

National Living Laboratory 2014-15 Cohort Stipend Final Report

Da Vinci Science Center and Lehigh University

Who Are We?

Da Vinci Science Center in Allentown PA serves the mission of *bringing science to life, and lives to science*. We have identified early childhood as a key area for growth, including building a new early childhood exhibit space and extending our programming. Living Laboratory proved to be perfect for advancing this strategy.

Da Vinci Science Center has partnered with the School Psychology Department at Lehigh University. The lab focus is on early mathematical skills, including skill development, assessment, instruction and intervention. Dr Robin Hojnoski is our research partner. There are already many collaborative projects between the two organizations, including the popular *Meet the Scientist* program. Dr Hojnoski was also advising DSC on its preschool expansions, so the transition into partnering in a Living Laboratory was a natural one. The DSC Living Laboratory is housed within our *Little Learner* preschool science space. It is a permanent space and includes signage explaining the concept of the Living Laboratory program. Studies are conducted every Sunday and Monday, and at other times DSC staff engages visitors through research toys.



Melanie Franklin, Lehigh University grad student performing the Mystery Shape Test

Goals of the NLL Stipend Award

When applying for the stipend award, we had two goals in mind. The first goal was to create a space suited to the needs of the program. This included printing signage and purchasing furniture and storage for the space.

The DSC Living Lab is now an inviting space with attractive, appropriately sized furniture. The second goal of our stipend application was to allow Living Lab to be a central part of our early childhood experience. This was achieved by allowing the Museum Education Manager time each week to coordinate the Living Lab, and to cover the cost of Museum Science Educators to activate the space, attend professional development sessions and perform researcher greetings.

Enhancing the Visitor Experience

The Living Laboratory has deepened the experience of visitors to the Da Vinci Science Center. All preschool exhibits and programs are carefully chosen to be pedagogically and developmentally appropriate, and Living Lab helps to show to care givers the importance of this informal science education.

Participants	Ed Opportunities	Research Toy Interactions
36	19	35

One couple expressed doubts about their child’s attention and willingness. As they watched him identify various shapes, they were amazed, and one parent commented “I had no idea he knew those. I guess he really is listening to us.” This observation led to conversation with the researchers about child development of shape knowledge.



Mutual Professional Development

Key members on the Living Lab team include the Museum Education Manager, Volunteer Coordinator, Education Team Leaders and part-time and volunteer educators from Da Vinci Science Center. From Lehigh University the lead researcher is Dr Hojnoski and two graduate students from the School Psychology Department.

DSC staff has received professional development from Lehigh University staff, explaining the goals and methodology of psychology in general and on the specific study being conducted at the museum. The stipend allowed a large number of museum staff to be included in this training, greatly increasing the impact of training on daily museum practice.

Lehigh University researchers have received professional development on how to write about science for a general audience, how to approach museum guests and how to discuss developmental psychology with families. This had had great impact on the graduate students, who will soon begin their careers in school psychology.

"I studied psychology at college, and it's so exciting to be able to use that knowledge now at the center."

Robert Layten, Museum Science Educator.

"Living Lab has opened our eyes to the kinds of studies we can perform. We can be much more ambitious than we first planned."

Dr Robin Hojnoski, Lehigh University.

Research Happenings at our site

The Development of Shape Knowledge in Young Children explores whether children's labels for 2-D and 3-D shapes is related to their ability to correctly match a 3-D shape to a series of images. Specifically, we ask are there age or gender differences in performance.

Children play the 'Mystery Shape Game' (identify a 3-D shape in a bag without looking). Then children are presented with images of 2-D and 3-D shapes as well as shapes in nature (i.e., candle to represent a cylinder) and asked to identify what shape matches the one in the bag.

2D representation task appears to be the easiest, whereas with the shape in nature representation task the fewest children responded correctly across target shapes, suggesting transfer of shape knowledge to natural objects was more difficult.

Preliminary results suggest that hands-on experiences with shape provide children with a wealth of information that informs the mental representations they create, which then can be used for general problem-solving and more advanced geometric understanding.



Lauren Exley, Museum Science Educator, facilitating the Novel Toy with a guest.

Outcomes and Future Goals

Living Lab has afforded a pronounced benefit to Da Vinci Science Center in that it has shown to our partner organizations our strong commitment to early childhood education. DSC is planning an expansion of its *Little Learner* space, and the Living Lab will be central to this expansion. The center already has a strong suite of programs that link the public to scientists, including our monthly *Meet the Scientist* program and the Mentor Allentown Coalition.

We currently plan to increase the number of active studies from the School Psychology Department, including a parent/child interactive study on shape knowledge that will begin in June. We are also in discussions with the Developmental Psychology Department at Lehigh University on possible future studies.