td>
<td>0 for colors</td>
</tr>
</tbody>
</table>

Conclusions
- None include suits
- The museum uses few buttons and screens
- The exhibits are dull
Artifacts

Spatial data
Artifacts

Temporal data

24 5 sec 2 min 10 sec 5 sec 1 min 10 sec 6 min 6.5 sec 5 min 5.6 sec
Other Projects:
Connected Worlds

Using log data to compute diversity, sustainability and tipping points
Other Projects: The Pack

Computational thinking in an open-world environmental game
Other Projects:
Northeast Big Data Innovation Hub