

Move2Learn: Engaging Preschool Scientists through Embodiment and Technology



Move2Learn Overview

A recent surge in theoretical research examining the role of embodied experiences in learning, coupled with rapid developments in sensing and interaction technologies that are increasingly being used to develop new interactive exhibitions and experiences, suggest that we are at a critical moment in which to advance informal science learning research. Informal learning settings offer special benefits for demonstrating and witnessing sensory-motor activity, such as more relaxed social and physical constraints, and thus provide a natural and engaging context for the investigation of embodied STEM learning.

Early learners may be able to enact STEM practices or ideas before they can verbally articulate them. This enactment may set the stage (foundation) for future STEM learning. The mission of Move2Learn is to explore the role that sensory and action experiences play in the way that preschool children think, learn, communicate, and feel about STEM topics.

The Move2Learn planning effort was a collaboration to bridge the gap between museum practitioners and researchers in the United States and the United Kingdom, who represent the spectrum of early learning, science education, embodied cognition, and interactive educational technology experts. The project was designed to test a new model of collaboration between museum practitioners and researchers in which the driving research questions are defined together through a process of mutual respect and negotiation. Project objectives include:

- Increase the capacity of informal science institutions to be more intentional in the application of insights from embodied learning and technology research to the design of exhibits and programs.
- Raise awareness of the need for practitioners and the research community to work together to articulate exploratory and experimental designs that involve whole body interaction exhibits in informal learning spaces.
- Share promising strategies and practices that practitioners and researchers can and are using to better understand the role of body movement and action in learning.
- Begin to establish a network of research/practice teams interested in investigating the role of whole body interactive exhibits in the development of young children's STEM concepts across different contexts and perspectives.

Project activities focused on the planning, preparation, and execution of two interdisciplinary convenings held at the Frost Museum of Science in Miami, Florida (April 21-23, 2015) and the University of Edinburgh in Edinburgh, Scotland (June 29-31, 2015). The events were facilitated by the project's leadership team, comprised of the

Frost Science Museum’s PIs Judy Brown and Cheryl Juárez, Drs. Robb Lindgren and H Chad Lane from the University of Illinois at Urbana-Champaign, Dr. Andrew Manches from the University of Edinburgh, Scotland and Dr. Sara Price, from the UCL Institute of Education, London. Workshop attendees were selected to represent a wide range of museum practitioners, and researchers from multiple disciplines.

To engage participants in dialogue, they were divided into small groups of research/practice teams and tasked with the challenge of designing a research scenario based on a question of interest to the group. The overall goal was to begin the collaborative process of identifying relevant research questions related to the design of physical and digital exhibits for young children, examining the role of bodily engagement in informal science learning settings. The questions raised during the development of the scenarios were distilled into four general areas for consideration in future research efforts.



Edinburgh convening



Visit to the National Museum of Scotland



Miami convening



Hard hat tour of the NEW Frost Museum site

Building a Research Agenda Related to Whole Body Interaction Research Questions by Area

1) What elements of WBI are key to enhancing science learning?

- What body-based metaphors or bodily actions are congruent with scientific concepts, and for which key concepts is this the case?
- What designs guide bodily engagement to elicit cause and effect relationships/other foundational science concepts?
- In what ways do WBI exhibits encourage social interaction around scientific ideas between children? Children and adults?
- How do parents facilitate children's movement? What adult bodily interactions best support children's participation in science exploration?
- What WBI activities best support peer-peer learning about science?



2) What is the role of bodily enactment in assessing children's understanding of science concepts?

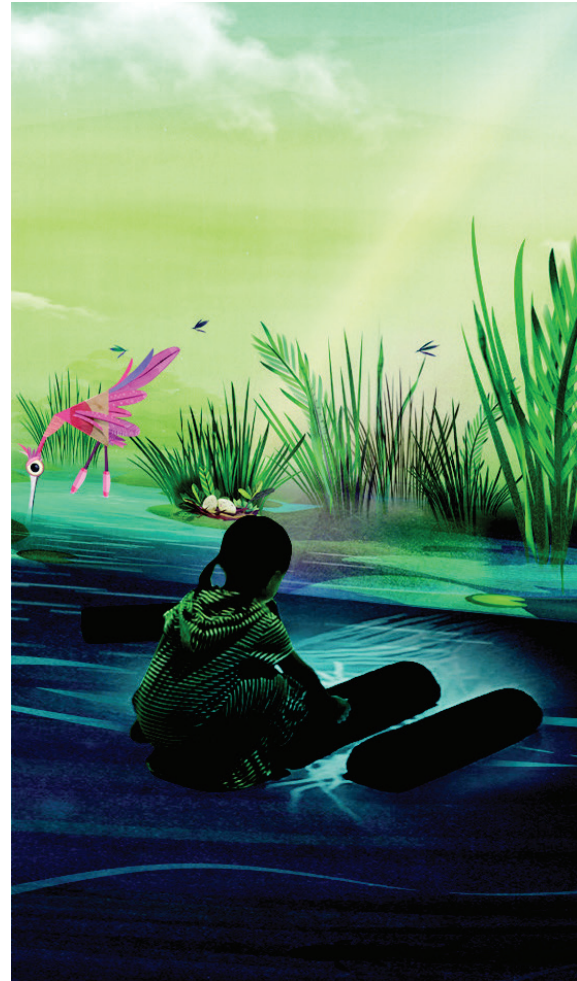
- Does intentional design of bodily actions, that are congruent with the science concepts and/or exhibit key messages, enhance children's scientific explanations?
- Does it increase children's imagining of hypothetical scenarios?
- Does it increase their ability to articulate their thinking about science?

3) What cross-cultural differences in embodied engagement emerge?

- Are there differences in how various cultural and linguistic groups engage physically within country and between countries?
- Are there differences between the US and UK children's interactions with exhibits, such as confidence, verbal expressions, and persistence? Parental behavior?
- Are there differences in peer-to-peer learning? Collaborative behavior?

4) How does WBI exhibit context impact the learning experience for children and families?

- Does a combination of hands-on and digital immersive experiences increase dwell time of families and preschool groups?
- Does the combination help children retain stronger memories than immersive alone?
- Does the sequencing of hands-on and digital immersive experiences affect the impact on the learning outcomes?
- Does the level of facilitation afforded by indoor versus outdoor environments affect the level of embodied engagement and associated learning outcomes?
- To what degree can WBI exhibits help adult visitors increase their understanding of embodied learning principles so that they can encourage learning at home (post visit)?



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