# Exhibit Lab: a Project of the Environmental Exhibit Collaborative (EEC)

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## Introduction

The four New England museums of the Environmental Exhibit Lab (EEC) set out in the Fall of 2011 to create a replicable model of collaborative professional development for small museums. The project, Exhibit Lab (sometimes called "EEC 2"), was funded by a 3-year grant from the Institute of Museum and Library Services [2011 21st Century Museum Professionals Program; IMLS Log Number: MP-00-11-0049-11]. At small institutions, impending deadlines, budget and staffing limitations, and professional isolation all too often get in the way of true innovation. The goal of Exhibit Lab was to help staff who, though conversant with current museum theory, sometimes struggle to apply that theory to their daily work, or to disseminate these ideas through an institution.

The problem is best laid out in the Statement of Need in the grant proposal:

### Statement of Need

> "For science and children's museums three areas of research and practice have emerged as critical to state-of-the art exhibit development. These best practices are: (1) Understanding and designing for family learning; (2) Prototyping and in-depth formative evaluation with visitors, and (3) Developing exhibits that foster open-ended investigation. While these ideas may be increasingly familiar to museum professionals, hearing or reading about these issues is not the same as putting them into practice, much less institutionalizing them as part of an organization's ongoing approach to exhibit and program development. The challenge – and potential - is especially great for smaller museums. Small and medium-sized museums constitute the majority of museums in the country, and given their flexibility and close ties to their communities they should be powerful incubators of creativity. Staff at smaller institutions often have educational backgrounds similar to their colleagues at larger institutions, but often work alone or with few other colleagues, juggle many responsibilities, and have limited funds for professional development or travel to conferences. Working in isolation, smaller museums lack the 'intellectual critical mass' for true innovation and sustained professional development.

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> The proposed project will create this critical mass by bringing together a broad array of staff from the partner museums to form a vibrant 'community of practitioners' to learn together, share expertise, and support and critique each other's work as we learn to put these three best practices in exhibit development into practice. The project is based on learning-by-doing, which recognizes that the most successful learning occurs when ideas are actively and thoughtfully incorporated into practice, with the support and intellectual challenge provided by collaborating colleagues. We believe the model developed for this work, and the evaluation results, will prove useful not just to the four institutions involved, but to other small and mid-sized museums considering collaborative professional development projects. ”

Exhibit Lab relied on a carefully crafted mix of meetings, workshops and staff exchanges, a combination of outside experts and peer-to-peer mentoring, to foster a community of practitioners, engaged in collaborative learning-by-doing. The Exhibit Lab project focused on the work of the Exhibit and Program/Education staffs, but we feel that the project model holds lessons for other museum departments, and for museums outside the Children's and Science museum sphere.

This Case Study examines these "generalize-able" lessons. Briefly this case study is broken down into the following sections:

>> **Background:** a brief history of EEC

>> **Project Structure:** the overall structure of the Exhibit Lab project (IMLS Grant)

>> **Project Evolution:** changes to that structure during the course of the grant

>> **Goals and Lessons:** a review of the goals of the grant, and some generalizable lessons about successful collaboration

>> **Vignettes:** Brief reports written by different museums focusing on aspects of their work during the grant, with commentary linking these to the grant's professional development goals, and some of the generalizable lessons introduced in the previous section.

>> **Moving Forward:** Lasting Changes, New Challenges: A look at the future: evidence of sustained change and future plans

>> **Appendices:**

a. "Collaborative Structures: Many Ways, Common Paths", *Exhibitionist*, Spring 2012

b. "Greater Than its Parts: Exhibition Collaborations for Small Museums", *Exhibitionist*, Spring 2012

c. Project selection tool (sample page)

d. The 2014 Environmental Exhibit Collaborative (EEC) Final Evaluation by Randi Korn & Associates, Inc.

# Background

## **EEC 1:** Collaborating to Create a Product

The Environmental Exhibit Collaborative (EEC) was initiated in 2004, originally bringing a group of smaller East Coast museums together to address a common need for small traveling exhibits on natural science topics that were hands-on and designed for a family audience. With exhibit departments often consisting of one or two people, EEC members were too small to follow the typical exhibit collaborative model where each museum builds a full exhibition, which is then rotated between members (e.g. SMEC, TEAMS, and YMEC). [See Appendix a for a comparison of different models of collaboration for developing exhibits.] Instead, we decided to work together to create each exhibit in succession, functioning as a single "distributed" exhibit department. EEC was fundamentally an exhibit development collaborative, but another major outcome of the project was professional skills development and capacity-building. Each museum took the lead where it had expertise (e.g. animal husbandry and life support, early childhood learning, exhibit design), but by problem-solving collaboratively to produce tangible exhibits, we were unavoidably engaging in peer-to-peer teaching and mentoring. While not exactly an unexpected outcome, the importance of this professional development as we looked back at the experience was eye opening. Other exhibit collaboratives reported similar experiences. (Appendix b)

The project, and the professional relationships it created, reduced the isolation of the exhibit staff while allowing the museums to tackle projects that would be impossible without the group. New skills and learning evolved naturally from working together on real products that we all needed, and there was much information sharing and discussion beyond the specific exhibit projects.

## **EEC 2:** the Exhibit Lab Project

At the conclusion of the initial five-year EEC project, most of the partners committed to remaining together, largely because working together had been so instrumental in our capacity-building. There were some limitations to the EEC1 model which the group hoped to address in a second-round project. One short-coming grew from the focus on producing a full exhibition each year. This sometimes led to falling back on tried-and-true interactives, simply because we lacked the time to overcome the inevitable road-blocks of prototyping riskier, but more innovative ideas. When deadlines grew short, risk-taking took a back seat to ideas that "we already know people will enjoy". On the process end, the biggest short-coming of EEC1 was the limited time we had to spend together and the small number of staff (namely exhibits staff) that reaped the professional development benefits.

EEC2 (later named Exhibit Lab) was designed to build on the strengths of EEC1 by focusing more explicitly on professional development but keeping within the context of real exhibit and program projects, expanding and extending the time we spent together in each other's museums, and narrowing (and deepening) the focus of our work from producing an entire exhibition each year, to focusing in-depth on a few exhibit components. It is worth noting that despite the fact that all the exhibit components were important to the initiating institution, and held general interest, there was something lost from the EEC1 model were the unity of a common task (developing a complete traveling exhibition as a team) drove the intensity and focus of the collaborative. We feel that this trade off in EEC2 resulted in greater depth, trying riskier projects, and time to reflect, but there were times when it was harder to keep the group focused on deadlines and carving out time for the project.

## Project Structure

Funded by IMLS (MP-00-11-0049-11), the 3-year Exhibit Lab project was structured to include two project cycles. During each cycle, the museums each selected specific prototypes to develop while applying the principals learned in expert-led workshops. The workshops focused on three areas of best practice:

**1)** family learning;

**2)** prototyping and formative evaluation; and

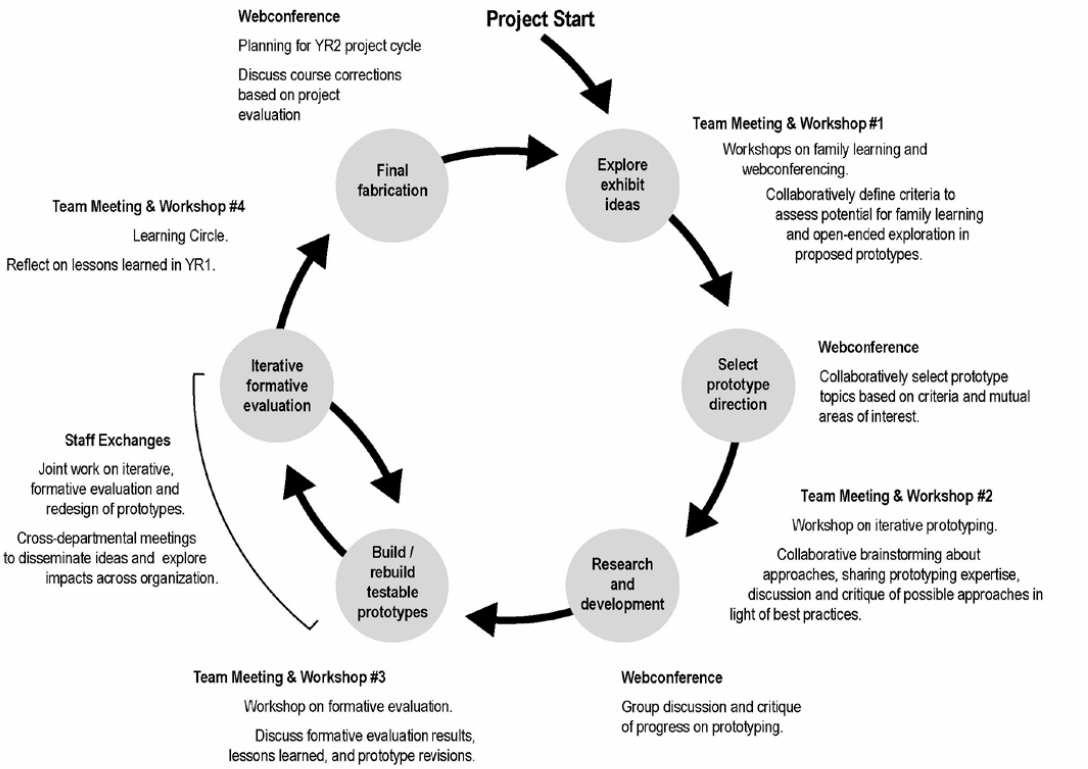
**3)** developing exhibits that foster open-ended investigation.

These foci were selected by the group as areas where we felt we could push ourselves to do better. Risk-taking was baked into the process by requiring each museum to select several prototypes in the early stages, allowing for failures that could be dropped without jeopardizing the project cycle.

The general project cycle is laid out in Figure 1. (Note that the proposed project as submitted included three project cycles over the course of three years. The actual awarded grant totaled 66% of the originally proposed budget, so one project cycle was eliminated from the project.)

**Figure 1: Project Cycle (Year 1)**

Note: YR2 & YR3 project cycles mirror YR1, though workshop topics differ (see Schedule of Completion for details).



The major project activities were supported by a variety of group activities:

*Two-day workshops/meetings*: In general, the first day of these meetings was a facilitated workshop (lead by outside experts and/or by experienced staff from the participating museums) and the second day reserved for deeper hands-on work applying the principals learned in the workshop to our actual prototypes.

*Staff Exchanges:* Once during each project cycle, each museum sent one to two staff members for a three day visit to another partner museum. Staff exchanges allowed extended time to share skills, work collaboratively on the host's exhibit projects and/or test our own projects with a new audience.

*Web conferences:* Between face-to-face meetings, we met monthly in a web video conference to offer updates on progress and plan future meetings. While no substitute for in-person meetings for the main conceptual work, they were useful for focused brainstorming on stalled prototypes, and keeping up on logistics.

## Project Evolution

**Workshop Evolution:**
While the general structure of the project followed that which was originally laid out in the grant proposal, over the course of the project, the structure of the two-day workshop/meetings and staff exchanges evolved significantly based on our experiences:

*Supplementary workshops:* The group found opportunities – planned and unplanned – to supplement the workshops lead by outside experts with workshops lead by participating museum staff. When the grant award was less than was requested, the planned number of outside expert workshops had to be reduced. Rather than drop them altogether, the group tapped the internal expertise of ECHO and the EcoTarium's programs and exhibits departments to create a workshop on formative evaluation. An unplanned series of workshops arose when many in the group were disappointed in an outside expert-led workshop on family learning. Most felt that the contents were not applicable enough to take back to their co-workers. As project coordinators, the EcoTarium staff felt strong pressure to address this short-coming. The Director of one museum, having come from the Boston Children's Museum, shared with us the "Learning Together: Families in Museums" curriculum and the related Adult Child Interaction Inventory. Using selected lessons from this resource, the EcoTarium created two internal, staff-wide training workshops. This in turn, inspired all of other EEC museums to adapt and institute the same internal training.

*Focus on the host museum's projects.* Early meetings and workshops involved each museum bringing their particular projects to work on. When possible, we broke into heterogeneous working groups to increase cross-pollination of ideas. But through happenstance, we held a meeting in which all of the prototypes most in need of group work belonged to the host museum. We found this longer, deeper focus much more productive – both for moving the prototypes forward and for our learning as professionals. We immediately scheduled all future meetings using this new structure. Each museum hosted the meeting when it most needed an influx of fresh ideas and perspectives on projects: exhibit prototypes, programs in development, and galleries in need of remediation. This has proven so successful that the Discovery Museums wrote the EEC group into another project as peer evaluators and critics.

*Director's sidebars:* The EcoTarium experienced a change in leadership in the middle of the project, welcoming Mr. Joe Cox as our new President on Oct. 1, 2012. To facilitate his orientation to the partner museums, we scheduled a "director's side bar"meeting to take place during a two-day Exhibit Lab meeting. This provided an opportunity for the museum directors to discuss issues outside of the project agenda. It proved so effective that the Directors requested that the sidebar become regular feature of all workshop agendas. In fact, the Directors hope to institute Directors' staff exchanges in any future collaborative projects.

*Cocktail hour Show & Tell:* Several staff members returned from the ASTC conference with photos they wanted to share among the collaborative at one of our regular meetings. With a tight workshop schedule, the only time available was shortly before dinner. We thus instituted a show and tell slide show with potluck snacks and drinks. This has become a regular and valuable feature of our workshop meeting agendas; and a consistent favorite. Because we are deeply familiar with each museum's work and plans, we can serve as extended eyes and ears ("I saw this video and thought it might apply to your project") as well as sharing new inspirations.

*Bringing in other collaborators:* Each museum has found that membership in the EEC group makes us a stronger partner in our other collaborations, in part because we can offer a larger potential audience for new initiatives. We have begun to weave some of these partners into our two-day meetings, such as outside aquarium designers in Portland, Israeli university and botanical garden collaborators in Acton, and YMCA educators in Burlington. This has lead quite naturally to writing the EEC partners into other collaborative grants, as the EcoTarium has done with an NSF-funded [award # DRL-1323168] urban ecology exhibit partnership, where the EEC members are serving as a review team and potential hosts for exhibit components being developed under the grant. Additionally, the Discovery Museums have included EEC members as a "Peer Evaluator Team" in a successful 2014 IMLS Museums for America grant project to develop a new 1000 ft² gallery, tentatively named Brain Building Zone.

**Staff Exchange Evolution**:

*Two models of exchange:* An accident of scheduling meant that we were testing two different models of staff exchange. In the first cycle of staff exchanges were conducted on a "round robin" basis, with each museum hosting colleagues from one museum and then visiting a different museum.

In the second cycle, the exchanges were reciprocal - each museum visiting and hosting the same museum (the one not visited or hosted during the first year of the project).


While we did not do any formal evaluation of the two structures, we did note that the reciprocal exchange felt more like one long extended exchange, allowing for more in-depth prototyping and chance to revisit earlier questions in a new environment.

*Embedding in daily activity:* When hosting a visiting colleague, each museum originally committed that at least one staff member would schedule no other meetings during the three days, to focus solely on the planned work of the staff exchange –prototyping of interactives and programs. However, life had other plans. At the EcoTarium alone, a visiting bald eagle expert, an all-staff meeting, even a job promotion all intruded on the staff exchange schedules. We simply folded these into the exchanges. Our visiting colleague joined the bald eagle exhibit brain-storming, and sat in on the staff meeting. Rather than disrupting the exchange, these interactions raised the profile of the exchange amongst EcoTarium staff, and gave her insights into a different institutional culture to bring back to her museum. During a subsequent exchange, the hosting staff person was offered a new position at the EcoTarium, which resulted in several long and valuable conversations with the visiting peer about management issues, which greatly eased the job transition.

*Shaking up internal dynamics:* In several cases, the presence of visiting staff allowed the host museum to overcome internal obstacles. For example, one participant had struggled to engage staff from their animal husbandry department in developing interactives at animal exhibits, despite her having described such interactives being prototyped at peer museums. During the staff exchange, the visiting staff member shared photos and details from similar work done with her own animal husbandry staff. Seeing this evidence helped allay concerns about animal welfare and led quickly to the host husbandry staff emerging onto the museum floor to participate in formative evaluation of an animal-based prototype. In fact, during the exchange the host exhibit staff person found it helpful to excuse herself from the museum floor, which allowed the animal staff to work with the visiting peer learning the new visitor-focused skill without feeling watched or evaluated by a co-worker. At another museum, the education manager specifically requested the visiting peer sit in on a department meeting to present several inquiry-based activities. Having information come from an outside peer gave it weight that it did not have had when it was previously presented by manager.

## Vignettes

In the following section, we look at Exhibit Lab participant experiences through a series of vignettes written by staff from each institution. Each vignette focuses on one project undertaken by a member museum. We have added a layer of analysis that comments on the vignettes using two different lenses:

### 1 Learning Goals

Evidence of achieving the professional development goals outlined in the project design, namely, increasing awareness, knowledge and skills in:

>> prototyping and formative evaluation
>> developing exhibits and programs that foster visitors' open-ended investigations
>> developing exhibits and programs that support family learning experiences

### 2 Collaborative Lessons

Evidence of the ways –many unplanned –in which the project structure supported that learning by creating a deeply collaborative Community of Practice.
While the three learning goals where defined in the initial grant (and were the bench-mark for the external evaluation), this second category "Collaborative Lessons" is based on group reflection and discussion. The group asked itself "Why did we succeed as a collaborative and what are the take-away lessons for other collaborative projects?" It is our summary of what worked and allowed the collaborative to grow. The lessons identified by the participants are summarized below.

a. Building relationships: personal, professional and institutional; The group's meetings were described by one participating Executive Director as "part peer pressure, part therapy". We have become each other's most trusted, most frank, and therefore most effective, critics. Factors identified by the group as contributing to this culture included:

>> personal relationships – these were the starting point for institutional relationships;
>> face-to-face time in a variety of formats; and
>> real buy-in and an on-going commitment from the top management.

b. Being complimentary institutions -similar but not too similar: The participating museums are of similar sizes, and have significantly overlapping missions, but each has a different focus and strength. Thus we each had skills and knowledge to contribute, and –just as important –we each wanted what the others could offer. This gave us:

>> a fresh professional perspective, and new problem-solving partners, whenever a project hit a snag
>> access to different audiences and environments for prototyping
>> a chance to use outside partners to help foster internal, cross-departmental collaboration

c. Doing important and real work: The group went through an elaborate process to select focus projects that where a priority to the initiating institution, but also would be of interest to others in the group. (See Appendix c for a mock up of the tool used in project selection) For example the EcoTarium's work with live animal-based interactives, meant that the two other museums with live animals could serve as testing grounds and could potentially bring a similar interactive to their visitors. Others selected projects that they could not tackle without the skills and knowledge of the partner museums. Thus, we were never just working for ourselves, but for each other. This reinforced the "peer pressure" part of the equation; participants frequently cited the importance of not wanting to appear before the group empty-handed.

d. Creating a vastly expanded reach: Beyond working on the focal Exhibit Lab projects, we found multiple ways that having the extended collaboration supported our work, including:

>> vetting products, and vendors;
>> meeting with (and sometimes working with) our partners' partners;
>> serving as each other's eyes and ears bringing back experiences from conferences, museum trips and other projects.

## **Vignette1**: From Circuits to a Mars Rover

Chris Sullivan, Director of Exhibits, Children's Museum & Theatre of Maine

The Mars Rover exhibit component in the Children's Museum & Theater of Maine's (CMTM) is an example of the power of the Environmental Exhibit Collaborative (EEC) as a resource for learning and institutional growth. We chose to focus on the rover because we believed that without the EEC's collaborative model we would not have been able to overcome the content and design challenges associated with its development. The rover is one part of a suite of components that make up our new Child Inventor Service exhibit. The exhibit as a whole is focused on getting children excited about electrical engineering. This component was intended to focus on having visitors learn to operate a working robotic arm.

We develop most of our exhibits in-house and have increasingly become more and more diligent about prototyping all components before the final design and fabrication phase. Regardless of our previous experience, this process highlighted that "best practices" are constantly evolving. Processes can continually be improved through conversations with colleagues, professional development workshops, financial resources, and experience. Our "rover" development process began with an off-the-shelf robot arm and anecdotal observations. As time went on, our staff attended workshops (though EEC) and we learned about design criteria for family learning, the importance of goal setting, the development of formal evaluation tools, and inquiry-based learning. After each workshop, we incorporated these lessons into our practice. We began setting specific goals for the component and using the new evaluation techniques to assess our progress toward these goals.

Because the content and technology were outside of our expertise, we utilized engineers from Fairchild Semiconductor, Worcester Polytechnic Institute (WPI; a partner in the grant), and the EEC partners as a resource. Throughout the process the engineers coached our staff on the electronics and pneumatics involved in the component's construction. They were a valuable resource for answering the question: "Can it be made?"
The EEC partners served as peer experts in informal learning. They helped with the bigger question: "Why should it be made?" During monthly meetings and staff exchanges, they provided leads for resources, assistance with problem-solving and, most importantly, a critical eye. They frequently held us accountable to our own goals and helped keep us on track throughout the process.

[Prototyping: We rarely read about missteps and mistakes in the literature on best practice. Yet as this vignette demonstrates these missteps are at the very heart of an iterative prototyping process. In the collaborative meetings the missteps were as much a topic of conversation as the successes.]

Overall the process was truly a hands-on, professional development experience. It was filled with missteps, mistakes, and dead ends, which lead to many lessons learned.

As we anticipated, EEC's collaborative model played an instrumental role in this. Here are a few of the lessons we have taken away from the group:

**Lesson 1:** The collective adds to your institutional experience:

The scope of the project involved a lot of technology. Because of the expense associated with this technology, our first hurdle was to figure out how to use our rapid prototyping process without blowing our budget on costly equipment. This question was posed to the EEC group and several strategies were shared: (1) Model the technology using a simulated experience; (2) utilize a less expensive "off-the-shelf" model for early testing; and (3) locate a similar component at another museum and observe it at their institution.

For this component we chose to purchase an off-the-shelf toy robotic arm and test it on out on our floor. This allowed us to do early prototyping to gauge visitor interest and test out preliminary applications for the tool. More importantly, this conversation gave us several strategies for early prototyping. In fact, we have used all of these prototyping strategies in later exhibits and education projects.

Prototyping: one of the refrains of the first prototyping workshop led by Paul Orselli, was "there is NO excuses for not prototyping": no time, no money, and no space -- all these can be overcome, if prototyping is central to your concept of how to develop exhibits.

**Lesson 2:** The exhibits, not the process, should be open ended:

One of the early prototypes required visitors to use the arm to move random objects. Once the arm was put out on the exhibits floor, staff conducted daily observations in which they recorded visitor conversations to see what questions visitors were naturally asking. Following each observation, we made enhancements to the prototype based on what the visitor found interesting. Even though we were learning a lot about visitor expectations, the process was not exposing a clear direction for improving the prototype like we had hoped.

Once again, EEC was the resource that helped us overcome this hurdle. Our peers asked us whether the component's goal was to give visitors the experience of using robotics as tools or whether it was about educating visitors about the science behind how the tool worked. We didn't have an answer. We were hoping visitor interactions would inspire a direction. It was like traveling down a road without a road map. Visitors are a great resource, but you have to know (approximately) where you are going in order to define a process that will get you there. In exhibit development, goals and outcomes help serve as road maps.

Later we worked with our peers on how to set goals and develop formal evaluation processes to test them. After this, we took a more targeted approach to prototyping. We identified "understanding the science of the arm" as our focus. We then developed an evaluation rubric based on this goal. Each week staff would observe visitors using the component and interview them (post observation). We then used this data to target improvements like: color-coded parts, didactic signage and display models. Later in the process we would used the same strategy to evaluate and increase the percentage of parent/ child interactions when using the component.

Prototyping and Formative Evaluation: As pointed out in the RKA evaluation, evaluation was initially an area that seemed confusing, but as Exhibit Lab continued became a more routine part of prototyping -- not extensive number crunching, but more focused observations, explicitly tied to the goals of the exhibit. In this example, evaluation was used to further both learning goals and family learning goals.

**Lesson 3:** The "why" is more important than the "how":

The technology requirements for this exhibit were new to our staff, and we were dependent on working with both engineers and our EEC partners to determine how to execute it. Our plan was to work with the engineers to design the interactive aspects of the component. At first, the technology was overwhelming, and possibilities were endless. It took months of technical prototyping before visitors could even use the component. Once we began prototyping, we saw that the arm was very difficult for visitors to use. There were more questions about how to control the arm than about the science behind it. We went back to our engineers, and their solution was to incorporate more technology and custom programming into the interactive. This process continued. The arm grew more and more advanced while becoming less and less viable as an exhibit. The engineers became extremely invested in the design of this exhibit, but by this point the arm was so alien to our staff that we could no longer facilitate the process.

It was not until we had a staff exchange visit by one of our EEC partners that we had realized that we had traveled down the wrong path. Because of the previous meeting, she was familiar with our goals and process. After a brief period observing how the arm worked with visitors, she gave us the bad news: we had stopped asking the right questions. We got fixated on the "how to make it run," instead of "why should visitors care?" Our goal was to educate children about the machine, not to build a state of the art component. We decided to no longer pursue electronics, switching strategies entirely. This was a sobering moment and felt like a defeat because it required us to take a few steps back in the process. Ultimately, this intervention was critical for getting us past this plateau and was a key moment that salvaged the project as a whole.

Relationships: the idea of supportive, but critical, peers came up often in discussions. Within any small organization it is easy to get swept up in daily crisis, or diverted by an attractive technology. In a sense, participants in the collaborative felt they were also reporting back to the larger group; being "held accountable" helped keep the focus on the larger exhibit goals.

**Lesson 4:** Part of being a good collaborator is knowing how and whom to ask for help.

In addition to reminding us to focus on the right question, this experience also made us better collaborators. As we changed gears, and the robotic arm began to evolve into a pneumatic arm, we also focused more on meaningful collaboration. Community collaborators can be valuable technical and content resources for our work; however they are specialists in their field, not ours. Their processes, constraints and questions are much different from ours.

Having the EEC peers involved in this process provided us with collaborators who are part of our field. They are the specialists who can answer questions about increasing visitor engagement; the role of signage and what to do if a ferret gets loose in your museum. We have always talked about the organizations in EEC as an extension of our exhibits department. However, we were learning that each of our museum's bring unique specialized skills at all levels. It is very helpful to have peers from a children's museum to brainstorm early childhood ideas for engineering.
When developing a pneumatics arm, it is equally as helpful to have at the table a science center with pneumatically controlled dinosaurs.

Expanded reach & Problem solving: In a large organization a walk down the hall in the exhibits department might provide access to colleges with a range of technical information and specialized skills. For those working in small and mid-sized museums, the collaborative structure of Exhibit Lab aimed to create a "distributed exhibit department" that would provide access to a network of colleges to help in problem solving and technical assistance.

**Lesson 5:** The learning process is never done:

Through prototyping, evaluation, professional collaboration, and continued interventions from our EEC group, the pneumatic arm continued to move closer and closer to our goals. When we would meet a goal, we identified new issues and continued to remediate the component. We were learning through a process of doing. As we learned strategies for teaching our audience, we continued to learn about our audience. For example, observations lead us to an understanding that an arm sitting alone in a case didn't have a purpose. Adding a tic-tac toe game gave the interaction a purpose and extended stay times. But this adjustment led to the observation that this purpose did not support the learning objectives.

Open-ended: The group devoted the better part of several group meetings digging into the concept open-endedness: Was long engagement always a sign of open-endedness? Did there need to be endless novel outcomes at an interactive or several novel outcomes for any one visitor? Ultimately, each museum, sometimes each project, landed with a different answer, but the peer conversation meant that we arrived at our answers deliberately, with an eye towards creating an array of engaging experiences, rather than by default.

Consequently, in the next iteration, the arm was transformed into a space rover, giving it context and changing the interactive from novel to relevant. Following this adjustment, the rover prototype was installed in the exhibit and tested for durability. We learned lessons about material choices, and the process continued.

The Rover has gone through final fabrication is now installed permanently in our museum. Even through the prototyping process is done, our work is not. There are still items we can adjust and improve. We know an exhibit is never complete, and there are always new things we can learn from it and improve upon.

Similarly, there are still lessons to be learned (and re-learned) from our collaborative process. EEC's collaborative model has had a tremendous impact on the components development, as well as fostered institutional growth that has already lead to future successes. Following the development of the rover, we continued to implement these practices in other exhibit projects. Our staff as a whole is more knowledgeable about our visitors. We have institutional strategies that facilitate better exhibit designs, and we have a deeper connection to our network of museums in our region. Our field, institutions and staff are always changing. The strength of this model is that it is organic. As each organization grows, it brings new assets to the group, strengthening each organization within the collective.

## **Vignette 2**: Operation Blue: Our Story

Lucia Stancioff, Visitor Experience Director, Children's Museum & Theatre of Maine

As we began thinking about developing a new exhibit, the Children's Museum & Theatre of Maine (CMTM) staff saw the need for open-ended play appropriate for our target age range of children ages 1-10 and their families. Through research, we determined to invest in Imagination Playground –large blue blocks designed for open-ended building, pretend play, and gross motor movement. Our lead exhibit staff observed these in use at EcoTarium during a staff exchange; when the [EcoTarium] staff brought the blocks out, the response was exactly what we were looking for in our new exhibit. In the words of our exhibit director: "I spent some time observing Imagination Playground today. I am seriously impressed with how popular they are with their visitors. The claims on their [Imagination Playground's] websites are not exaggerating." His observations confirmed that the blocks worked for different age levels and demonstrated a lot of intuitive collaborative play between kids who were not part of the same group.

Expanded Reach: Working in the collaborative means more experiences to draw on, more people sharing experiences at conferences, more exhibits that people have seen or tried. In this case, one partner could draw on the experiences of another partner with a commercially available exhibit, thus helping reduce the risk of a large purchase. However, surprises were also in store.

Open ended: How can we encourage staff to step back from the daily deadlines and logistics to have the more philosophical discussions about of the sorts of learning we want to foster at our museums? Encouraging and supporting this sort of discussion and learning requires time, having the right people in the room, and benefits from the wider pool of experiences and knowledge that are brought together though the collaborative.

The Environmental Exhibit Collaborative had already been helpful to us in relation to the blocks before we took on this challenge. First, we had discussed the play-based learning associated with the blocks in great detail as a collaborative, and these discussions really helped us understand what type of play these blocks encourage. Realizing that the creative, open-ended, and child-led play was just what we were looking for, we then enlisted more help from our EEC peers by asking for their feedback on the use of the blocks. Finally, in the staff exchange mentioned above, CMTM's exhibit director visited EcoTarium and was able to see the blocks in person being used by children in our target age range.

Using these observations and our research into the blocks' use at a variety of museums, we went ahead with the purchase. When we put the blocks into one of our current exhibits and sat back to observe the magic happen we were really disappointed. Why weren't the children running over with excitement? Where was the great collaborative play we'd seen and heard so much of? And the biggest question of all— why weren't the youngest visitors ages 1-3 taking an interest in the blocks? It baffled us as to what made our environment so different that it affected the use of the exhibit materials. We decided that we needed to make some real progress on environment to create a space which allowed and encouraged the free play we'd previously observed in other places, or we would have to completely reconsider the use of the blue blocks.

Real work: Having invested in the big blue blocks, with the exhibit opening scheduled in just a few months, the museum had no choice but to spring into action. Fortunately, this arose more than a year into the Exhibit Lab project, so the museum staff had a number of newly-honed tools and skills.

Prototyping: On the one hand, this "all staff observation" is a concrete example of a museum applying knowledge gained though the professional development efforts of the grant. But on the other hand, the whole-staff observation approach went beyond any modules presented —and became an inspiration to the other EEC members. Many felt that it raised the bar for future formative evaluation efforts.

The next step in moving toward discovering how the blocks could be a better fit for CMTM felt natural to us, thanks to the past few year's of evaluation practice which developed as a result of EEC. We created an initial evaluation tool based on the naturalistic observations that we had practiced many times at EEC conferences and at other institutions. In the first week, we enlisted the entire CMTM staff (18 people) to help; we asked everyone to spend one hour per week observing the blocks in the space and how they were used.

The results were tremendously helpful. We discovered that the number of people in the building, as well of the age of children, seemed to affect how the blocks were used. We also learned that many children were being distracted by exhibits nearby that were unrelated to the blocks, and that many caregivers were leading their children away from the blocks. We saw that adults (and some children) didn't sit down on the floor with the blocks. And we saw toddlers had little to no interactions with the blocks.

Instead of stopping there, we thought about our prototyping experience and how much the environment can affect use of a prototype, so we set out to make a few changes based on the observations. We added chairs for seating. We tried building the blocks into a structure to make them look more inviting. We ordered and installed a small floor of softer material to delineate the block space and to give a comfortable option for floor-sitting. And then we observed again. Every week for 6 weeks we asked the entire staff to observe, an hour at a time and often in pairs, and to record what they saw. Using the guidelines for caregiver involvement[the "Adult-Child Interaction Inventory"] and the Active Prolong Engagement information from the EEC meetings, we changed the observation for each week and continued to alter the space.

Family Learning: The familiarity with the Adult-Child Interaction Inventory (ACII) came through a second family learning workshop coordinated by EcoTarium staff and based heavily on the 2010 "Learning Together: Families in Museums" curriculum and the ACII developed by the Boston and Chicago Children's Museums.

Open Ended: in one Exhibit Lab workshop we invited two staff who had worked on the APE (Active Prolonged Engagement) project at the Exploratorium. The workshop examined the Exploratorium's definition and approach to open ended exhibits, as well as how the Exploratorium goes about evaluating an open ended experience.

We learned that through observation, recording, and prototyping on this scale, we could collect more than enough information to make a truly informed decision- not one based on anecdotes alone. And through this we continued to develop our new exhibit design. We learned the blocks can't stand by themselves as an exhibit, so we focused on a complimentary climbing structure to accompany them. We learned that the space below the blocks is just as important as around, so we installed a large, soft, grass-like flooring in the space. And we learned that some children wanted more than just blocks to build with, so we included balls, scarves, and holes to put the blocks into to allow for more open play.

Prototyping: this example shows an "evolutionary"or iterative approach to exhibit development, with repeated modifications, observations and further modifications. Just designing exhibit (or in this case buying it) does not insure it will work as intended. Though continued modification based on the observational data collected, the exhibit evolved into a successful exhibit.

The end result? Through internal design and working with outside contractors, through involving the entire staff in observation, and through utilizing the advice, resources, and skill sets gained from the EEC partnership, we now have a truly open-ended exhibit which promotes creative play and gross-motor skills. We really feel the new exhibit developed meets the goals we set out to accomplish (and it also happens to be very popular with our visitors!). And while we are proud of the space, we are also very proud of the unexpected results. The involvement of the entire staff led to a sense of pride and ownership in the new exhibit. The involvement of visitors in evaluation and prototyping gave us the opportunity to explain our design process and collect valuable visitor feedback. The observation process helped us learn how to develop useful evaluation tools and gave us practice in the area of naturalistic observation and interviewing. Most importantly, it fostered an ongoing dialogue and created a viable exhibit design model which we continue to use today.

# **Vignette 3**: Playing with Turtles: Seamless Collaboration to Enhance Visitor Engagement at Live Animal Displays

Betsy Loring, Director of Exhibits, EcoTarium

## Extended, Blended Collaboration

The story of developing live animal-based interactive involves every mode of peer professional development available to the EcoTarium through the Exhibit Lab project: outside expert-led workshops, web-conference brainstorms, staff exchanges (both as a visitor and as a host), internal cross-department work, and two-day workshop meetings. In virtually every instance, our peers took lessons from our work and applied it back to the next iteration of their work. This, in turn, would often yield results that would feed back to the next iteration of the EcoTarium's prototype. In the end it became virtually impossible to "unpack" where "our" interactive ended and a partner's began - the ideas developed and flowed back and forth between the institutions. I will focus here on the various EEC meetings that moved the project forward.

Relationships: a goal of Exhibit Lab was to create a "distributed exhibit department" or a community of practitioners. This vignette shows how ideas and innovations developed in this environment, and in ways that would be unlikely within a one- or two-person department at a small museum.

## Background

Throughout the course of the Exhibit Lab project, the EcoTarium has had an on-going interest in increasing visitor engagement with its displays of live animals, especially in increasing visitor's use of science process skills (aka. science practices). Research has shown that while live animal displays are often attractive to visitors, stay times are often disappointingly short, and, perhaps worse, analysis of conversations often shows a fairly superficial level of observations being made and limited use of other science process skills. We were curious if this could be changed though the addition of interactive exhibit elements that could allow people to engage with the animals in safe and illuminating ways.

The work with live animals builds on the work of EEC's original project director, Alexander Goldowsky, in which visitors' behavioral observations of live penguins was dramatically enhanced by the opportunity to interact with the birds (via a visitor-operated light that penguins could chase). The original idea was based on an "animal enrichment" activity designed to help increase the activity level of the penguins. By allowing the light to be controlled by visitors an interactive link was developed. Adding this simple element of interactivity increased visitors' stay times, but also increased their use of science process skills (such as posing questions, conducting small "experiments", making observations, etc.) We wanted to increase visitors' use of science process skills at our animal exhibits, so this penguin project served as inspiration for the EcoTarium to see if we could increase visitor engagement at our displays of live animals.

Open ended: Live animal exhibits are potentially open-ended visitors could theoretically observe any number of different characteristics or behaviors, and focus their observations to answer any number of potential questions. In practice, however, most visitors are not trained animal behaviorists and need some structure and background information to engage in science practice beyond making simple observations. The EcoTarium took on task of developing exhibits that could support visitors in the use of science process skills (as a proxy for open-ended engagement) at its animal exhibits

However, the potential for failure in animal-based interactions high. Contributing to the risk are:

>> Technical issues need to be worked out on two ends: the visitor interface and the animal interface, so the opportunities to fail occur on both ends.

>> The fragility of live animals necessitates significant coordination with Wildlife staff and very close monitoring of all prototypes for signs of animal stress or endangerment. However, existing demands on the Wildlife Department's time means that coordination was difficult on the logistical level.

>> Animal behavior is variable and unpredictable, and can include bouts of behavior –like sleeping and basking - that visitors don't automatically find engaging. Also, animals can become habituated to a novel objects and stimuli, so enrichment activities that work once, may not work on an ongoing basis.

To mitigate that risk, the EcoTarium decided to pursue multiple prototypes with multiple animal species simultaneously. In addition, two of our museum partners –ECHO and the Children's Museum & Theatre of Maine (CMTM) –also have live animal displays and had similar interests in increasing visitor engagement, so we knew that using the Exhibit Lab project for this line of inquiry would give us multiple partners in brainstorming and problem-solving as well as multiple beneficiaries from any progress we made.

The EcoTarium team pursued two general "themes" in our prototypes: 1) enrichment-based interactives (essentially "toys" for the animals that could be manipulated by visitors) and 2) data-gathering interactives, especially around observation of animal behavior. As described below, we tested multiple iterations of enrichment-based interactives at our fox, ferret, and otter exhibits and at two different turtle exhibits. The three mammal interactives encountered different logistical issues and were ultimately put aside, with the strong potential for revival of two of the three as public programs using the equipment used in the prototypes under the direction of a staff member. (And, in work subsequent to this article, the enrichment-based interactive is currently being pursued by the EcoTarium with live rats in its City Science exhibit.)As we narrowed the exhibit options down, we ultimately focused on our turtle interactives, which had the added advantage that both ECHO and CMTM had live turtles.

Real Work/Complimentary institutions: Three of the four EEC organizations have live animal collections (and the fourth was expanding programming in the area of biological science). This common interest was critical to making the topic relevant for multiple institutions, even if it was not the top priority for all the institutions. However, all the institutions also had quite different approaches to the interpretation of their living collections, as the following paragraphs show. If all the institutions had the same interpretive strategies it is unlikely the prototypes would have received as much positive criticism and critique.

Relationships: Interestingly, the turtle interactive prototypes suffered from some of the same hurdles as the mammal-based interactives (such as animals sleeping), which leads to the speculation that having the fresh perspective and the infusion of energy from collaborative partners, along with a novel venue as a test site, could have been key to keeping this line of prototyping moving forward where the others got bogged down

Each of the three museums with live turtles had a different initial set of goals for their turtle exhibit:

>> ECHO, an institution with a strong conservation mission and messaging, hosts neonate turtles through a state "Head Start" program, which allows hatchling spiny softshell turtles (a state threatened species) to grow in captivity before being returned to the wild. The turtles had been housed in the animal care room, which has glass windows, but is not typically treated as an "exhibit" by visitors. ECHO moved to incorporate the neonate turtles into its new "Action Lab", a hybrid exhibit/program space. There goal was to increase visitor awareness of, and engagement with, the hatchlings in ways that were not occurring when the turtles were in the animal room. ECHO decided to try to have visitors to identify individual turtles and to record each turtle's behavior as a way to learn about turtle research.

>> CMTM has had a tank of three yellow-eared slider turtle for years. The tank is consistently popular with the museum's young visitors. Some general information and turtle puppets are available near the tank, but the focus is on fairly unmediated open-ended observation of the turtles. The museum had a general interest in capitalizing on children's attraction to turtles, and used this exhibit as part of some programs, but the exhibit was not one that the museum had any immediate plans to alter.

>> EcoTarium has several tanks with turtles on display in our Freshwater exhibit –a dated, but serviceable exhibit about various freshwater ecosystems and species. Interpretation consists of graphic panels with a focus on biological/ecological facts about the species and habitats. As with CMTM, there was no pressing need (or budget) to change the exhibits, but we had the already-stated desire to increase visitor engagement with the animals on exhibit with the hope of promoting more use of science process skills.

## Project Chronology

### Outside Expert-Led Workshop:

Work began on March 30 and 31, 2012, at a workshop led by Paul Orselli on rapid iterative prototyping. Because the workshop was hosted by the EcoTarium, we had the advantage of testing a prototype with our live animals. As mentioned above, we were focused on mammal exhibits, at this stage because we felt they were more likely to engage in play-based behavior. Thus, we tested an interactive in the museum with our ferrets, which proved extremely interesting to visitors.

Building on the early prototypes tried in the workshop, we pursued further enrichment-based interactives on our own between meetings: a ferret toy manipulated by visitors with a strong aquarium magnet; hidden squeakers operated remotely for the foxes, even a visitor-pumped air bubble "dispenser" for our otters. Through multiple iterations, we found visitors highly engaged and showing evidence of asking good questions and making interesting observations. Doing this work gave us the confidence to trust our own instincts. For instance, we found with the fox interactive that we needed to "violate" some of the family learning design rules of the PISEC project. We found that creating a multi-user interactive (multiple noise making stations) lead to visitors fighting over "taking turns". As soon as we reduced access to one user at a time, we saw a transformation in visitor conversation and behavior: now people were focused on the foxes and spoke as a cooperative team, discussing how to create different sounds and commenting on the animals' reaction.

Family learning/ Prototyping: the PISEC project was a major contribution to the informal learning and zoo field and gave the EcoTarium a valid starting point for its animal interactive designs. However, the lessons of prototyping and formative evaluation helped keep the focus on visitor learning, so that the group knew not to rest on a cookbook approach to designing for family engagement.

Ultimately, we found that a number of logistics, especially the animals' intermittent engagement, were stumbling blocks for stand-alone exhibits but we have taken many lessons about the user (human and animal) interface which we continue to apply to future plans. We have settled on a model of interactive-enhanced programs, in which training and enrichment devices are built into new animal exhibits, but are made available – to the animal and the visitor – during specific programs.

Prototyping: The project valued risk taking —and embraced the inherent possibility of failure. As the long string of misses and partial successes shows, the collaborative was successful in supporting projects that took far longer, and had far more iterations than anyone initially anticipated.

### Web-conference Brainstorms

During a subsequent web meeting with our partners, we reviewed our prototyping efforts, especially the roadblocks that we were hitting. Because outdoor exhibits face the added layer of complexity introduced by weather, we had an incentive to try interactives with our indoor animal displays, which included a significant number of turtles. Julie Silverman, Director of New from ECHO mentioned a book on animal play where she had read of a soft-shelled turtle which would play with a ball. Although the turtle mentioned was a different species that the one in our collection, this presented an intriguing possibility, which we started testing immediately, along side our continued work with ferrets.

### **Staff Exchange 1**: Hosting a Peer

In our first year of staff exchanges, we each hosted a peer from a partner museum and made a visit to a different partner museum. In September 2012, the EcoTarium hosted Denise LeBlanc, Director of Learning Experiences of the Discovery Museums. During her visit, we first tested and iterated two different interactive avenues with our ferrets, furthering the work we'd begun at Orselli's workshop.

Expanded reach: this is a classic case were the staff in a medium size museum can not possibly keep up to date on all the relevant research. Expanding our networks multiplies our access to information.

We tested the magnet-controlled ferret toy again with Denise, and though we eventually dropped the prototype as an exhibit for reasons stated above, we found enough visitor engagement to investigate other enrichment interactives. During the exchange we also tested several iterations of a data collection activity on ferret behavior, inspired by ECHO's turtle behavior data interactives. Having Denise "in the trenches" with us helped us feel that we had enough evidence to know that identifying individual ferrets was critical to recording interesting data, and was extremely difficult for all but a few visitors. Again, this helped us put this line of prototyping aside as an exhibit - at least with ferrets

Prototyping: as much as the participants managed to carve time to prototype on their own, they often found that the intensive prototyping in workshops and staff exchanges to be even more valuable. Having the extra set of eyes, ears, hands and a fresh mind generally accelerated the rate at which participants could get new, testable iterations in front of visitors.

Relationships: it can be very valuable to have a colleague who is familiar with a project —but not too close to it —to help with formative evaluation. Their perspective can break a log jam, or can tell you when its time to stop working on a prototype. As mentioned in Sullivan's vignette of the Mars rover, "the exhibits, not the process, should be open-ended".

During this same visit, we were also able to test versions of the enrichment-based interactives with our spiny soft shelled turtle. We purchased the brand of sturdy, buoyant balls that had been best received by ECHO's turtles, glued a rare earth magnet inside the ball, and gave visitors a strong aquarium magnet with which to manipulate the movement of the ball from out-side the tank. Like the ferrets, the turtle engaged readily and steadily with the ball, but with the advantage that the interaction was much easier for groups of visitors to see in the aquarium. Also, the concept of a turtle playing was a surprise to many visitors (and even staff).We had steady crowds of visitors, some staying for as long as twenty minutes.

**Staff Exchange 2:** Visiting a peer

During the second exchange, I visited ECHO where we focused our work on ECHO's turtle interactives. While ECHO was pursuing a different direction for their interactives, the lessons learned had a direct impact on the paths we followed with EcoTarium's prototypes. For example, ECHO was interested in having visitors collect data on individual turtles' behavior through-out the day. Their goal was to help visitors explore the notion of animal time and energy budgets and to give Animal Care staff information that could potentially be used to fine-tune turtle husbandry practices.

As a model for these behavioral observations, I had brought one of our prototype ferret behavior data sheets, which listed behaviors such as grooming, playing, eating, etc. Julie Silverman raised the question of whether visitors would agree with those names for behaviors and be able to recognize them. Accordingly we took a step back, and taking a page from Paul Orselli's advice to get out and test on the floor, we interviewed visitors in front of ECHO's large multi-species, naturalistic turtle exhibit to develop a visitor-generated list of observable behaviors. As an example, visitors were able to recognize "basking behavior" under the heat lamp, but asked to name the behavior, tended to use the equally accurate, but less technical, term "Sunbathing". ECHOS's multi-species tank offered opportunities to see many more behaviors in a shortened timeframe than any of the EcoTarium's tanks, so we could generate a comprehensive list of visitor-named behaviors very quickly. At the EcoTarium, we now incorporate this practice of asking visitors to define their own behavioral terms, thanks

to this exchange. We also took the step of adding illustrations of each behavior on the data sheets at ECHO to help younger visitors recognize a behavior, something that we now incorporate in visitor data collection activities when appropriate.

Complimentary institutions: ECHO happened to have an artist on their animal care staff, so getting behavioral sketches was quick and easy. Without serendipitous access to this skill set, this line of testing would have gotten bogged down in searches fro appropriate images – or dropped.

**Staff Exchange 3&4:** Reciprocal Visits

For the second round of staff exchanges in Summer 2013, the EcoTarium hosted Chris Sullivan, Director of Exhibits from the Children's Museum & Theatre of Maine (CMTM) and, two weeks later, Maureen McConnell (Team Leader of our Programs Department) and I visited CMTM. Again, both sessions moved our turtle prototypes forward.

By this time, the EcoTarium was testing turtle identification and behavior observation at our tank of three Blandings turtles. We experimented with several different keys to help visitors identity individuals (shell pattern, plastron markings, etc.) We were partially successful. Those visitors who could identify the individual animals, could easily move to the stage of identifying behaviors. However, it was difficult to get a high success rate across a broad majority of guests and ages with the first step of identifying the individual turtles. Because the prototype was being presented by another staff member, Chris and I could stand back to observe and to discuss our observations as things unfolded, something difficult to do when trying to do formative evaluation on one's own. Chris noted that we identified people by faces and wondered whether a turtle's face would be a more intuitive marker of identity.

We did not have time to test the facial recognition idea at EcoTarium, but picked up the work during our visit to CMTM. Working with their tank of yellow-eared sliders, we created a poster that illustrated each turtle's unique facial markings. During prototyping we found that it was difficult to get visitors to refer to the poster, much less make the translation to the live animal. Again, with the chance to stand back and reflect as the session unfolded, I noticed the turtle finger puppets that CMTM had around the tank. I suggested that it would be interesting to paint the faces of the puppets to match each individual in the tank. We tested this idea immediately, using plastic turtle models the museum had on hand, and had near immediate success. Visitors were handed a turtle, and asked to find that individual turtle in the tank. From there, the majority of visitors would turn to the previously-ignored poster to find out the name of the turtle in their hands, and then turn back to the tank to discover what "Kite" or "Carrot-top" was doing. What had been a tank of generic turtles was now a home for identifiable individuals, each engaged in a different activity to be observed and commented upon.

Back at the EcoTarium, as we continue to move forward developing a suite of animal identification and behavior observation programs and interactives, we have incorporated elements from each of these peer-to-peer working sessions. The turtle identification activity using models has been incorporated into the regular rotation of public programs. And as the EcoTarium moves into a capital campaign, we are incorporating animal interactive exhibit/program hybrids into the designs of new animal exhibits. For instance, the most extensive and successful prototyping has been with live rats for our in-design City Science exhibit. The design of the permanent rat enclosure includes a visitor-operated training device. To prevent habituation (or over-feeding) the device will be hidden except when unlocked by staff. But the permanent installation of this exhibit/program hybrid ensures far more frequent use by a wider variety of staff and volunteers, thus greatly increasing our capacity for frequent animal-based programs.

We are using this as a prototype for similar interactive devices to be incorporated into several planned outdoor, multi-species animal enclosures on the museum grounds.

Real work: The EcoTarium has a number of new animal exhibits planned in its future and so has a vested interest in continuing to pursue this difficult line of interactives, with much more experience under its belt and with a ready-made pool of peer consultants.

Each of our partners has also taken elements that originated here back to their institutions. The Children's Museum & Theatre of Maine is has incorporated the facial markings animal identification tags on the turtle tanks. ECHO used the opportunity when it hosted the June 2014 Exhibit Lab meeting, of asking the group to offer a variety of potential remediation avenues for its new Action Lab turtle tank to continue to increase visitor engagement. Although our products (exhibits and programs) often look quite different at each institution, it has become nearly impossible to tease out who has contributed which part of those products. They are all truly the outcome of collaboration.

## **Vignette 4**: Preschool Educators Save Science Geek from the Volcano

Julie A. Silverman, Director of New, ECHO Lake Aquarium and Science Center

ECHO has been a part of the EEC and X-Lab [Exhibit Lab] collaborative project since the start of the project, and while the collaboration continues to change as the needs of the organizations change, the collaborative has expanded to support almost every aspect our institution. ECHO engaged more staff in visiting and working with other institutions and in thinking about new exhibit and program design than ever before in the history of the institution! But the single most transformative part of Exhibit Lab was our three-day staff exchanges.

In preparation for ECHO's plans to reimagine our early learning Discovery Place area, my intensive three-day staff exchanges specifically focused on working with our two children's museum partners, the Children's Museum &Theatre of Maine and The Discovery Museums. While every EEC exchange helped move my personal and our institutional learning about open-ended investigations, prototyping, family learning, and formative evaluation forward, my time spent working 'hand-in-hand' with early learning educators really moved me out of my science content comfort zone. This upending experience challenged many of my assumptions about play and preschool learning. Lessons from the preschool exchanges also rippled throughout ECHO but are having the most tangible impact on the development of ECHO's new Discovery Place exhibit area and early learning program design.

Relationships: Staff exchanges were built into the Exhibit Lab grant as a way to increase staff interaction, share expertise and provide an additional avenue for providing support and critique on projects. The success of doing focused work together over multiple days during EEC 1 prompted the collaborative to increase the time spent in each other's institutions via formal staff exchanges during Exhibit Lab ("EEC 2".) This vignette highlights a number of powerful professional development experiences born out of these exchanges.

Real Issues: The learning described in the next paragraphs is stated in big-picture, theoretical terms. However, as the vignette describes, this learning emerged out of problem-solving in the context of a concrete project being undertaken by the museum. This focus on real issues as a basis for professional development was a key part of the design of the Exhibit Lab project.

Several big ideas emerged, or reemerged in some cases, from my time spent immersed in the early learning world. The first is the idea of novel vs. familiar experiences. Adults often seek out novel experiences for their personal growth and development. Traveling to new places is an example of this novel seeking behavior. Your brain is open to new sights, sounds, smells, and tastes making colors seem brighter, food taste better, and everything seems more memorable. As an exhibit developer/informal educator, I can capitalize on "the travel brain"to guide the development and design process of synthesizing complex topics, ideas, or phenomena to create unique ways to interpret information in an attractive, novel, and accessible way. The transformation or interpretation of information into new exhibits and programs is an exciting—and very self-indulgent—process for the developer, and the outcome often satisfies the experience needs of the adult audience. Unfortunately, this method of information dissemination often falls short for our youngest guests.

While novelty can be attractive, small children also find comfort in the familiar, thrive on repetition, seek out physical encounters, and find joy in mastery in supported activities. As Lev Vygotsky said, "What the child is able to do in collaboration today, he will be able to do independently tomorrow." This behavior is all developmentally appropriate behavior that I knew about from the education psychology classes I took in graduate school —but submerged under the "science content delivery" part of my brain.

By watching how my colleagues created opportunities through rigorous prototyping and evaluation for preschoolers to play with repetitious activities like rolling balls down ramps, building with blocks, and playing with scarves in fans, I began to understand the need for carefully crafting experiences that are not only open-ended but are on a continuum that spans a range from the familiar to the novel, and that support the learners as they grow and develop.

Open-ended: Although the entire group agreed on the project goals, this vignette points out that we each came to the goals with different levels of comfort and practical experience. The entire group devoted many conversations to defining "open-ended" experiences for our guests, a conversation greatly enriched by our different missions, and audiences.

Being complementary intuitions: this is one of several examples of how peer-to-peer learning in a familiar but different museum served as a powerful professional development opportunity. Observing theory being put into practice by colleagues can shape one's own thinking. Being immersed in the environment of another museum where there are different approaches and norms can foster new insight.

Exhibit development for early learners is not an either-or proposition between novel or familiar, it is more about how broad the learning continuum can be to engage multiple level learners with in the same exhibit or program experience. That said, ECHO primarily serves adults with children, so I have to also keep in mind that adults bring their children to science centers and children's museums. And, although early learners may not require a high level of unique and novel experiences, their parents do. This is the embedded design conundrum. During the design of the new Discovery Place a developmental continuum will be add it to our list of design criteria.

Family Learning: As the project continued, thinking about families during exhibit development became "more entrenched"(Appendix d). One of the key points to emerge was that there is no one right way for families to interact. The first Exhibit Lab workshop focused on the PISEC work. This was followed by a look at the ACII, which proved especially fruitful in helping participants to think about the different ways parents and children can interact, and how each family learning evaluation system has its value. The conversation shifted from the PISEC checklists, to the balances, and sometime competing options, for supporting different the types of caregiver/child interactions outlined in the ACII.

A second big "aha"moment was about prototyping and playing with ideas. The inquiry learning workshop had reawakened my desire to play with "stuff"first and research later. This jumpstart set me up for my early learning exchange experiences where my colleagues helped me start to break out of the "Volcano Science Fair Project"exhibit process. This formulaic process looks something like this: Step 1: pick a science topic—volcanos—from a list provided by others; Step 2: research everything you can about said topic; Step 3: make a visual display about what you learned about the topic; and Step 4: make a model of a said topic—a volcano that spews baking soda and vinegar all over, a very fun phenomena to watch at any age. This is a safe and predictable but not very inspiring process. That's not to say that reading and learning about science and other topics can't be exciting and that good exhibits and programs can't arise from deep research, but from my experience with my children's museum colleagues I learned that there is another way creating great experiences that starts with messing about with stuff—the process of science instead of the content of science.

Prototyping: the Final Evaluation (Appendix d) suggests that of the three goals for professional development, prototyping "became central to the collaboration". Starting from early "doubts that prototyping could become an institutional priority" it became "a more ordinary part of how each institution operated". This vignette focuses on very early stage prototyping —"messing about with stuff".

Instead of taking the deep dive into the science content, my colleagues showed me ways of engaging really young learners and their caregivers in more open-ended play and exploration with materials, imaginative play, and creative outdoor exploration. I really started to understand that they too view adults as a primary audience and that they work hard to gently shepherd and engage the adult caregivers through learning and discovery alongside their children. The educators shared with me that being a play and inquiry role model was equally important for the adults as it is for the child. This type of peer-to-peer discussions and on-the-floor behavior modeling with trusted and respected colleagues is invaluable professional development that you can't get at a conference. While on exchange we teamed-up and had "permission" to take risks and try new things together that we may have never done without the support of our partner. And we had a "partner in crime" from outside the institution to lend legitimacy to the tinkering and testing of a new idea or process.

Relationships: "Trusted" and "respected" were key words used to describe the sorts of long-term relationships developed in the collaborative. Staff exchanges proved extremely valuable in building relationships, for the sharing of expertise peer-to-peer, and for the opportunity of being able to play with new ideas with a supportive and equally curious partner.

The third important lesson I learned was about audience. When I first arrived at the Children's Museum and Theatre of Maine, I wondered how easy it would be to work in a children's museum where you don't have such a wide spectrum of different ages that you have to design for, you only have to design for young children and their caregivers. Then I started to look a little closer and noticed that they do segment their space design based on age but the range is a lot smaller than at a science center like ECHO. They have an area for kids under three while the rest of the building is for all ages, generally 3-9 years old. The Discovery Museums' Children's Building is entirely designed for toddlers through early grades and does not have a special place for pre-toddlers.

I realized ECHO needs to understand more about our Discovery Place audience and what they need. Who are ECHO's micro-markets? What is the need in our community for exhibit areas that should be dedicated to pre-crawlers, crawlers, toddlers, or preschoolers? How much space should we dedicate to each micro-market? Because of the exchange, I began to look around the country at different models for meeting early learner needs. From the Exploratorium, San Francisco, CA that does not have any separate early learning space in a massive over 300,000 square-feet facility to other children's museums such as Indianapolis and Phoenix that have large areas that are dedicated to 0-5 years of age while still others, further segment their audience and space design by the developmental needs of 0-1, 1-3, 3-4 and 5+ years olds, the options are endless. I now have more questions about designing for early learning audiences than I have answers. I wonder for a relatively small—approximately 30,000 square-feet—institution like ECHO, what's the right size space for our community?

Extended Reach: Not only could Silverman call on her own experiences visiting different museums around the country, but she has the collective experience (and photos) of the rest of the EEC group, vastly expanding the number of existing examples of successful early learner spaces that ECHO can draw inspiration from. In fact group discussions frequently veered towards our different experiences as visitors to other museums around the country.

And finally, not only has my time spent with early learning experts influenced my approach to redesigning ECHO's Discovery Place but it has also affected the way I think about staff collaboration and leadership. Lessons learned from spending invaluable time immersed in children's museums include: engage staff early and often, they may need your guidance and not even know it; encouraged curiosity and personal passions—no matter how obscure, you never know where they may lead; take risks with trusted friends, they will help you up when you fall; take play seriously, it is good for everyone's development and growth; guide with a smile and gentle touch; and share lots of food and laughs together.

## **Vignette 5**: The Air Play Room and other Exhibit Lab Influences

Denise LeBlanc, Director of Learning Experiences

The Discovery Museums (TDM) were not part of the first years of the EEC collaborative but joined the EcoTarium, ECHO Lake Aquarium and Science Center (ECHO), and the Children's Museum & Theatre of Maine (CMTM) when the IMLS Exhibit Lab (Exhibit Lab) collaborative project began in the fall of 2011. The beginning of Exhibit Lab coincided with TDM's plans to design a new theme room – Air Play. Air Play is a 250 sq. ft. space now open in our Children's building, and includes several interactive exhibits that encourage young children and their families to experiment with moving air in different ways – air that blows and pushes, like the wind; or air flow that pulls things in, like a vacuum. Through these experiences children discover cause and effect relationships and compare and contrast the behavior of different objects.

Real Work: The structure of Exhibit Lab was based on working with exhibit development projects that were already on the exhibit calendar, not adding additional projects. Practically, this meant that the institutions had already committed staff time and money to implementing the projects. Exhibit Lab could add resources to take a project that was already an institutional priority and turn it into an opportunity to strengthen staff skills and enrich the offerings they can provide to their visitors.

The primary audience for Air Play is toddlers and preschoolers, their parents, and caregivers. For many years TDM has wanted to engage adults more explicitly in the museum experience by designing exhibits and environments that encourage adult and child interactions. Family learning is a key goal of the Exhibit Lab project and very timely and relevant for TDM. As described here the entire process of developing our Air Play exhibition benefited from the many facets of the Exhibit Lab collaboration.

Family learning: Early in the project, the staff of TDM made clear that they wanted to use Air Play as their test for more deliberately engaging adults in their exhibits.

The Exhibit Lab resources and collaboration with EEC colleagues enabled the TDM team to develop stronger research, design, prototyping, and evaluation methods for this important TDM project. TDM has always had strong design criteria and guidelines for its interactive exhibits, but as a medium size museum, few staff can attend conferences and workshops. Exhibit Lab made it possible for TDM staff to collaborate with colleagues, and participate in workshops that focused on prototyping and evaluation practices that work best for museums of our size.

In the fall of 2011 TDM assembled an Exhibit Lab team that includes the CEO, education and exhibit staff. After the first year we added visitor experiences staff to this team. This internal team met weekly to report on progress, plan next steps, and to insure that we incorporated best prototyping and evaluation practices throughout our design process. Early in the project we brainstormed with our EEC colleagues on possible design elements for Air Play and we visited relevant exhibits at CMTM during Exhibit Lab workshops. At rapid prototyping workshop led by Paul Orselli at the EcoTarium in March 2012 each EEC team created or brought proto-types to test. TDM's team brought materials for Air Play. We also borrowed materials, including a Dyson bladeless fan, from our EEC partners.

Expanded reach: Shared resources can help make prototyping doable and affordable. In this case borrowing a $200 fan helped the team move forward on a prototype. This culture of loaning expensive items became a regular occurrence and included: a robotic ball and gutter cleaner, temporary wall systems samples, and a live-capture Spin Browser. Perhaps the most dramatic of these was a $5000 infrared camera loaned by TDM to the EcoTarium and ECHO for a few weeks. This gave the EcoTarium experience to make a convincing case for an IR camera in a successful exhibit grant to the National Science Foundation.

During the workshop, with advice and guidance from Paul Orselli and EEC colleagues we created two prototypes that we tested with EcoTarium visitors. Observations, reflection, group debriefing, and discussion were important elements of the experience.

Inspired and informed by the tests of our first Air Play prototypes, our team designed new prototypes to assess at TDM during the summer and fall of 2012. We challenged ourselves to test things with our visitors, rather than merely speculate about what materials to use, or what the physical size, shape, and arrangement of components should be. The staff exchange with the exhibit director from CMTM that summer was critical to this process. His visit to TDM was a focused time for our team to do rapid exhibit prototyping and testing of materials. With his help we were able to set up a cardboard and duct-taped air table prototype in the Museum for visitors to test. We were able to quickly try ideas, observe visitors, and rapidly modify the prototype. In a short time we were able to test many design options and materials – while insuring the safety of our visitors by having many hands and eyes overseeing our sometimes rickety set ups.

Complementary institutions: Because CMTM has an air tube room (albeit in a much larger room), this exchange brought TDM an additional element of practical, directly-relevant experience, perhaps more so than any other exchange in the project.

This intensive testing during the staff exchange provided independent peer review and informed the next generation of prototypes for Air Play. With sturdier air table and twisty tube components we gathered feedback from our early education and accessibility advisors, and we did formal evaluation with our visitors. Using evaluation tools developed with EEC partners, TDM did onsite Naturalistic Observations and Interviews, and sent Post-Evaluation Questionnaires home with adults who came with children to the prototyping sessions. These evaluation tools had been introduced at our workshop at ECHO and modified by CMTM. CMTM's example and encouragement was an important factor in our implementation. This formative evaluation led to additional changes in design and materials. Suggestions from visitors and colleagues also helped identify which experiences and materials were most engaging.

Prototyping: TDM adapted evaluation tools that were introduced by another institution, and were later modified by still other members of the collaborative. As each partner museum borrows, adapts, and then shares a tool or resource, the idea of the group as a resource for professional learning becomes more embedded.

In the fall of 2012 TDM hosted the 2-day Exhibit Lab workshops. These workshops included time for EEC colleagues to do very open-ended experimentation with fans, blowers, and mate-rials. It also included time for all of our gathered EEC colleagues to observe TDM's visitors using several of our Air Play prototypes on the exhibit floor. This experimentation and the visitor observations not only informed TDM's exhibit designs, but it also inspired additional potential exhibit ideas for our EEC colleagues. Design modifications and evaluation of Air Play continued through the fall as components were being developed. In the spring the interactive components (Air Table, Twisty Tubes, Windy Corner, and Shimmery Wall) were fabricated. Air Play was installed at TDM in June 2013, but the Exhibit Lab process continued!

In September of 2013 TDM hosted 2-day Exhibit Lab workshops led by Exploratorium exhibit and evaluation staff. The workshops focused on identifying exhibit phenomena, characteristics, and features that encourage visitors to have Active Prolonged Engagement with an exhibit. During these workshops EEC colleagues also observed visitors in the Air Play Room. EEC colleagues reported on their observations.

Open-ended investigations: The Exploratorium workshop came fairly late in the project, after the group had devoted many conversations to practical ways to increase the open-endedness of exhibits. Yet, the workshop showed that the group could review a number of "finished' exhibits and brainstorm small, do-able modifications that could greatly increase longer, thoughtful engagement and science process skills - an important lesson for all to take home.

They identified successful features and suggested modifications that could improve the visitor experience, foster active prolonged engagement, and encourage more adult-child interactions.

This respectful and professional praise and critique highlights that both exhibit design and the visitor experience benefit from ongoing observation and evaluation - even when the exhibit is installed and 'finished'. TDM's Air Play project had EEC peer support and critique throughout the entire design process – initial concept brainstorming, prototyping, formative evaluation, and beyond. The processes we practiced and applied to Air Play were beneficial to that project and they have informed the other Exhibit Lab exhibit projects that TDM has worked on in years two and three.

Relationships: The group had developed enough trust and enough understanding of each museum's culture, visitors and goals that we could accept – even solicit – critiques that push us to continue to improve the experiences we offer our visitors.

Peer support and regular contact with our EEC colleagues through 2-day workshops, web calls, and staff exchanges has also been invaluable. But even as the Exhibit Lab grant is coming to a close TDM's team has incorporated new processes that support risk-taking and thoughtful innovation. This is evident in TDM's approach to a potentially "crazy" concept for a new theme room– nighttime outdoors. This idea for a 'dark room' could have been dismissed during brain-storming as much too scary for toddlers and preschoolers. But our experiences with Exhibit Lab gave us the confidence and skills to know that we should take the question to our visitors at this very early stage.

Our team quickly came up with an action plan. We darkened the potential exhibit room and added elements that we thought might be intriguing – a faux campfire, lanterns and bugs, hollow log to crawl through, and materials for shadow play. Preliminary tests were promising (rather than scary). TDM was inspired by CMTM's model of including all of their staff in their Operation Blue evaluation project, and so we recruited staff from all departments to further test the 'dark' concept. Despite busy schedules, many TDM staff signed up to help. With their help, we gathered more observations. The participating staff also gained a better understanding of the exhibit design and evaluation processes, and they now have valuable firsthand visitor stories. In several days of prototyping and observations we were able to determine that the surprise of darkness and flashlights engaged adults and children at the threshold. Adults often encouraged children to join in an imagined adventure, saying "Let's pretend . . ." They also shared camping and stargazing stories from their youth and even pretended to roast marshmallows with their children.

It is worth noting several other practices that have been adopted internally by TDM as a result of Exhibit Lab, and continue even after the X-lab [Exhibit Lab] funded activities have ended.

Since the outset of Exhibit Lab, TDM's team, which includes our CEO, exhibit, education, and visitor experiences staff, has met weekly. These regular meetings provide an infrastructure for sharing ideas, planning next steps, reporting progress, and working toward common goals. This institutional and interdepartmental commitment is valuable for TDM's team, and the meetings continue.

Also ongoing are the family learning workshops we have incorporated into our Explorer (floor staff) training. This workshop is based on the family learning workshops the EcoTarium developed for their staff. Their enthusiasm and the activities they suggested encouraged TDM to do family learning workshops as part of our trainings. Even though we have had turnover in our Visitor Experiences department, these workshops are ongoing.

Finally, as an outgrowth of our experiences prototyping, TDM has established regular prototyping through our 'Try It Out Tuesdays' public programs. During these programs we continue to test ideas for the backyard at night exhibit as well as other exhibit and program ideas. TDM education and exhibit staff can use this forum to explore new ideas, activities, and techniques with our members and visitors. Because of EEC's collegial support and honest sharing of successes and failures, TDM is a bit more comfortable with risk-taking, prototyping, and giving our-selves 'permission to fail'. As a learning organization we want to foster a culture of inquiry, exploring new ideas, and thinking 'out of the box'. By working as a supportive team and using thoughtful processes we can test our ideas to see if they are indeed 'out of the box' innovations, or just crazy ideas. Prototyping with our members and visitors informs our decisions and models inquiry learning, risk-taking, and creativity, as well as providing a popular program for our visitors.

## **Moving Forward:** Lasting Changes, New Challenges

As stated in the introduction the overarching goal of Exhibit Lab was to create the "intellectual critical mass" to help staff in small and mid-sized museums overcome the isolation that can inhibit innovation and professional development. We believe the vignettes above show that the project has succeeded on this front; the group has created a "virtual department"; a true Community of Practice.

This raises two other questions: 1) is there evidence that this shift is sustainable? and 2) can the collaborative model be expanded?

### Evidence of Sustainability

As recounted above, there have been internal cultural shifts in the participating museums. New habits of prototyping and practical formative evaluation have emerged: both formally, as in "Try it out Tuesdays" in the program and exhibit departments at the Discovery Museums or the new cross-department exhibit development teams at the Children's Museum & Theatre of Maine, and informally, as expressed by one participant: "[one unexpected outcome has been] the number of times that the [ECHO] staff uses the word 'Prototype' across departments - I've heard Marketing use it, Education uses it for programs, Animal Care has used it, even Events [Department]". As evidenced by how often the writers above use phases like "these workshops are on-going" and "many lessons … which we continue to apply to future plans", the participants' comfort with their new skills help ensure that these shifts are becoming "baked in" to everyday practice.

Another remarkable sign sustainability is the endurance of EEC in the face of staff and institutional turn-over. Between 2004 and 2014, the collaborative has gained and lost member institutions. Two of the three founding museums remain, and new institutions were "courted" and brought on board to maintain a membership of three, then four, museums. (The two departures were amicable and due to changing institutional priorities.) It has held together through gaps in funding (and rejected grant proposals), three changes in Executive Directors, a change in Project Director, and too many staff changes to count. Over the course of the three year Exhibit Lab project, forty-three staff members have participated in Exhibit Lab group meetings and workshops, with a typical meeting attendance of about twelve. Throughout these changes, the collaborative has maintained a culture of respectful peer critique, deep conversations about practically applying theory to practice (to the point of requesting pre-workshop reading "homework"), strong social bonds on all levels, and a commitment to the group and its work from the very top of each museum.

Further, the EEC has been cited by several participants as a significant (often surprising) resource for participants when they faced career transition. In the words of a new museum director, writing about unexpected benefits of the Exhibit Lab project, "Perhaps most importantly, participation in the IMLS collaborative has personally allowed me to develop close relationships with the staff at the partner institutions-particularly the other directors." Another transition occurred when Goldowsky left the EcoTarium, and Loring was subsequently named to the same role (at the museum and in the Exhibit Lab project), coincidently during a staff exchange. As stated in a journal entry at the time: "The role of staff exchanges and peer support in my development as a manager was a huge side benefit…No career counselor could have offered such perfectly custom support, nor would they have had my deepest trust."

## Going Forward: Expanding the Model

The EEC museums continue to find ways to collaborate outside the confines of the Exhibit Lab project. Three of the four museums have purchased and now share a small traveling exhibit. And as mentioned above under "Project Evolution", two of the partners have found roles for the partner museums as peer reviewers or evaluators in other grant-funded projects.

The group is currently doing the groundwork to expand the focus of the collaborative to other departments in the museums. The goal will be to use the original core EEC participants as a cohort of peer coaches to bring prototyping, testing, and evaluation to other museum departments. By creating cohorts of front-line staff (visitor services, floor staff, etc.) and of institutional advancement and stakeholder relations staff (development, membership, etc.) the collaborative seeks to create the same Community of Practice in the staff who are often less familiar with best museum practices and current theory.

While we feel EEC and the Exhibit Lab project hold many transferable lessons for other collaborative museum projects, further testing the model ourselves outside of the exhibit and program realm should yield yet more lessons for the field.

# Appendices

# Collaborative Structures:
## Many Ways, Common Paths

*by Alexander Goldowsky Ed.D. and Betsy Loring*

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***If you would like to comment on this article or others in this issue, please log on to the NAME listserv at http://groups.yahoo.com/group/NAME-AAM/.***

Not all happy collaborations are alike. After years of coordinating the Environmental Exhibit Collaborative (EEC), the authors have researched a range of other exhibit collaborative models. While each project may be unique, we found it useful to make some basic classifications; groupings that reflect the role that each partner plays in the collaborative structure. Is one model best? It depends on the participants, their goals and capacities.

As Pearson points out in the accompanying article (2012) starting or joining an exhibition collaborative is a major strategic decision. Time, money and the quality of exhibitions in your museum, not to mention staff sanity, are all at stake. At the outset it is worth reflecting on the range of approaches that have been tried. In thinking about the models in the table below, or a new model, you might start by asking the following questions:

- Do the member institutions have roughly equal roles—or are roles purposely asymmetrical (e.g. hub and spoke models)?
- What roles are centralized? Even in a group of "equal" partners someone has to keep track of schedules and accounts.
- What structures are in place to maintain quality, and how are decisions made so as to insure products work for all members?
- Is each museum responsible for developing a whole exhibition (e.g. Build and Swap models) or is it a shared task (e.g. Collaborative Development)?
- Are staff development and capacity-building explicit goals in addition to developing exhibits?

This table is not intended to be definitive in terms of the classifications or examples used. We present it as an outgrowth of the research we did in setting up and running an exhibition collaborative, and as a starting point for dialog. We would welcome hearing about other examples, ideas, and experiences.

**Exhibit Collaborative Structure Examples***

| Exhibit Development Model | Examples | Notes |
|---|---|---|
| **Hire Out:** Exhibitions developed, designed, and built by outside contractor, overseen by staff of the small and mid-sized member museums. | **Arkansas Discovery Network**-Round 1; **Oklahoma Museum Network**-Round 2 | Funded to provide access to quality traveling exhibitions for members and increase expertise in exhibit development for member museums with varying levels of experience in this area. |

**** In addition to collaborative and exhibition websites, where available, this chart is based on: Coats (1994); Dierking (1997); Pacific Science Center (1997); Aloia, G.F. (2003); Carroll, et al. (2005); Trautmann, et al. (2005); St. John (2008); Dianne LaFollette, Network Coordinator Arkansas Discovery Network, personal communication, Sept.10 & 23, 2009; Sherry Marshall, Director, Oklahoma Museum Network, personal communication, Oct. 1 & 5, 2009, Feb. 1, 2012 and the authors' personal experience with EEC and Exhibit Lab.***

## Exhibit Collaborative Structure Examples*

| Exhibit Development Model | Examples | Notes |
|---|---|---|
| **Buy Turnkey Components:** Each small or mid-sized museum selects off-the-shelf exhibit elements to illustrate a theme, and then creates a storyline and graphic elements to unify. | **Arkansas Discovery Network**-Round 2;<br>**Oklahoma Museum Network**-Round 1 | Same institutions, funding and goals as above. Working with the funder, each collaborative decided to adopt aspects of the other model in the second round of funding, to take advantage of the different benefits the respective models provided. |
| **Build and Swap:** Museum members share resources for each to develop separate exhibitions. Exhibitions then travel to each partner. | **SMEC:** Science Museum Exhibit Collaborative;<br>**ERC:** Exhibit Research Collaborative;<br>**YMEC:** Youth Museum Exhibit Collaborative;<br>**SCC**: Science Carnival Consortium;<br>**TEAMS 1:** Traveling Exhibits at Museums of Science | Designed to provide structures for sharing exhibitions among institutions with similar exhibit needs and of generally similar experience in exhibit development and production. Each collaborative has a different business agreement and operational policy for sharing resources (i.e. grants, dues, fee based), and for insuring that common interests, tour schedules, and quality standards are established and maintained. |
| **Build a Copy for the Group:** Exhibition created by one museum. A copy of the exhibition is fabricated for travel to members of the collaborative. | *Flip It, Fold It* by the Museum of Life and Science for **North Carolina Grassroots Collaborative;** *Magic School Bus Kicks up a Storm* by Children's Museum of Houston for the **Magic School Bus Collaborative** and **YMEC** | Mechanisms for sharing an exhibition originating at one museum (which may have more exhibition development capacity, or targeted funding) with other collaborating museums with common interests and exhibition needs. |
| **Partner, Build and Swap:** TEAMS 1 "veteran" museums partner with a single "new" museum; each pair collaboratively develops and builds an exhibition. Exhibitions travel to all partners. | **TEAMS 2;**<br>**TEAMS 3** | Based on an evolving collaboration, this model brought in partner museums with less exhibit development capacity. The emphasis on staff development and research increased. |
| **Hub and Spoke:** Exhibit elements developed and built by a lead museum. Partner museums subscribe to receive exhibits and professional development. | **ExNET:** Exploratorium Network for Exhibit-based Teaching;<br>**TexNET:** Texas Network for Exhibit-based Learning and Teaching;<br>**SMRC:** Small Museum Research Collaborative | Structures designed to allow dissemination of exhibits and professional development from a large lead institution to partners (generally smaller and/or new museums). |
| **Topic Specific:** Multiple organizations oversee the development of a topic-specific traveling exhibition. | *Seasons of Change* for the **Northeast Science Center Collaborative;**<br>*What About AIDS?* for **NAEC:** National AIDS Exhibit Consortium;<br>*Wild Midwest Weather* for **SPARC** Collaborative | Partnership is driven by mutual topical interest. Role of partners may be asymmetrical based on exhibition development capacity, etc. |
| **Collective Development:** Partner museums work together to jointly develop and produce exhibitions, which travel to different partner museums (EEC); or collaboratively develop permanent exhibit components installed in multiple partner museums (Exhibit Lab). | **EEC** (Environmental Exhibit Collaborative);<br>**Exhibit Lab** (a project of EEC). | Designed to divide the work involved in producing a traveling exhibition (EEC) to make this task manageable for small and mid-sized museums; Exhibit Lab focuses emphasis on staff development though collaborative work on permanent exhibit components. |

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# Greater Than its Parts:
## Exhibition Collaborations for Small Museums

*by Paul Pearson*

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***If you would like to comment on this article or others in this issue, please log on to the NAME listserv at http://groups.yahoo.com/group/NAME-AAM/.***

*You can't always get what you want*
*But if you try sometimes, well you just might find you get what you need.*
(Jagger & Richards, 1969)

Partnerships and collaborations between multiple organizations are among the most difficult and thorniest activities contemporary museums attempt on a regular basis. In a world where conversation and consensus are standard procedure, it is tough enough for members of a single organization, however clear its mission, to agree among themselves on strategy and implementation of necessary projects. This article explores why some small museums opt into complex partnerships for creating and disseminating interactive traveling exhibitions for family audiences. And why some opt out.

Most museums use external services or academic partners in the development and manufacture of significant exhibition projects. Topical affinities, complementary resources, funding opportunities and shared business objectives motivate many museums to form temporary partnerships with others to develop traveling exhibitions on a project-by-project basis. Some institutions have accumulated impressive rosters of products for rent in this way. Collaborations take many forms. The accompanying brief by Alexander Goldowsky and Betsy Loring of the EcoTarium succinctly describes a range of collaborative models organized to produce and share exhibitions. (Goldowsky and Loring, 2012).

I focused on long-term exhibition collaboratives involving four or more small-to mid-sized museums as equal partners. Three such entities, Youth Museum Exhibit Collaborative (YMEC), Environmental Exhibit Collaborative (EEC), and Traveling Exhibits at Museums of Science (TEAMS) are variants of partnerships that Goldowsky and Loring classify as either "Build and Swap" or "Collective Development" collaborations. I spoke with several senior managers intimately involved with overseeing their museum's participation in these collaborative partnerships to understand if there was a common rationale for undertaking collaborations and if these strategic goals were borne out by their experience.

- What were the leaders' assumptions going in?
- What factors were important to their decisions to participate?
- Did the goals and structure of the collaborative change over time?
- Who would ultimately benefit from the collaboration?

### The Need for Change on the Floor

Perhaps the most compelling factor motivating leaders to consider traveling exhibition partnerships was the perceived need for frequent change on their exhibition floors. Program decision makers shared a consistent understanding that their audiences appreciated new experiences to complement their continuing engagement with "old favorites" at their institutions. By the time Boston Children's Museum was contemplating joining YMEC in 2002, it had already initiated an independent


*Members of the Environmental Exhibit Collaborative (EEC) working with prototypes during a development meeting for the traveling exhibition Tree Houses. Photo by Don Biehl, courtesy of Ecotarium, Worcester, MA.*

traveling exhibition program and a space for visiting exhibitions. Neil H. Gordon, then Boston's Chief Operating Officer, was attracted to YMEC as an "affordable alternative to rentals that would provide audiences with something fresh to spark their curiosity and reinforce the value of regular visits." When I asked several leaders if the same objective could be accomplished by renting any of the hundreds of exhibitions available through the dozens of well-known traveling exhibition clearinghouses, their responses were strikingly similar. Managers were frustrated with the options available for smaller museums on the open market. David Goudy, Executive Director of Montshire Museum of Science in Norwich, VT, and a founding member of the TEAMS exhibit collaborative, said:

> Before TEAMS, our museums were essentially consumers of traveling exhibitions. We found that very few affordable, high quality rentals were available for smaller museums with limited budgets and limited space. Popular blockbusters are too expensive and too big. TEAMS was formed in 1996, in part, as a response to the thinness of the marketplace at that time.

**Supporting Family Learning**

Aggressively promoted visiting exhibitions may stimulate interest among potential new audiences but, surprisingly, none of the interviewees felt that driving attendance was a high-level objective for collaboration. Leaders were more concerned with providing quality experiences for visitors as a primary outcome. Gail Ringel, Vice President, Exhibits at Boston Children's Museum, who serves on the YMEC board of directors, related a recent encounter:

> I was in our featured exhibit's gallery recently to check out one of our YMEC exhibitions and came across a young mother busily playing with her two children. I asked if they'd seen the previous (non-YMEC) visiting exhibition, an expensive blockbuster based on a perennially popular motion picture, she said: "Yes, we enjoyed that, but this one is so much better!"

The mother's preferred exhibition, *Building Brainstorm*, developed by the Brooklyn Children's Museum expressly for YMEC, features no media superstars and no characters from popular children's books or fantasy films. Its theme investigates the comparatively prosaic subjects of architecture and interior design, yet it is done in a way that invites and rewards prolonged engagement. Ringel concluded, "YMEC exhibitions are produced by organizations that understand how children and families operate in a museum environment. The exhibitions are subject to rigorous peer review by museum professionals with a real stake in their success." Neil Gordon

I focused on long-term exhibition collaboratives involving four or more small- to mid-sized museums as equal partners.

*Overview of the completed* Tree Houses *exhibition on display at the EcoTarium. The exhibition is now toured by Sciencenter, Ithica, NY. Photograph by Don Biehl, courtesy of Ecotarium, Worcester, MA.*

*(continued from page 9)*

addressed a key assumption that is helpful in understanding why hosting blockbuster exhibitions is not a critical audience development strategy for many small museums: "Most people don't visit children's museums to see something specific. Families' objectives for visiting are more generally directed at having a positive social experience around exploring and learning together."

Perhaps the most compelling factor motivating leaders to consider traveling exhibition partnerships was the perceived need for frequent change on their exhibition floors.

## Value Added: Varying Business Models

### *The Economic Benefits of Collaboration*

Several of the leaders felt that the economics of collaboration made sense for them. Ringel explained:

> YMEC continues to be part of our strategic effort to engage audiences with a variety of themes and new perspectives, something that is difficult for a museum to do by itself. Fulfilling the need for predictable change in our galleries by sharing exhibitions is less expensive than renting.

Founded in 1990, YMEC has operated continually for 21 years and is now in its fifth round of exhibition development. YMEC members each pay annual dues of $35,000. Each member designs and builds one 1200sf exhibition per five-year round and receives production grants from YMEC totaling $120,000. Members use these grants to supplement their independent fundraising efforts. The exhibitions travel to each member on a staggered release schedule, and the collaborative pays for shipping and insurance. YMEC participants discovered that many independently rented traveling exhibitions of comparable quality, scale and interactivity, cost as much as $50,000 for a 12-week rental including shipping and insurance. Factoring in a member's dues and grant returns, the prorated cost to a member for one YMEC exhibition is about $9,000. Over a five-year period, then, YMEC members get $250,000 to $300,000 of rental value for less than $54,000 of net costs.

### *Attracting Resources*

The TEAMS collaboration adopted a different business model for its three, 4-year rounds of exhibition development. Charlie Trautmann of the Sciencenter of Ithaca, NY and Cynthia Yao of the Ann Arbor Hands-On Museum hatched the idea for TEAMS during a 1994 National Science Foundation proposal workshop in Washington, DC. They reckoned that a consortium of several smaller science centers could demonstrate broader impacts and exert greater leverage to gain funding for collective projects than through individual proposals. They enlisted three other museums with similar objectives: Catawba Science Center, Hickory, NC; Discovery Center Museum, Rockford, IL; and the Montshire Museum of Science, Norwich, VT. Their foundation strategy paid off with a large supporting grant from NSF's Informal Science Education unit and TEAMS became a functioning reality in 1996 (Trautman, St. John, Goudy et al., 2005).

…surprisingly, none of the interviewees felt that driving attendance was a high-level objective for collaboration. Leaders were more concerned with providing quality experiences for visitors as a primary outcome.

***Collective Development***

Like YMEC and TEAMS, EEC (Environmental Exhibit Collaborative) was founded by several small museums to create and share exhibitions among its membership. (EEC's founding members were: ECHO at the Leahy Center for Lake Champlain, Burlington, VT; EcoTarium, Worcester, MA; Squam Lakes Natural Sciences Center in New Hampshire; Children's Museum and Theatre of Maine in Portland; Museum of Science and Nature, Sherbrooke, Quebec) While YMEC derives its operational funding through member dues, the TEAMS and EEC partnerships support their strategic activities through shared foundation grants. EEC, however, has a very different production model. Alexander Goldowsky, Director of Exhibits and Education at EcoTarium, explained:

> The first iteration of EEC was structured around "collective development," where all members would work together on one exhibition at a time, rolling out an exhibition each year over a five-year cycle. Depending on their organizational competencies, individual members played different roles in the process, but all members contributed and learned through each phase of ideation, design, and production.

Although leaders agreed on the business efficacy of exhibition sharing partnerships, they also felt collaborations provided other significant strategic values to members.

**Intangible Benefits of Collaboration**

EEC has spawned a second iteration called Exhibit Lab that focuses even more purposely on creating a "community of practitioners" by working together to develop permanent exhibit components as part of the core learning environments on each member's floor. Exhibit Lab, now in the first of three planned years, has four participating museums including three of the original five EEC members: EcoTarium; ECHO Lake Aquarium and Science Center; and the Children's Museum & Theatre of Maine. Neil Gordon, now CEO of the Discovery Museums in Acton, MA, accepted EEC's invitation to join Exhibit Lab, in part, because of his previous experience with YMEC.

> Sure, the economics of sharing resources and products makes sense, but I was even more impressed with the value of collaborative process as a staff development tool. Exhibit Lab is a means for us to engage in a thoughtful discussion of what makes a great exhibit and offers an opportunity to test our ideas on the floor.

**The Challenge of Change**

Even with the benefits of collaboration, each of the partnerships featured in this article have experienced changes in membership between rounds. Contacts at museums which made the choice to leave said that their organizations had benefited from the collaboration and that deciding to exit had been difficult. At their time of departures, most of the museums had recently undergone changes in leadership, or were entering or emerging from major capital expansions. Demanding partnerships were no longer ideal fits with these organizations' new conditions. The Children's Museum of Houston (CMH), a longstanding YMEC stalwart, is a

*Constructing the "Great Wall" in* Children of Hangzhou: Connecting with China*, a YMEC exhibition from Boston Children's Museum. Courtesy of Boston Children's Museum.*

*(continued from page 11)*

case in point. Cheryl McCallum, CMH's Director of Education, offered insight into Houston's exit from the collaborative:

> YMEC allowed us to work closely for 15 years with leading children's museums. CMH built expertise as we learned how to build traveling exhibitions and keep them on tour. While we were gearing up for our expansion (completed in 2009) we developed new strategic objectives that reduced our need for YMEC exhibitions. Our *What's New?* temporary gallery is now a birthing ground for developing and testing new CMH exhibits that will help us meet our commitment for continually infusing fresh experiences for audiences throughout our building.

Tracing the evolution of TEAMS over its 12 years of operations reveals a commitment to mentorship, learning and growth as characteristic of successful long-term collaborations. TEAMS was initially structured to enable individual members to build and circulate exhibitions within the five-member collaborative. TEAMS 2 retained their production goals and intensified professional development activities around the theme of "Universal Design." Participation was also expanded with three new museum partners who were each paired with a veteran TEAMS member. TEAMS 3 added a substantial family learning research component aimed at "developing tools for science museums to use in fostering deeper conversations about science among children and adult visitors" (Trautman, St. John, Goudy et al., 2005, p. 6). TEAMS 3 concluded its work in 2009 when its leadership elected not to pursue continued funding. During our interview, David Goudy reflected the impact of the collaborative:

> The exhibitions that TEAMS created met most of our goals for enriching the visitor experience at our respective museums, but the most powerful product was building staff skills and organizational intelligence. TEAMS' real legacy was in increasing all our capacities to execute complex projects of increasing quality and potential to enhance science learning by our audiences.

A summary assessment of TEAMS by Inverness Research (2008) affirms the capacity building outcome of the collaborative:

> In the early rounds of TEAMS funding, TEAMS was often the main project that exhibit developers had on their plates. In the final round,

Whereas all the partnerships were initially focused on the tangible output of *producing and sharing exhibitions,* the ultimate desired outcome was *increasing family learning through exhibitions.*

> TEAMS was one of many projects that these museums were working on. As one director said: "TEAMS started the whole thing for us. If we hadn't had the TEAMS project, I don't think any of the other projects would have happened." (Inverness Research, et al., 2008, p. 16)

Viewed together, the EEC, TEAMS and YMEC experiences shed light on what may be the most critical strategic outcomes of the collaborations. Whereas all the partnerships were initially focused on the tangible output of *producing and sharing exhibitions,* the ultimate desired outcome was *increasing family learning through exhibitions*. The ancillary outcome necessary to make this happen was *increasing the capacity of exhibit practitioners and organizations* to produce high quality experiences. The key mechanism for building knowledge and organizational capacity is *the collaboration itself.* For small museums, the short term, physical outcomes (exhibitions) seem less important, certainly less enduring, than the shared learning potential generated through the powerful engine of collaboration.

The author thanks the following colleagues for their generous participation in the interviews that formed the core of this article:

Alexander Goldowsky, Director of Exhibits and Education, EcoTarium, Worcester, MA. http://www.ecotarium.org/

Neil Gordon, Chief Executive Officer, The Discovery Museums, Acton, MA. http://www.discoverymuseums.org/

David Goudy, Executive Director, Montshire Museum of Science in Norwich, VT. http://montshire.org/

Cheryl McCallum, Director of Education, Children's Museum of Houston, TX. http://www.cmhouston.org/

Gail Ringel, Vice President, Exhibits & Production, Boston Children's Museum, Boston, MA. http://www.bostonkids.org/

**References:**

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Jagger, M. and Richards, K. (1969). *You can't always get what you want,* from *Let it bleed*. Decca Records: London, UK.

Trautmann, C., St. John, M., & Goudy, D. (2005). *Teaming up: Ten years of the TEAMS exhibition collaborative*. http://informalscience.org/researches/Teaming%20Up%20e-book.pdf

**For further reading:**

For a detailed history and assessment of TEAMS, I highly recommend two fine papers that are publicly available online: Inverness Research: St. John, M., Carroll, B., Helms, J., Robles, D., Stelmah, L., (2008) *Lessons learned from the long-term investment in the TEAMS collaborative:* http://www.inverness-research.org/reports/2009-02-TEAMSIII-completefinal/2009-02_Rpt_TEAMSIII-LessonsLearnedFinal-2008-12.pdf

For information on the TEAMS and EEC exhibition rentals go to: http://www.sciencenter.org/exhibits/d/exhibition_rental_flyer.pdf

For information on the Youth Museum Exhibit Collaborative go to: http://www.bostonchildrensmuseum.org/ymec/

| | | | Comments & Questions | | | |
|---|---|---|---|---|---|---|
| Project | Theme/ Topic | Exhibit component | ECHO | EcoTarium | CMTM | Discovery |
| City Science | Engineering/physics | Designed to move: (Build and test a bridge or skyscraper. Which withstands the forces of wind and the weight of cars better?How can you improve your design?) | | | Our technology exhibit prototypes are also focused on being an engineer. For this we are continuing our work with our team of electrical engineers. | How could this be done differently from other places? Cardboard, large scale? |
| City Science | Land use/ fragmentation/urban& suburban ecology | • City hot zones: (Experiment with heat sensitive cameras to see the temperature effect of asphalt or a stand of trees; check the actual temperatures around the city. | | | | We have thermal cameras and handheld IR camera, resources, and activities |
| City Science | Land use/ fragmentation/urban& suburban ecology | • Let it rain: (Make it rain on a model city. Where does all the water go? Why does it act differently in different places?) | We're working on our outdoor rain garden | | The public works museum in Philidelphia has one of these, It uses beads to represent the water and shows how some go to river, other go into the ground, and some fall into a lake. | We have done many activities on watersheds, rain, pervious and impervious surfaces and groundwater. |
| City Science | Land use/ fragmentation/urban& suburban ecology | Magnetic neighborhood: (Design a healthy city street, using magnetic pieces. Post a picture of your design; tell us how living there would feel.) | | | the talk back / record part is really powerful. We are interested in doing this in our engineering exhibit. | |
| City Science | Animals - in-depth exploration | • Pigeon language: (Decipher pigeon communication. Study Worcester pigeons' social life and compare it to pigeons around the world.) | | | could this be a bigger conversation about comunication, sign language, or body language | would like to know more - could it also apply to squirrels and chipmunks? |
| City Science | Wild (non-captive) animals on property | • What comes out at night?: (Scroll through video from hidden cameras to see where city animals go and what they do when people aren't watching. | | | how does this push what you are doing in tour touch tank, or the spin browser in your new exhibit? | interested in trying on adjacent conservation land |
| Wildlife Trail | Wild (non-captive) animals on property | Radio/satellite collar/tag of animals living on property | | Scope of project/timing not finalized, but desire to enhance wild life trai to include interactives in new visitor shelters (semi-protected outdoor). | GMRI in Portland has a program where middleschoolers work on current reserch questions. They are working on "what is the most effective number of lobster traps to put out." | different squirrel populations? Grey, brown, and black? Chipmunks? |
| Wildlife Trail | Wild (non-captive) animals on property | Create artificial dens – rc tunnel cameras to watch animal activity | | | | *interested |
| Tidepool | | Other ways of interacting with animals in tanks | | Desire to increase number of interactives & more background graphics.Have not done a lot of specific brainstorming yet. | This seems to fit with our interests for testing more live exhibits. | |

NOTE:This is a sample page from one sheet of a comprehensive list of planned exhibit projects. Each museum created a list of projects, then commented on commonalities of each other museum's project list. Though a bit unwieldy, these lists framed the conversation which guided each museum's choice of exhibit prototypes to develop through the Exhibit Lab project. Prototyping projects were selected if they were of interest to at least one other museum, andcould benefit from the resources of the group and the project foci family learning, open-endedness, etc.)

# ENVIRONMENTAL EXHIBIT COLLABORATIVE (EEC) FINAL EVALUATION

This report, prepared by Randi Korn & Associates, Inc. (RK&A) presents evaluation findings for the final year of the Environmental Exhibit Collaborative (EEC)—made up of the EcoTarium, The Discovery Museum (TDM), ECHO, and the Children's Museum and Theater of Maine (CMTM). Evaluation in the final year was comprised of periodic journal entries by individual participants, environmental scans completed by each institution, and a Learning Circle facilitated by Randi Korn & Associates. Journal entries reflect a select number of participants' responses to specific aspects of the EEC, like workshops (a complete summary of the journal entries is in the appendix of this report). Environmental scans are comprehensive self-assessments conducted internally at each institution and included more staff than those directly involved in the EEC (instructions for the scans are in the appendix). The Learning Circle was a group conversation facilitated by RK&A in March 2014, designed to help EEC participants reflect on their experiences by collectively processing their achievements and challenges.

# FINDINGS

One of the most notable (and somewhat unexpected) outcomes of the EEC emerged in the Learning Circle and is a subtle shift in the collaboration from being four distinct individual organizations focused around distinct content areas to a collaboration with blurred boundaries, both among the institutions and also between the various content areas. Moreover, it seems that within each institution, the EEC had started to move away from being in the hands of just those staff members directly involved in the project, toward greater involvement by other staff members. This blurring of boundaries suggests that the EEC has started to become entrenched in the institutions—it is not so much an "add-on" as it is becoming an integral part of the institutions and individuals involved. As will be shown in this report, each institution has taken on new activities or new ways of working that may not have happened without the EEC grant as the instigator. And, even though the EEC may be responsible for these new activities, it is now difficult to differentiate anything as specifically EEC-based; as one participant said in the Learning Circle, "No longer can [we] point out the EEC project [as separate], it has filtered down and spread; there has been culture shift." Even though the grant period is coming to an end, EEC participants do not see the collaboration as ending along with it. The EEC will continue to exist and participants will continue to seek grants to fund its continuation.

The report is organized into two sections. The first section describes the achievements of the EEC in regard to its original impact areas (open-ended investigation, family learning, prototyping, and evaluation). The second section describes the nature and extent of the collaboration overall. Unexpected outcomes will also be noted where applicable. And, finally, the appendix includes the summary report of the journal entries that took place over the last 18 months.

## ORIGINAL IMPACTS

### *PROTOTYPING*

Of the four original impact areas—open-ended investigation, family learning, prototyping, and evaluation—prototyping became the area central to the EEC. In fact, the other impact areas became nearly subsumed as part of prototyping. Prototyping's dominance was not evident in the first year of the grant—even though the prototyping workshop by Paul Orselli was very well received by participants who became excited at the prospect of additional prototyping. By the end

of 2012, many of the participants continued to express doubts that prototyping could become an institutional priority, mostly because of the time involved. In the 2012 Learning Circle, participants were conflicted over what, if anything, to do next in regard to prototyping.

This unforeseen shift in prototyping—from being a challenge to becoming a dominant part of the EEC—happened during one of the two-day workshops in 2013. In that meeting, the group decided to alter its approach to prototyping going forward. Rather than testing prototypes brought by each museum, the group chose to focus exclusively on the projects in development at the host museum. This exclusive focus approach first occurred randomly at the 2012 November meeting and seemed to address the "scattered" feel of the older approach. The meetings in 2013 were scheduled around the project schedule of each museum, so that the group arrived at a key point in the host museum's project(s). This afforded the group a chance to spend time in deeper and more focused problem solving. More importantly, this approach gave each host museum hundreds if not thousands of dollars worth of prototyping, evaluation, and design consultation from trusted but extremely (even brutally) honest critics who knew the workings of the museum intimately. This peer critique and consulting has been so valuable that several museums have written the EEC group into other grants in the same peer evaluator-critic role.

As a result, during 2013 of the EEC, prototyping seems to have become an integral part of how each institution operates. In fact, in the environmental scans prepared by each institution, a recurring comment was that prototyping is something that has grown immensely in each Museum as a direct result of the EEC and that it has spread across the institutions beyond the original EEC activity. By the time of the Learning Circle in March 2014, each institution recounted the ways prototyping has taken hold in each of their museums.

- CMTM recounted one staff member's assessment of their department-wide effort prototyping ready-made blue foam blocks as a "paradigm shift" in the institution. Over the course of six weeks, all staff across the Museum took turns doing naturalistic observations of visitors using the blue blocks. The Museum tried out a variety of configurations and situations to see how it affected the visitor experience. As a result, their staff aligned around this initiative and the core exhibit and program team learned how to communicate the purpose and findings of the prototyping to the entire staff.
- EcoTarium converted an old underutilized space in the Museum into a permanent prototyping space where visitors are encouraged to "try things out" at designated periods of times, like school holidays. Essentially, prototyping becomes a kind of programming space.
- TDM instituted Try it Out Tuesday as a weekly prototyping program in the Museum. The program is still in its infancy, but it continues to grow. One participant said she has used it as a space to test out ideas she's been meaning to try for years. Even though they market Try it Out Tuesday as a program, they make sure the public is aware that they are "testing" something.
- ECHO cited that during the grant period, prototyping had been incorporated into several exhibits including Turtle Tank and revisions of Discovery Place. Further, prototyping has spread across the institution, including programs and evaluation of a pre-school program through a YMCA grant.

An additional, unexpected outcome was that EEC participants began prototyping programs even though the collaboration was designed around exhibits. Through other project activities, staff from the museums' education departments found ways to utilize Ex-Lab project goals to test their theories about public programming. For example, the EcoTarium has now tested one program in their local school district, Worcester Public Schools, as part of the Massachusetts 21st Century Community Learning Centers program for Out of School time. The program "Chemistories" was first developed and tested by program staff from the four museums at the Ex-Lab workshop led by Paul Orselli as a public program, and subsequently adapted and tested by EcoTarium staff. The staff reported that the Out of School time teachers stated that the student engagement in the Chemistories program was the higher than for any other similar program.

EEC participants noted they still have work to do in the area of prototyping and cited various challenges that remain: deciding what to test, knowing when to stop collecting data, making decisions based on the data, and assigning responsibility for those decisions, especially when a large group is involved. Nevertheless, prototyping seems to be a process that "there is no turning back on" at this point. Below are a few exemplary quotations about prototyping from the environmental scans.

> I really did not realize the whole value of prototyping everything and how it can impact future decisions. I started out thinking that you prototype for exhibits because that is what the exhibit team is always doing, but really you can prototype for anything. [EcoTarium]
>
> We've come to understand that every member of our staff has a valuable perspective and that we represent different stakeholders. We also fully comprehend that there is no better way to find out if something is viable, family-focused and open-ended than to try it out with our visitors, observe, and then seek their feedback. People seem truly interested in being part of the exhibit and program development process here—not in focus group, but in actually getting physically and intellectually engaged in our process and materials. (CMTM)
>
> Because the audience is directly involved as staff start to present programs, the feedback can be both brutal and nurturing. We have started to implement in-program feedback mechanisms which should over time radically reform our efforts. I believe, as we engage audiences more we will witness the power, and then ask for more, a positive feedback loop. (ECHO)
>
> Over the last few months we have included regular public programming solely on the topic of prototyping. These have been purposefully carved out into the schedule to allow prototyping and guarantee that it occurs. We are still figuring out how to best use these programs to provide valuable feedback for future programs/events/exhibits, but I see this as a valuable step in a process of change. (TDM)

### *EVALUATION*

Notably, even though evaluation was discussed as a distinct focus area in the 2012 Learning Circle, it became indecipherable from prototyping by early 2014. In 2012, the area of evaluation prompted the greatest dissatisfaction. At the end of 2012, participants had questions about evaluation and the evaluation process that remained unanswered. Many were confused about gathering data (e.g., how do you see the "aha moment?"), and knowing when to conduct a formal evaluation versus when quick-and-dirty methods would suffice. Participants also wondered how much data was enough,

how to ensure that the evaluation would be useful, and how best to ensure reliable data. In the 2014 Learning Circle and in the environmental scans and journal entries, participants referenced evaluation as "formative evaluation" exclusively and their descriptions were always connected somehow to the prototyping process. One CMTM participant aptly described the nature of evaluation in the EEC:

> Evaluation [for us in the EEC] is not so much hard number crunching, but more like observing and taking note of trends and then drawing meaning out from them. And then taking that meaning and creating something concrete from it. I think I learned a lot from being a part of that process, and now feel a lot more comfortable with the actual logistics of it. Not so much the "research in the field" of evaluation, but the nuts and bolts of taking a whole lot of information or data, thinking about it critically, drawing some conclusions and creating something (in this case, an exhibit) in response to that. (CMTM)

### *OPEN-ENDED INVESTIGATION*

Open-ended investigation was not a focus area in 2012, and at the end of that year, participants voiced their desires for next steps in regard to this topic, including the need for each institution to use the type of open-ended investigation most appropriate to their unique needs (including the age of the target audience) and to acknowledge that it can be difficult to support content learning through open-ended investigation. EEC had two workshops focused on open-ended investigation in 2013, and they were well-received.

In the 2014 Learning Circle, open-ended investigation did not come up as a distinct topic, but rather was interwoven in the discussion on prototyping, with one participant suggesting that prototyping had allowed her institution to shift to a more open-ended way of thinking generally. Similarly, another participant said prototyping had led to more risk-taking in his institution, which in turn has led to more creativity and innovation; he explained that this can become a way of modeling open-ended investigation to visitors.

Nevertheless, in 2014, participants continued to struggle with knowing when being open-ended is appropriate. One participant cautioned that risk-taking and being open-ended should not be an excuse for mediocrity or carelessness, and that if not careful, it can be perceived as messy. Participants also struggled with knowing how open-ended to make an exhibit or how to balance it with other types of exhibits, illustrated in the quotation from the Learning Circle below.

> Did we start out saying family learning and open-ended is what we seek? Or is it something we look for balance? A more realistic understanding of what these things are make us realize it isn't always possible, not everything can be open-ended.

Even though participants still grapple with defining and utilizing open-endedness, it has clearly become a part of their internal conversations and a consideration in planning and exhibit development, as evidenced in this excerpt from the Learning Circle (the asterisks represents a change in speaker).

> [Open-ended investigation] was always there but we are more explicit about it, and it becomes a part of our conversation. *We have raised the bar on ourselves about how open-ended we can make it…the number of our ideas have increased…*Asking ourselves more

> often, "is it open-ended? Can we make it more open-ended?" *The question may never be answered, [but] it is no longer implicit.

Below are quotations from two of the environmental scans, illustrating where these two institutions stand in regard to open-ended investigation.

> And also, open-ended is great, but it's not for every kid all the time. It means different things for different people. Open-ended for somebody could be paint and paper, whereas for someone else that could be really restricted. It's part of creating our own definition for how we use that here. (CMTM)

> It is really an interesting conundrum trying to develop more open-ended experiences that embrace natural sciences including live animals. With this new paradigm in mind, I am hopeful that the new Discovery Place, an exhibition that is our greatest open-ended exhibit, can further push this boundary. (ECHO)

### *FAMILY LEARNING*

At the end of 2012, participants felt they had some basic tools to support thinking about the experience of the whole family. However, there was little evidence of growth or development in this area at the first Learning Circle. But by early 2014, participants talked about family learning in a way that suggested it has become more entrenched in their approach to exhibit or program development and prototyping. Participants from CMTM spoke about using the notion of family learning to prototype the blue foam blocks. In observations, they were explicit about looking for the ways that children versus parents were leading and using the blocks and activities. They learned that in their context, parents need to be involved with the block building for the activity to be effective. Similarly, a participant from EcoTarium said that the family learning ideas had drastically changed the way she prototypes. A participant from ECHO said they now use prototyping to explore ideas like family learning. Quotations from the environmental scans illustrate the extent to which family learning has been embraced at all four museums.

> The ACII [Adult Child Interaction Inventory] has been a huge tool that changes how I watch families. I now try to foster and support a wide variety of parents' roles in exhibits. (EcoTarium)

> I'm always thinking about parents when I develop programs. Not just logistics, like where do they stand or sit, but what's their role in this project. How old are the kids? Is it a project that will clearly need parental involvement? (CMTM)

> We keep coming back to questions of how do we promote or further family learning experiences on a regular basis. In regards to programs, we have specifically made a move to construct more programs appropriate for a wide range of ages. This is a result of this project [EEC]. And for the planning of our new building expansion, where we will find these two unique age groups all in the same building, [we consider family learning]. (TDM)

> There have been more deliberate conversations about family learning approaches to designing and delivering exhibits and programs. We have another grant that is all about working with the preschool/caregiver audience and how we can do better. (ECHO)

## NATURE AND EXTENT OF COLLABORATION

At the end of 2012, participants agreed that for real change to happen within each institution, they would need to "widen the net" beyond the eleven individuals directly involved in the Collaborative. Though still a work in progress, in 2014, participants talked about the ways in which this had begun to happen. For example:

- AT CMTM, the blue blocks prototyping project allowed them to disseminate EEC ideas to their entire staff, across all departments. Since every staff person was responsible for conducting observations, they all became invested in the project, and thus understood why it was happening and toward what purpose. As one staff person said, "We will be forced to explain our decision [about the blue blocks] because everybody wants to know why they made the decisions."
- ECHO has taken ideas from the EEC and is now working with its entire staff, through crowd sourcing, to develop a visitor survey.
- Participants noted that the involvement of leadership from all four collaborating institutions in the EEC, including their attendance at the meetings, creates a sustainable model of dissemination and capacity-building. For example, in an effort to better acclimate the EcoTarium's new president, EEC scheduled a "director's side bar" meeting to take place during one two-day event. This provided an opportunity for the museum directors to discuss issues outside of the project agenda. At their request, and because it proved so effective, this is now a regular feature of workshop agendas.
- The inclusion of staff from outside those directly involved in the EEC, at various points in the Collaboration, was an important part of disseminating the benefits of the project. As one said, "more staff with first-hand sharing of ideas with other collaborators is super important, [it takes] the primary project person out of the role of the filter for new information."
- Staff exchanges began at the end of the first round of funding and have had an instrumental effect on dissemination across institutions since they involved staff from varying departments. The cross-department involvement proved to be one of the most significant aspects of EEC. Host museums used the visit by an outside institution as a way to underscore internal dissemination of the goals and lessons of Exhibit Lab. Further, visiting staff's capacity to bring a fresh perspective to the table proved to be a resource for a variety of museum projects and teams, by including them in department meetings, exhibit brainstorming sessions, and one-on-one meetings with educators, visitor services, facility rental staff, and animal care staff.
- Focusing workshops on real projects at the host museum became a dissemination tool in itself. For example, three of the museums (ECHO, CMTM and EcoTarium) worked together on live-turtle interactive exhibits that were designed to engage visitors in better science practices: closer observation (through identification of individual animals), collecting data, and making predictions and asking questions (especially about turtle behavior). With each workshop meeting, web conference and staff exchange, the museums saw an aspect of another museum's turtle interactive they wanted to borrow and test. As a result, all three museums now have programs and/or exhibits that emerged from a process of continuous collaboration.

# APPENDIX A: JOURNAL ENTRY SUMMARIES

## JOURNAL 7: INTERACTIVITY WORKSHOP – MARCH 2013

### *QUESTIONS*

- What is your reaction to the discussion about "interactivity," "hands-on," and related terms? In what way, if any, does your reaction to these terms impact your thinking about your Exhibit Lab or other future projects? What questions does it raise for you?
- Does the hands-on investigation/prototyping work that you did in small groups spark your thinking about your current or pending projects? If so, how? If not, do you have any thoughts on why not? How could the EEC push the process to be more productive?
- What was the impact—for you—of Ed Seidel's presentation? Of the tour of Gulf of Maine Research Institute?
- Any comments on other sections of the meeting, or lessons learned for future meetings?
- Did you find other aspects of the 2-day meeting to be helpful; if so how?
- Finally, are there concerns or questions raised for you at the meeting?

### *FINDINGS*

Five respondents answered Journal Question 7; they represented all four institutions. Respondents did not answer all of the questions, but gave responses to the questions they felt most applied to their individual experiences. The summary below synthesizes all the responses.

- Most respondents said that the discussion of "interactivity," "hands-on," and related terms was a positive experience, saying that the conversation was "rich and helpful," and that it was "good to have a discussion of what it can mean and what we want it to mean."
- Many respondents also said that the conversation about terms helped them think about the concepts in new ways, but admitted that the definitions were still vague, saying things like, "[We] never finalized whether we thought sensory experiences were interactive."
- Many respondents said that the conversation impacted their thinking about the Exhibit Lab because it allows for "a better way of describing what I want out of our prototypes," and is a first step in "figuring out a strategy to build a connected space of interconnected goals."
- Many respondents talked about how the prototyping work sparked their thinking about current projects or the role of the Exhibit Lab in developing projects. Most of these thoughts were focused on the interactivity testing that took place at CMTM. For example, respondents said things like, "It was exciting to see the work we are doing at ECHO influence our colleagues and their thinking."
- A few respondents talked about how they were still struggling with some aspects of interactivity and engagement, wondering about the right amount of engagement and how to engage different groups of people, saying things like, "If the design of an exhibit experience causes the visitor to spend more time looking, noticing, and observing, is it interactive?"

- A few respondents talked about the fact that the interactives that were tested were not technologically savvy, but did seem to get the attention of visitors, saying things like, "Setting up backgrounds for the flatfish…was very helpful to play out ideas and possibilities, even when the animals weren't doing anything. Also, having visitors walk up and say 'what's going on?' was informative."
- A few respondents continue to worry that partners are more concerned about the mechanics of the interactives instead of the testing that is supposed to happen with visitors. One respondent noted that rapid prototyping has been successful during staff exchanges and wondered, "how can we capture that in the larger group meetings?"
- Many respondents found Ed Seidel's presentation helpful and interesting. These respondents said things like, "This was a great presentation, very, very interesting and [I] had not thought about it from that perspective before," and "I believe [his presentation] helped us come to some common understandings [about the different vocabulary used around interactivity]." One respondent thought that the Ed Seidel presentation did not present any new information and found it unimpressive. This respondent said, "Although the stop action software he brought was interesting to play with on the Turtle Tank, I think our down and dirty turtle ID drawings and questions were just as compelling and fostered deeper observation."
- There were also mixed feelings about the Gulf of Maine Research Institute tour. Several respondents thought the tour was inspiring and said that it was interesting to see how the Institute serves the student population. However, a few respondents said the tour was too long and were disappointed that "we did not get to go into any labs [or] see research happening. We saw no authentic science." Several respondents mentioned that they wished the Institute offered outdoor programs or that there was more connection to the outdoors in the programs, saying things like, "[I] also hope the kids get a good chunk of time outdoors by the waterfront or on the docks having experiences collecting water samples, or along the shore. [It] would be great for them to do some actual outdoor experiments."

## JOURNAL 8: INQUIRY LEARNING WORKSHOP – MAY 2013

### *FINDINGS*

Four respondents answered Journal Question 8; they represented all four institutions. There were no formal questions presented to participants, but they were asked to reflect on their experiences. The summary below synthesizes all the responses.

- Most respondents felt that the inquiry learning workshop was beneficial, with one respondent who did not attend reporting that she/he received "rave reviews from the staff members who did attend."
- Most respondents felt that Karen Worth's facilitation and guidance was "invaluable" and that she "challenged the group in a way no one has before and that they [the group], too, were able to challenge each other and her." Additionally, Karen was able to guide the group to an understanding of the goal of each exhibit, specifically whether an exhibit was to share a message or if it was to promote exploration and play.
- A few respondents reflected on Karen's use of the "Salad Dressing Activity." These respondents felt that the activity was a good way to remind participants that they need to

"provide people with opportunities [to] explore what they are interested in and for them to be able to make meaning."

- When talking about the animal engagement activity called Eat, Sleep, Play, a few respondents said that the activity was something that kids could "relate to and apply to themselves, the animals at EcoTarium, and their pets." Because of this, respondents felt that there was an impressive level of engagement at the activity.
- When talking about the storm water run-off activity, a few respondents felt that it was a good experience because it was a more challenging concept to test. Additionally, these respondents talked about the fact that the activity led to a productive discussion with Karen about developing open-ended experiences when there is a specific message to convey.
- One respondent talked about the Executive Directors conference call that took place on Friday. She/he felt that the conversation was "highly productive" and "covered many important bases."

## JOURNAL 9: STAFF EXCHANGE EXPERIENCES – JULY AND AUGUST 2013

### *QUESTIONS*

- What was the most useful aspect (or most important take-away) of your time during the staff exchange?
- What questions did the exchange raise for you?
- In what way, if any, did the exchange help you get more hands-on experience with formative evaluation?
- What further questions do you have about formative evaluation?
- How, if at all, did the staff exchange inform your thinking about what constitutes "interactivity?"
- Based on the exchange, do you have any thoughts/suggestions for the November workshop?

### *FINDINGS*

Three respondents answered Journal Question 9; they represented all institutions except EcoTarium. Respondents did not answer all of the questions, but gave responses to the questions they felt most applied to their individual experiences. The summary below synthesizes all the responses.

- All respondents answered the first question, "What was the most useful aspect (or most important take-away) of your time during the staff exchange?" A couple of respondents talked about the time to focus their attention elsewhere and explore ideas—including issues or challenges shared with the exchange institution. A couple of respondents also talked about the useful conversations that happen during staff exchanges and the opportunity to receive outside feedback. One respondent talked about the chance to "just take the time to try it [an activity] out without lots of risk," saying that the staff exchange offered permission and support to "make the change to the exhibit that you have talked about" and other rapid testing ideas.
- All respondents talked about the questions the exchange raised for them. A couple of respondents said the exchange raised practical questions about how to handle problems

within their own institutions, having to do with the visitor experience (e.g., "how to keep older kids out of pre-school areas and how to keep younger kids out of areas designed for kids and adults?") or with the way exhibit work is completed by the staff (e.g., "How can I restructure exhibit work to engage more staff without them feeling like it is pulling them away from something else?"). A couple also mentioned questions or concerns about the collaboration as a whole, such as better understanding of "the misconceptions about staff and leadership dynamics at each partner institution," or "How can we use our EEC colleagues for more informal evaluation practice?"

- Two respondents got more hands-on experience with formative evaluation as a result of the staff exchange and both of these respondents reported learning new things. One respondent talked about the challenges associated with formative evaluation, specifically determining how many visitors to involve, and the importance and challenge of remaining objective when reporting and talking about findings. One respondent reported having a positive experience testing adult and child content focused on the same topic, which allowed visitors to learn similar concepts at an age-appropriate level.
- Respondents' questions about formative evaluation reflected their experience with the process. One respondent wanted to know more about how to be unbiased in reporting, how to encourage visitors to participate, and how many visitors are enough to consider a prototype "tested." Another respondent wondered if it was possible to embed the tools of formative evaluation (e.g., counters, cameras, etc.) into the exhibits so that the evaluation process did not have to be separate from the exhibit process.
- One respondent noted that interactivity does not always lead to understanding or inquiry, saying, "little kids sometimes just enjoy pouring water over and over again." Another respondent noted, "The group as a whole is coming closer together on what it means to have an interactive exhibit." A third respondent said that the interactive idea was not central to the original intent of the activity, but it "seemed visually compelling and engaging for younger kids." This respondent went on to state, "If I'm curious about an idea, will others be too? Test it!"
- All respondents offered ideas for the November workshop, with many of these ideas focused on continued work in evaluation and peer feedback.

## JOURNAL 10: JUICY QUESTIONS WORKSHOP – SEPTEMBER 2013

### *QUESTIONS*

- What did you learn? What surprised/delighted/inspired/frustrated you? Has the workshop caused you to rethink your approach to some aspect of your work?

### *FINDINGS*

Four respondents answered Journal Question 10; they represented all institutions except for EcoTarium. Respondents did not answer all of the questions, but gave responses to the questions they felt most applied to their individual experiences. The summary below synthesizes all the responses.

- All respondents talked about the Juicy Questions and Active Prolonged Engagement (APE) exhibits. The respondents had positive experiences with the Juicy Questions and APE testing that they did in the exhibit space, although one respondent remained skeptical that Juicy Questions would work on the museum floor, saying, "I still think that

for the Juicy Question to work, it would have to be a facilitated activity via floor staff." Other respondents reflected on their individual experiences, with one respondent saying, "It was fascinating to see how well the [Juicy Question] process worked for my group at the fog table and how it did not work so well at the light table." Respondents found the time spent discussing Juicy Questions and APE particularly helpful, although one of these respondents wished there had been more tips provided for evaluating APE exhibits.

- A couple of respondents talked about the benefits of having the leadership from all four collaborating institutions in attendance at the meeting. One respondent said, "[The] building of a more sustainable model of dissemination and capacity-building requires leadership investment and real participation." Another respondent said, "I'd like to see some Director time built in to every workshop."
- One respondent talked about the benefit of having other staff in attendance, saying, "I think it was important for them to hear and see [and] talk with other staff from other institutions and their approach to [the] learning and exploration process…More staff with first-hand sharing of ideas with other collaborators is super important, [it takes] the primary project person out of the role of the filter for new information."
- One respondent reflected on the positive experience working with staff from the Exploratorium and said that it was important for every workshop to involve "at least one outside presenter so that we are less insular in our approach."
- One respondent talked about the importance of well-developed prototypes for use in testing situations, praising the two prototypes that were used in this workshop. This respondent said, "The staff members who presented the prototypes were truly invested in the prototypes and sincerely appreciated the feedback."

### JOURNAL 11: LEARNING READINESS WORKSHOP – NOVEMBER 2013

#### *FINDINGS*

Nine respondents answered Journal Question 11; they represented all four institutions. There were no formal questions presented to participants, but they were asked to reflect on their experiences. The summary below synthesizes all the responses.

- Many respondents talked about the fact that, despite the differences between the institutions, there are always similarities in both the work and the challenges. One respondent said, "No longer are institutions say[ing], 'I admire what you are doing, but we could never do that.' People seem to [be] seeking ways to fit successful models from one organization into their own." A few respondents also talked about lessons they have learned from other Exhibit Lab partners. For example, one respondent said, "We spent a chunk of time talking about evaluation for ECHO. This was a very insightful portion of our meeting because it gave me ideas and resources for polling volunteer staff here at TDM."
- Several respondents talked about the partnership between ECHO and the local YMCA. Respondents found the discussion about the preschool program to be enlightening. One respondent said, "I liked expanding our discussion to include ECHO's community partner, the YMCA. I found it refreshing to bring two very professional but very different groups together to talk about how we approach working with preschoolers and

their care givers in different ways, but all want to provide the very best experience to create healthy and happy children."

- Several respondents talked about their experience observing and brainstorming in the Action Lab exhibit space. These respondents felt that they were able to come up with strong, useful ideas that could also be used at other institutions or other exhibit elements. One respondent said, "Brainstorming takes time—the larger block of time was essential to moving forward from generally good ideas to more in-depth ideas which were both things we could actually try and that also asked bigger questions."
- There were a few respondents who were participating in their first Exhibit Lab workshop. Although these respondents had positive experiences, they also said it was challenging to contribute because they lacked the background information on many of the projects being discussed. For example, one respondent said, "I learned a lot in a very short amount of time, [but] my big regret was that I didn't feel that I could contribute much to the group because I felt that I was playing catch-up for most of the session."
- A few respondents who had participated in multiple workshops reflected on the benefits of including new people and outside staff in the discussions that happen. For example, one respondent said, "Having a core group of 'regulars' brings continuity and momentum to the process. Having a group of new people forces the regulars to not make assumptions, and to reach out and articulate more fully what we're trying to do." Another respondent commented that it was great to have outside staff present their work and not just attend the meeting.
- A few respondents talked about the changes in the collaboration between cycle one and cycle two and continued struggles the institutions are facing. Overall, these respondents liked the fact that the workshops now focus on projects at the host museum, with one respondent commenting, "every time, we end up finding that the host museum's project(s) parallels something we're doing." Two respondents talked about the fact that collaboration is now more "second nature" and participants are more comfortable reaching out to each other. In fact, the Exhibit Lab collaboration has lead to other collaborations between the partner institutions. One respondent commented that three of the four directors were more fully engaged in the process in the second cycle, which "always translates into forward momentum for their organizations in the months following the meetings." Another respondent noted, "[we are] still struggling with how we can implement a strong dissemination program with our staff…"
- A few respondents talked about the idea of layering content to better appeal to a variety of age ranges. This respondent also noted, "It will likely be impossible to have every exhibit accessible to multiple age groups," and said that it was important to think about the best method for delivering varied content.

## REFLECTIONS: UNEXPECTED OUTCOMES

### *QUESTION*

- What have been unexpected outcomes of the Exhibit Lab project?

### *FINDINGS*

Many Exhibit Lab partners attended the IMLS convening in Denver in September 2013. As a result of this meeting, the partners realized that unexpected outcomes of the collaboration might be

missed by the evaluation. Nine respondents submitted reflections; they represented all institutions except the CMTM.

- Many respondents talked about aspects of the staff exchanges as being unexpected outcomes of the collaboration. These unexpected outcomes included the realization that the staff exchanges provided an "information resource," an opportunity to consider and test new ideas, and the ability for staff exchanges to "spill over into other projects." Additionally, one respondent said, "The staff exchanges seem to have given us all confidence in our knowledge and perspective."
- Many respondents talked about the positive and productive experiences they had with prototyping. Several of these respondents were surprised about how much they learned prototyping on the floor of other institutions. For example, one respondent said, "Prototyping on the floor of museums that aren't yours is really powerful. You get to see how their exhibits are created [and] you can look at their results without the bias that you have in your own institution." A few respondents also talked about the fact that a culture of prototyping has taken hold at their institutions, in weekly events such as "Try it out Tuesday," or in the use of prototyping in departments as diverse as marketing and education.
- Many respondents also talked about the peer support system that the collaboration afforded, often reflecting on their personal experiences as well as experiences they had seen between other peers. A few of these respondents talked about how this support extended beyond the Exhibit Lab project work, saying things like, "ECHO and the director at CMTM [talked] about human resources issues at small museums…because small museums do not have H.R. departments to help facilitate discussions or awareness." Additionally, participants were able to support their peers because they were more connected. One respondent reflected, "We've all become each other's feelers into the world, if we see something that pertains to what someone else is working on."
- Several respondents talked about finding unexpected similarities and gaining a greater understanding of different institutional cultures through the collaboration, saying things like, "The commonalities of institutional size which relates to staffing structures and resources, and influences problem types we encounter, has been a powerful and uniting commonality." Also, this greater understanding allowed partners to "brainstorm ways to get around [budget and staff] challenges [that are shared by the institutions]."
- A few respondents said that the collaboration offered a safe space in which to take risks and try new things at their museums, saying things like, "[it] provided the culture to experiment." Some of this stemmed from the fact that "others [were] trying things that are challenging [and] sharing honestly about difficulties and failures," which made it easier for other museums to try risky things.
- A few respondents spoke about idiosyncratic benefits specific to their role or their institution. For example, a partner from EcoTarium said that due to the museum's involvement in the Exhibit Lab collaboration, they have been able to receive additional grant funds from NSF to work with other collaborations. One respondent said that the collaboration has allowed him/her to combine experience in exhibits and programs, saying, "the combination of skills could be invaluable to an institution, but you tend to get classified." One respondent expressed deeper appreciation for the facilities at his/her institution.

## APPENDIX B: ENVIRONMENTAL SCANS

Format for Self-Assessment (a.k.a Environmental Scan)
Post-Project Assessment 2014

Please follow the same format as the first Assessment, with the same staff (individuals and functions) as possible. These were the instructions:

**Step One:** Key grant personnel from each site should answer the set of Institutional Questions below – just one set of answers per institution. These pertain to assessing the overall exhibits at the institution. We are assuming key personnel have a basic knowledge of the key ideas (family learning, formative evaluation, open ended and phenomena based interactive exhibits) – but we could still supply background info if need be.

**Step Two:** Each museum holds a meeting that includes any standing exhibit committees, or all people likely to be connected to exhibit and program development, facilitated by the key personnel. Have everyone at the meeting (including the key personnel) fill out the Individual Questions regarding their comfort and use of with family learning, evaluation, prototyping and open-ended investigations.

**Step Three:** *At the same meeting*, facilitate a discussion using the Discussion Questions below. Record good quotes as verbatim as possible so we can potentially use them in the grant. Use the results from your first assessment discussion to help the group discuss the impact or lack thereof of the project. How did this project help address – or not address – the barriers that the group identified in the first assessment?