Extending the Reach of Embodied Interaction in Informal Spaces

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Research Question
Informal institutions (e.g. museums, zoos) are exploring exhibits that are dynamic, interactive, and embodied. However, these exhibits can only serve small numbers of visitors at a time.

How can designers and educators extend interactive embodied exhibits so that the experience is more inclusive for large peripheral audiences?

Context & Study Design

Our prototype exhibit, A Mile in My Paws, uses physical effort to afford learning. One zoo visitor has control over a virtual polar bear, and must make swimming and walking motions in alternation to traverse the arctic environment. Paws simulates the effect of climate change over time, which reduces sea ice, forcing the player to spend more time and energy swimming.

Location
- Underwater viewing area, Brookfield Zoo’s Great Bear Wilderness exhibit

Two sessions
- Spread across two days, 1.5 hours each
- Day 1: Morning / Day 2: Afternoon

Participants
- 12 interpreters total: 10 from paid seasonal Roving Naturalist (RN) program, and 2 from high-school Youth Volunteer Corps (YVC) program
- 1,049 total zoo visitors came through the Paws exhibit area during the study

Design Challenges Raised
How can we extend the player's personal experience of swimming and walking to reach the surrounding zoo visitors?
- The zoo interpreters came up with a "pantomiming" activity when using Paws with school groups. While one visitor plays as the virtual bear, others in the audience follow the player's actions by making "swimming" and "walking" motions along with them. This activity was possible due to the simple control scheme of Paws, as well as the clear visual cues indicating which activity should be performed (walking when on land, or swimming when in the water). However, visitors would not engage in pantomiming spontaneously, and would only continue pantomiming when prompted by interpreters. Also, only children were willing to pantomime, which leaves their parents without a clear participatory or supporting role.

How can technology help interpreters complement and extend the embodied experience?
- We created an iPad application with dynamic representations of the Paws player's live progress. This allowed for facilitation with adults and children who didn't engage in pantomiming. The interface includes:
  - Live map of player progress and distance to the goal
  - Graph of the virtual bear’s simulated caloric expenditure
  - “Pop-up” climate change/polar bear discussion prompts
- Interpreters engaged families with the discussion prompts, bringing in the player’s experience with the map and graph representations. Some also used the iPad to interact directly with the player, providing progress updates and encouragement. The interpreters are also interested in using the iPad to control "second screen" projections of climate data and audience questions.

How can we better engage adults in the learning activity?
- How can we give pantomimers a more perceptually-rich experience?

Supporting Facilitation

The iPad app shows multiple representations of the Paws player's progress, including map location and caloric expenditure. It also periodically displays discussion prompts relevant to climate change, polar bears, and conservation. Interpreters can use this tool to engage zoo visitors in the periphery of the Paws audience.

Engaging Peripheral Audiences

How can technology be used to augment facilitation of dynamic exhibits?

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