

A faint, light gray technical drawing of a mechanical assembly, possibly a steam engine or boiler, serves as the background. It includes various components like pipes, valves, and structural frames, with some handwritten-style labels such as '3" 1/4', 'WC 24', '2 1/2" INT. DIA. EXHAUST PIPE', 'WC 15', 'ST 62', 'WC 35', 'ST 84', 'C 187', '7 1/2"', 'ST 68', and 'C 185 C'.

prototype

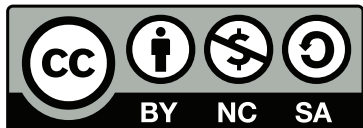
colLABorative

prototype collABorative

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A thesis submitted to the University of the Arts in partial fulfillment of the requirements for
the degree of Master of Fine Arts in Museum Exhibition Planning and Design

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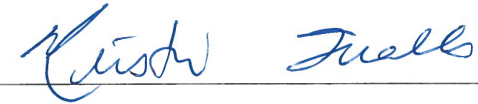
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Abstract

This thesis focuses on a possible implementation of a cross-disciplinary design space where professionals and the public collaborate to create and prototype concepts for future museum exhibitions. Collaboration and the use of open-source information have become every day activities due to new technologies and the interest in forming creative communities. Thesis research was collected by studying specific examples of collaboration and prototyping in many settings, ranging from museums to companies to websites. The research

showed how valuable these concepts can be in these various settings. A plan for the prototype collaborative, a lab that aims to provide a platform for exchanging of ideas and fostering dialogue between professionals and the public, was created to answer the need for this type of space in the museum field.

For Buddy and Elsie, Lester and Bidy,
and the 33
forever in my thoughts

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Preface

The journey of researching and writing this thesis began well before the formal process. It began even before my undergraduate experiences at Virginia Tech graduate and my study at The University of The Arts.

As a child, I was always interested in science. I was fascinated by space and emerging technologies. My father would take me to The Franklin Institute several times a year and was those experiences stuck with me.

In 2001-2002, I was a high school senior, unsure of my future. I had an interest in both science and art, having taken advanced chemistry and physics classes as well as independent studies in ceramics and sculpture. I had no idea how to combine these areas of study. After a visit to a perspective university without any idea of what my major would be, a professor

mentioned Industrial Design. I had never heard of the discipline before, but in learning more about it, it seemed to fit my skills and interests nicely. When I enrolled in the Industrial Design program at Virginia Tech I was immersed in design processes. I loved researching, brainstorming solutions, sketching, ideating, and prototyping.

As I graduated from Virginia Tech, enthusiasm for design gave way to the realities of the job world. Difficulty in finding a design job forced me into management in the foodservice industry. Then one of the most influential events of my life occurred. While I was still living in Blacksburg, the Virginia Tech tragedy occurred, and a friend of mine was injured. The event caused me to look at my life and intensify my efforts to make a change.



Kate Wellington (Creative Commons)

I ended up taking a low level job fabricating signage. In hindsight, while I didn't enjoy the work, the experience and knowledge I received there was one of the best things for me. I learned specific building processes which are valuable in rapid prototyping. I used large format printers, plotters, CNC routers and laser cutting machines. After a year, I moved to Virginia Beach and became the production manager at another sign shop. Still, there was something missing. I was building things, but seemingly without a purpose. I had lost the inspiration for design. I was seeking a way to integrate my love of science and passion for design.

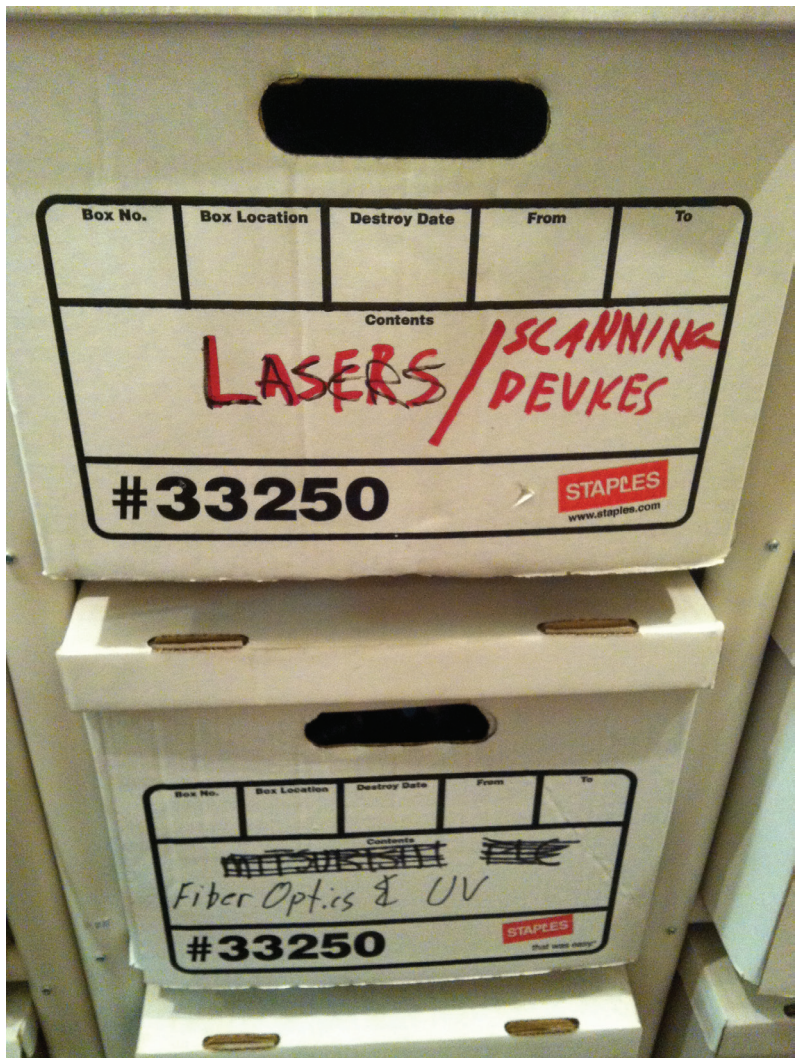
Then I remembered visiting The Franklin Institute as a child, and something clicked. I realized that the world of museums offered the opportunity to unify my two passions while producing meaningful experiences for others. Within a month, I quit my job, applied for graduate school and was accepted. I began my studies with a renewed passion.

In the spring of 2011, I had the wonderful opportunity to take an internship at the place responsible for my decision to study museum planning and design, The Franklin Institute. The first project I worked on at The Franklin Institute was for a NSF grant supported program called MRSEC (Materials Research Science and Engineering Centers). MRSEC programs extend to many types of institutions including science museums and universities. One small part of the MRSEC museum outreach program involves the development of table top science demonstration kits for museums. These kits consist of several separate demonstrations about a common theme. The Franklin Institute in partnership with Penn State University develops and design these kits. During the spring and summer of 2011, I designed, developed, and fabricated these demonstration kits. Each demonstration about a scientific concept is made up of two parts, a demonstration of the phenomena and a molecular model of the material involved.

The first step was to decide on the content direction for the kits. At a meeting with a group of material science researchers from Penn State, the theme that was arrived at was "Hidden Power", exploring how material science contributes to electricity generation. After we decided on the overall theme, specific topics for individual kits were brainstormed. With about ten different concepts, I set out to prototype for different solutions for each kit.

After creating several prototypes, they were then taken to the museum floor to perform an evaluation. This evaluation consisted of performing the demonstration for a group of visitors then asking them a series of questions about their experience. These responses were used to refine or in some cases, completely re-imagine a given prototype. Of the 10 original concept ideas, seven were finalized and produced. The group of kits were built and assembled in-house at The Franklin Institute and sent out to 15 different museums who had applied





to receive them free of charge through the grant funded program.

This experience was an amazing opportunity to come up with creative solutions to a challenge, and to have my solutions being used in 15 museums across the country. Moreover, it reinforced the importance of brainstorming, prototyping and testing as essential to the development process. I also learned how important the physical space is in the prototyping process.

From the moment I stepped foot in The Franklin Institute *Testing Zone*, I knew that it was the right place for me. It is the maker-geek's paradise, with all the tools and materials necessary to create prototype science museum interactive devices. The *testing zone* has a full compliment of tools for working with wood, metals, and plastics; a soldering station; and several computer work stations for programming computer-based interactives. Additionally, there is a myriad of electrical components taken from

previous devices, commercial products or other sources. Switches, wires, tubing, sheet material, hinges, screws, displays and many, many more kinds of materials are stored there. Just about anything you would need to create prototypes. The staff in the testing zone spend their days brainstorming solutions together, building devices and testing them with visitors.

Seeing the vibrant group of designers and builders, passionately invested in creating great experiences was very influential to me. It inspired me to begin intensely studying prototyping. I started thinking about other museums which didn't have the resources to create their own testing zone; how do they solve problems and create positive visitor experiences.

Prototyping and testing at The Franklin Institute has evolved over the years, but it is because of the size and resources of the institution that they are able to sustain this prototyping process. I started to wonder

about the process at smaller museums, and how the Franklin Institute model could be used to benefit them.

Looking back, many of these activities I was exposed to for the first time were very influential in the direction of my thesis project. I believe in the importance of group brainstorming, of the visual expression of ideas, and learning by doing. These beliefs have come to drive my thesis research and application.

What follows is the culmination of both my personal interests and my graduate museum studies. My hope, as I enter the museum field, is to be able to apply or implement this research and planning in my career.

prototype

colLABorative

Introduction

While collaborating across disciplines has always been prevalent, the advent of the internet has brought all new tools for sharing ideas and information. Spaces for design, prototyping and experimentation, however have been around long before the internet age. This thesis explores the combination of these two ideas, by creating an open prototype lab for the creation of new museum exhibits. The research question which drove the investigation of these areas is as follows:

What are the possible implementations of an open-source, interdisciplinary, public design space where the intersection of thoughts and concepts from university students and faculty, museum professionals and the public can be prototyped and applied to the creation of new museum exhibitions?

This investigation of this question resulted in a plan for the Philadelphia museum prototype colLABorative. This prototype lab would serve all museums of any size, but would be of particular benefit for small and medium museum lacking the resources to effectively prototype in-house.

The first step in this project was to research concepts that would be important in developing such a space. These core concepts are Wikinomics - “the theory and practice of harnessing mass collaboration.” The open-source software movement, providing for free, intellectual property which was traditionally protected. And finally the concept of artscience, the melding of “subjective, sensory, emotional and personal understanding with objective, analytical, rational, public understanding.”

Next was an investigation into institutions which apply these concepts, both past and present. Some of these examples include: The Bauhaus, the legendary design school; The Exploratorium which influenced types of interactivity in science museums; and NextFab Studio, a collaborative facility for rapid prototyping. These institutions pioneer the creative use of the previous concepts as well as learn from and influence each other.

In order to better understand the need for and an interest in a prototype colLABorative, a front-end evaluation was conducted. A survey was sent out to museum professionals asking, their interest level in the space. Both the statistical data and many free response answers confirmed a need for a prototype lab that can serve small and

“We don't have enough space to prototype, so such a space would simply allow us to try it!”

- Survey #57, Museum Survey

“We don't currently have the facilities or staff to adequately pre-test ideas and get feedback before launching so this type of space could be quite useful”

- Survey #52, Museum Survey

medium-sized institutions.

The research and evaluation were used to develop and inform the plan for the Philadelphia museum prototype collABorative. This prototype collABorative serves museums, universities and individuals interested in developing exhibition elements, interactive displays, and programs for public audiences. The plan outlines the goals of the space, its major stakeholders and examples of how it may function.

The research and evaluation are supported with quotes from interviews with museum professionals as well as written sources such as books, magazines and journals.

The research and evaluation show that prototyping and collaborative design are important for developing the best exhibition experiences possible. The Philadelphia museum prototype collABorative will further the understanding and value of prototyping, aid the professional development of individual participants, and build prototyping capacity and efficiency into the participating institutions

This document should serve as abroad overview of many concepts and institutions which can be influential in creating any collaborative design space. The plan for the prototype collABorative is one solution to implementing these concepts and would benefit the museum field overall. This plan is a reproducible model which can serve as a template for other groups or cities to create their own lab.

Typical Nomenclature

Maker

Someone who builds new and unique things or modifies existing products to suit their needs, mostly as a hobby in their spare time.

Maker Space

A place where makers can get together, build things, share ideas and show off their creations

DIY

Do It Yourself

Open-Source

A production practice which provides open access to the end product’s source materials.

artscience

Combining the areas of art and science to influence each other

Crowdsourcing

The practice of obtaining needed services, ideas, or content by soliciting contributions from a large group of people and especially from the online community rather than from traditional employees or suppliers

Wikinomics

The theory and practice of harnessing mass collaboration through varying means

Interdisciplinary

Combining two or more academic fields into one discipline

Prosumer

A consumer who actively participates in the production of the product they will consume

Prototyping

The practice of creating an early sample or model for the purposes of testing a concept or idea.

Brainstorming

Generally a group practice where a list of spontaneous ideas is assembled as a solution to a problem or challenge.

Ideation

Creative process of generating and developing new ideas

Iteration

A process of concept or prototype development involving repeated re-designing of a project

Collaborative Project Development (CPD)

An umbrella term used to refer to many various techniques for using groups to create a project

research

“The final goal of all visual-art activity is construction. Architects, sculptors, painters - we must all go back to handicrafts.’

Artists and artisans were to receive the same training. A romantic notion that divided the student body into apprentices, associates, and junior masters.”

- Ferdinand Kramer, *Bauhaus and Bauhaus People*, p.154

The Bauhaus

Like many concepts within the world of design, art/science labs, in part, owe their existence to the innovations developed at the legendary Bauhaus design school. Bauhaus, literally meaning “house of building” was founded in 1919 by architect Walter Gropius. The defining characteristic of the Bauhaus education concept was the combination of art with handicrafts and building.

The Bauhaus model of education served as a blueprint for many art and design schools to follow. Combining artistic theory with practice is now a staple of many modern design and art schools. Many teachers and students went on to become famous architects, artists, and designers. Josef Albers revolutionized color theory for artists. Ludwig Mies van der Rohe and Marcel Breuer helped to define modern architecture and design. After the Bauhaus dissolved

“The achievements of the Bauhaus are twofold: the creation of new prototypes and the creation of a new teaching method. In pedagogy one uses scholastically already-known facts, in order to introduce students to their professions. It was different at the Bauhaus. In its high-tension atmosphere types were created that did not exist before”

- Sigfried Giedion, *Bauhaus and Bauhaus People*, p.209 - 210

in 1933, a few of these men brought the teaching concepts to schools in America such as Harvard and Black Mountain College.

While the education system introduced at the Bauhaus, was indeed the foundation for many art and design schools, the curriculum itself evolved as the school moved from Dessau to Weimar and finally, Berlin. The importance for the inclusion of science in the pursuit of art and design was recognized by Hannes Meyer once the school moved to Dessau.

“Yet the institute that today is a legend, at that time used only workshops and studios- not even laboratories for scientific experiments. The industrial product remained, more or less, an artisan's artifact. Theo van Doesburg had not yet begun to lecture in Weimar. Only later, in Dessau, did Hannes Meyer recognize the necessity for scientific foundations, and tried to incorporate pertinent material in the curriculum.”

- Ferdinand Kramer, *Bauhaus and Bauhaus People* p.79 - 80

While the Bauhaus' legacy influenced art, design, architecture, crafts and theater the take away for the collaborative prototype lab is the way in which all these disciplines informed each other. After the Bauhaus was dissolved, other institutions built on the interdisciplinary and building-centric philosophies pioneered there.

Albers, Josef. *Interaction of Color*. New Haven [Conn.: Yale UP, 2006. Print.

Neumann, Eckhard. *Bauhaus and Bauhaus People: Personal Opinions and Recollections of Former Bauhaus Members and Their Contemporaries*. New York: Van Nostrand Reinhold, 1993. Print.



“What the Bauhaus actually taught - as Gropius expressed it - was equal evaluation of all kinds of creative work and their logical overlapping in our modern world order.”

- Fritz Hesse, *Bauhaus and Bauhaus People*, p.154

The influence of The Deutsches Museum

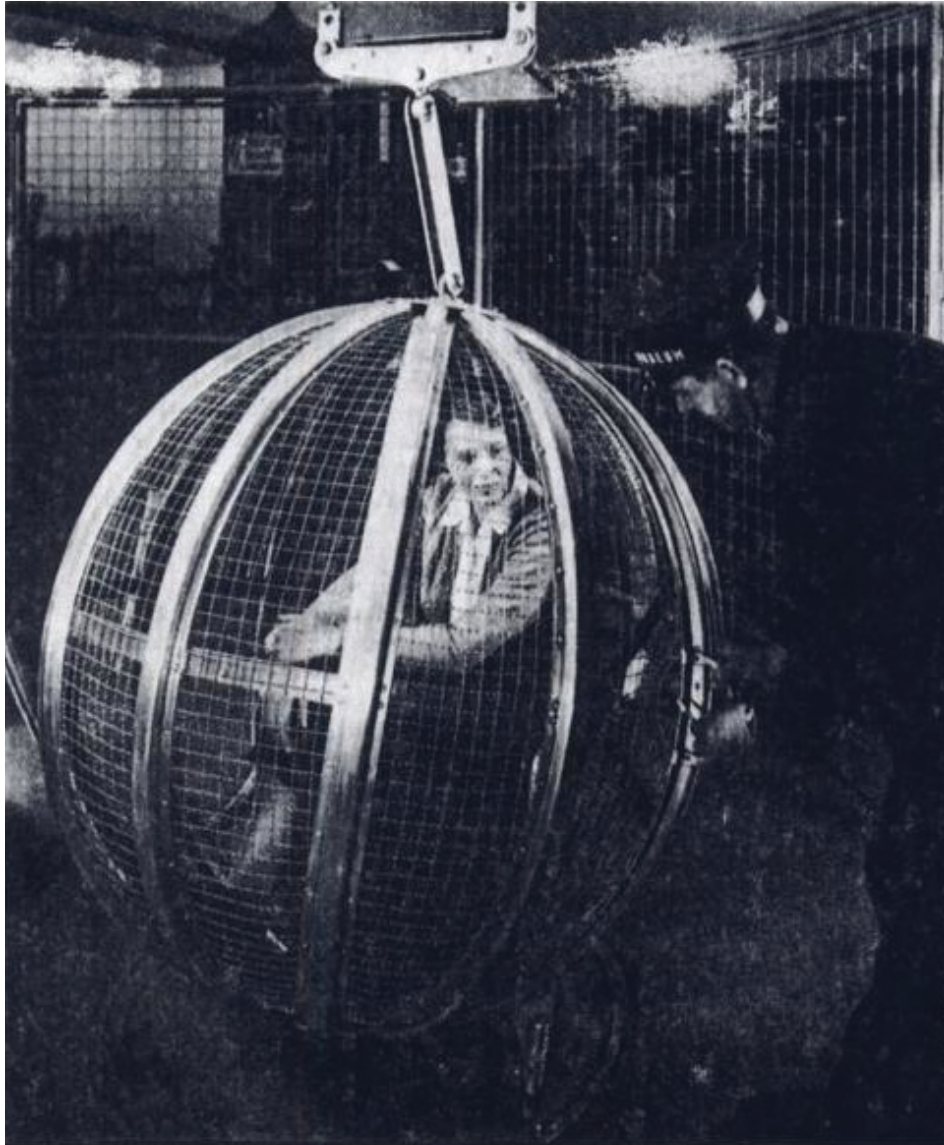
“Probably the most important innovation was the comprehensive use of fully functional originals, replicas and models, and of scientific demonstrations that visitors could activate. For example, the X-ray machine was fully accessible, so that sportsmen sometimes came to the Museum on a Monday for self-diagnosis of fractures they had suffered over the weekend.”

- Mayr, p.9

It can be said that the most influential change in science museums was the change from object-based curatorial exhibitions to interactive and experiential exhibitions. The pioneering museum, which many other institutions looked to for inspiration in creating interactive science exhibits, is the Deutsches Museum. The main museum building at the Duetsches is called “Masterpieces of Science and Technology” and indeed, the museum can be seen as the first modern science and technology center. The advances there served as inspiration for both the Museum of Science and Industry in Chicago and The Franklin Institute in Philadelphia.

“The Deutsches Museum of Oskar von Miller, first proposed in 1903 and finally opened in its own building in 1925, was the **first modern technical museum** in which extensive use was made of operating exhibits to draw attention, to provide entertainment designed to arouse curiosity, and to involve the visitor in the exhibit (as, for example, by pushing a button to start the action). Miller's museum was formed largely through his own efforts; exhibits and objects were not obtained from an international exhibition. Nevertheless, **the dispensing of popular and painless education through entertainment and activity is an underlying aim of this museum and those that have copied its methods.**”

- Furgeson



“Sometimes an original machine or piece of equipment can be activated by the observer; sometimes sections are cut away to reveal what goes on inside; sometimes working scale models are constructed; or sometimes simple experiments of physics and chemistry are devised that the observer may perform by touching a button. Early visitors to the Deutsches were surprised at the great amount of machinery and paraphernalia unprotected by glass cases and left open to the public.”

- Alexander, p.361

The Exploratorium took the concept of visitor interaction from The Deutsches Museum and applied it to scientific phenomena. While the Deutsches Museum and the others focused on technology and machinery, The Exploratorium invited visitors to explore scientific principles.

Inspired by the techniques employed at the Deutsches Museum, The Franklin Institute created exhibitions which combined interaction with collections. After The Exploratorium came on the scene, The Franklin incorporated experiential phenomena, creating exhibits emphasizing objects, scientific principle and technology.

Without the pioneering concepts of the Deutsches Museum, the advances of other institutions would not be possible.

“The guiding principle was that the Deutsches Museum should above all be entertaining.”

- Mayr, p.9

Mayr, Otto. The Deutsches Museum: German Museum of Masterworks of Science and Technology, Munich. London: Scala, 1990. Print.

Furgeson, Eugene. “Technical Museums and International Exhibitions.” American Studies @ The University of Virginia. Web. 11 Apr. 2012.

Alexander, Edward P. Museum Masters: Their Museums and Their Influence. Nashville, TN: American Association for State and Local History, 1983. Print.

The Exploratorium

The Exploratorium in San Francisco was founded by physicist Frank Oppenheimer, brother of the Robert Oppenheimer, both of whom worked on The Manhattan Project, which developed the first nuclear weapon. After World War II, Frank held several positions studying physics, but during the Cold War, Oppenheimer was blacklisted from the scientific community for being a suspected Communist. During this period Oppenheimer took various jobs, but the most influential to him was teaching high school science(Hein p.12). This experience inspired him to bring science education to various age groups.

“Its emphasis [...] was to be interactive - directed to people as thinkers, creators, and users rather than as passive consumers.”

- Hein, p.24

“The Exploratorium, the museum of science, art and human perception” fulfills Oppenheimer’s vision for a new kind of science education center, and in the process, fundamentally changed the way science is presented and experienced in museums(Hein p.xiii). The new model which The Exploratorium pioneered was interactive experiences about scientific phenomena.

Thinking of the customer as creating value not merely consuming content is one of the foremost concepts of Wikinomics discussed earlier. One facet of which is the “Prosumer” or a consumer who actively participated in the development of the product they will consume. This concept pioneered by the Exploratorium is another example of modern concepts which were explored there.



The experiences in The Exploratorium emphasize the human perception of a scientific phenomena. In order to present these phenomena in the most practical and inspiring way, the designers at The Exploratorium sometimes use artistic techniques and concepts.

“The thesis that science has and aesthetic dimension and art a cognitive one is implicit in the experiential concentration and perceptual focus of the museum.”

- Hein, p.xvii

“Furthermore, perception provides an extremely natural way of linking art and science, since both influence the way people perceive their environment and, in very different ways, are specially concerned with seeking out patterns and in sensitizing others to what they perceive. The works of artists and the didactic demonstrations of scientists and engineers combine not only to show the sights but to alter each in a characteristic mode”

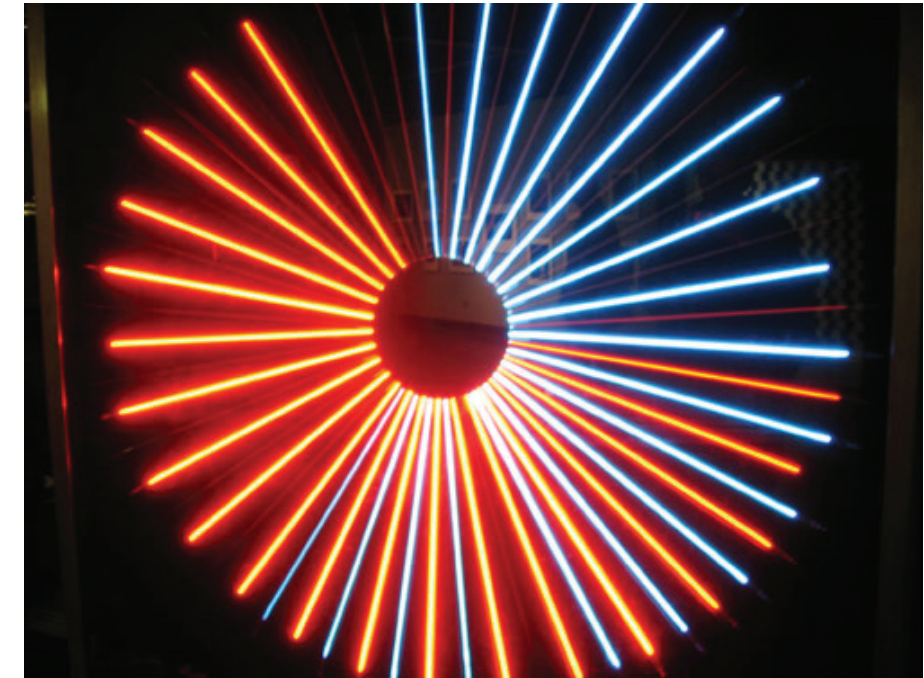
- Frank Oppenheimer, p.344-5

Indeed the influence of art on science and of science on art are integral to the success of The Exploratorium. What is particularly remarkable about the museums embracing the concept of artscience is how seemingly ahead of the curve Oppenheimer was. The “artscience manifesto” represents the culmination of years of thought and writing about the intersection of art and science, and it was published in 2011. The Exploratorium, which embraced these tenets opened its doors over forty years earlier.

While the experiences The Exploratorium presents were and are extremely influential to the museum field, so are the manner in which those experiences were developed. When The Exploratorium first opened, there were very few exhibits, mostly a large open space with a workshop for creating experiences.

“On August 20, 1969, with no fanfare whatsoever, the giant doors of the Palace of Fine Arts were opened and the public was allowed to wander in. Visitors arrived almost immediately. Tourists and curiosity seekers who were enjoying the park discovered the museum largely by accident and went in to see what was going on. There were almost no exhibits inside, only a small band of people industriously at work and a sign that read: “Here is being created the Exploratorium, a community museum dedicated to awareness.”

- Hein, p.21



“The building of the museum itself would be the first exhibit, and the public was invited to take part in creating it.”

- Hein, p.26

“Oppenheimer's plan called for a centrally situated and well-equipped workshop where exhibits could be fabricated within view of the public and with their active participation.”

- Hein p.47



By using these concepts and techniques, Oppenheimer created an environment where visitors could see and participate in exhibit development. He saw the museum as an experiment, constantly evolving. He also recognized the importance of the act of building and playing with things, physical creation as exploration. The construction of prototypes in the exhibit development process was of paramount importance to Oppenheimer.

In addition to pioneering the areas of artscience, prototyping and experiencing phenomena, The Exploratorium also created a new way of distributing its exhibits. Called “The Exploratorium Cookbook”, the museum sold plans for implementing the innovative exhibits they developed. The dissemination of exhibition concepts in this manner was nothing short of revolutionary!

“Frank worked best from the real thing and he felt that only from the real thing - and not from a wonderful set of words or even a drawing - could one decide what to do next.

The desire to work from the real thing naturally led Frank to realize the importance of developing full-scale prototypes as the first incarnation of each exhibit.”

“Probably no form of publicity has spread the museum’s fame more widely than the Cookbook or won it more friends. But people are sometimes more puzzled that a museum allows its contents to be duplicated. Does that not detract from the museum’s uniqueness? The question reflects a bias in favor of individuality and misconstrues the function of a science museum. Art museums tend to celebrate works that are unique and unrepeatable, but science cannot be conveyed by similarly irreproducible evidence. **A good science exhibit is one that can be shared**, and the Exploratorium has been enthusiastic in its efforts to propagate good exhibits.”

The Exploratorium made the philosophical decision to share their efforts with the rest of the museum community. This decision did not water down the experiences within and helped to improve science education everywhere. This decision embraces the idea that the openness of ideas is more important than the ownership of them, that by providing access to great ideas, everybody benefits.

The development and use of these pioneering concepts by The Exploratorium are integral to the development of the prototype collABorative. The Exploratorium shows us that these concepts can be used by the institution itself, as well as in the community of science museums. By employing these concepts into the prototype collABorative, the hope is to provide a participatory community development environment.

Oppenheimer, Frank. “The Palace of Arts and Science: An Exploratorium at San Francisco, California, U.S.A.” *Leonardo* 5.4 (1972): 343-46. Print.

Hein, Hilde S. *The Exploratorium: The Museum as Laboratory*. Washington: Smithsonian Institution, 1990. Print.

Murphy, Pat, ed. *Working Prototypes: Exhibit Design at the Exploratorium*. San Francisco, Calif.: Exploratorium, 1986. Print.

The Franklin Institute Testing Zone

The Franklin Institute is one of The United States oldest science centers and has remained in the forefront of science and exhibition experiences.

“In the spirit of inquiry and discovery embodied by Benjamin Franklin, the mission of The Franklin Institute Science Museum serves to inspire an understanding of and passion for science and technology learning.”

- Franklin Institute Mission

Brad Bartley, Senior Exhibit Designer, and Eric Welch, Exhibit Designer and Head Prototype Developer were interviewed about the exhibition design process as whole and the role of prototyping and testing in that process.

Prototyping and testing at The Franklin Institute has evolved over the years. The first and most driven proponent of conducting prototyping and testing internally is The Franklin Institute's Director of Research and Evaluation, Minda Borun. The type of prototyping and testing is what Borun calls “formative evaluation” in that the information is used to form and inform the creation of a new exhibit or program.

“Formative evaluation tests program components during the design stages to isolate problems in how visitors use and understand them.”

- Borun and Korn, p.vii

The “Testing Zone” at The Franklin Institute evolved out of this desire to create better exhibits using the input of their visitors.

Initially, the shop where prototype developers experimented and built test exhibits was in basically a closet in the basement, hidden away from the visitors as far as possible. When a space became available on the third floor for testing prototypes, the exhibits team took it over. Initially, was only for the testing of prototypes. Over time however, the space was expanded and converted into a dedicated prototype development shop. The shop is complete with the standard array of wood and metal shop tools as well as everything needed to create computer interactives: numerous computers, monitors and touch screens, a soldering station, a wall full of electronic components, switches dials and the invaluable arduino units, a programmable USB circuit board used by tinkerers, and programmers and DIYers everywhere.

The exhibition development process at The Franklin Institute is largely structured, with exhibition teams consisting of at least one 3D designer, 2D designer, content

developer, prototyper, evaluator, and project manager. The role of prototyper, however, has been evolving through the past four exhibitions that have been developed. In past exhibitions, some individual interactives were created based on the independent idea of the prototype developer. However, the process has evolved to become more team based, with all members involved in prototype iteration. The current exhibition being developed is called “Your Brain” and will be the largest single exhibition ever developed at The Franklin Institute. Because of the size of the exhibition, the development cycle is long and more rigorous than in the past.

“Know what you want to teach first”
-Brad Bartley

When the development of “Your Brain” began however, the exhibition team got together to brainstorm hundreds of possible exhibits and experiences. Then, they developed an educational goal or “content

point” which it was meant to express. Prototypers took each of these exhibits and created a conceptual “sketch” of each. This sketch presents an idea for how to express the desired content point. This sketch concept is then shown to the entire exhibition team to comment on. Only then do the prototypers take the concept and start building.

The process of actually building a prototype takes a variety of skills depending on the needs of the exhibit. Above all, prototyping requires problem solving; trying to find the most efficient, cheapest and easiest way to get the job done, all while conveying the experience as accurately as possible. Once the device is built and functioning properly, it is time to test it with the visitors. Currently, devices are set up in the front area of the testing zone, separated from the shop area from temporary walls. This was not always the case however. When testing of exhibit prototypes first began, it was conducted on the actual floor of the

museum. There were several problems with this practice, the primary being durability. The exhibits at The Franklin Institute are presented as completely finished, and above all safe for visitors. While exhibits evaluated in the testing zone are by no means dangerous, they are not built with the same durability in mind which exhibits that appear on the floor are. Another reason for providing a dedicated space for prototype evaluation is to make the actual evaluation process easier. Evaluators have sheets to fill out with empirical observations as well as direct questions to the visitors. Trying to fill out these sheets in a crowded, loud and sometimes chaotic environment is difficult and would diminish the accuracy of the evaluation. By creating a dedicated space for testing, the visitor leaves the context of the museum and enters a new space where the expectations for experiences can be different. While in some ways this can change the manner in which visitors interact with the devices, it more accurately tests the content as opposed to the human

factors and ergonomics. By bringing visitors into a space to test the devices, it changes the context in which those devices are experienced, creating an even playing field for each testing session.

“The biggest thing is the person with the clipboard” - Eric Welch

Indeed, as Mr. Welch observes, the person who is performing the evaluation can be the most important variable in testing. While there is a scripted statement to give context to the visitors about to test an experience, it is possible that the evaluator’s personality and inflections, and involuntary reactions could effect the visitors. Additionally because some of the questions are content based, trying to ascertain the how effectively the device communicates the concept, some visitors may feel as if they are being test as opposed to the device. While the evaluators make every attempt to convey that they are using the visitors’ help to test the exhibits,

by simply being asked questions, some visitors may feel pressured to get the “right” answer. According to Mr. Welch, the goal is to try to make the visitor feel smart and empowered, to feel like they are a part of the process.

In creating the plan for the prototype collABorative, the concern of where it should be located was of prime importance. Options considered were within a museum, within a university, or in an independent space. If located within a specific museum, the prototype space would be influenced by the context of the museum in which it was hosted. If it were to be located in a university, the potential audience visiting the space, and therefor the pool of potential testers would skew too much towards the university demographic. By locating it in an independent space, the prototype collABorative can engage with the most diverse group of visitors possible.

Borun, Minda, and Randi Korn, eds. Introduction to Museum Evaluation. Washington, D.C.: American Association of Museums, Technical Information Service, 1998. Print.

“The thing that attracted me to this place was the attempt to collide technology with the arts, rather than attempt to collide technologists with artists. You're always better getting people who have already had that collision in themselves.”

- Alan Kay, Brand, p.83

“Commercial designers go where the perceived market leads them. Amateur designers, user designers, go where curiosity leads them. It's the difference between convergence on the known and divergence from the known.”

- Brand p.175

The MIT Media Lab at the Massachusetts Institute of Technology was founded by Nicholas Negroponte and Jerome Weisner in 1985. The lab “took computing out of the box” and was integral in the recent digital revolution. Rather than focusing solely on the technology, researchers endeavored to explore ways people interact with technology. One of these ways was to incorporate the concept of artsience, facilitating the interaction of the two disciplines.

Another area which media lab researchers are investigating are the areas of wikinomics, prosumers and citizen scientists. According to brand, certain product areas lend themselves to what he calls “User Designers” to bring their knowledge and experience to the product development process.

“The Media Lab has a different function than a business. Chasing horizons is its job. It sells not what works, but what might work.”

- Brand p.177

The newest director of the Media Lab, Joi Ito believes strongly in the concepts of interdisciplinary development, the intersection of art and science, and the importance of building and prototyping ideas. In the following interview with Gregory Mone, Ito describes the importance of these concepts:

“

How much do you think the layout of the Lab matters, in terms of where groups are located?

I think it's tremendously important. That's part of what managing the Lab is going to be about: trying to make that space perfect. Because the way it's laid out, the way things are connected, and how people run into each other and stumble on new things, a lot of that is affected by the layout. I don't think everybody gets how important that is.

Why does the Lab emphasize multi-disciplinary collaborations?

Multi-disciplinary is a really key missing part of society, whether you're talking about science or the economy or any of these things. We've gotten so good at getting deep and being more and more specialized about a smaller and smaller thing that now we've got so many people who are really, really smart but don't know how to talk, let alone build anything together.

How do you get specialized thinkers to work together effectively?

A physicist and a chemist and an architect are only going to work together really well when they're building something. You can have them sit around a table and argue but they'll really only be talking across each other. The minute you try and build something together it becomes rigorous.

So it's better to have people down on the Lab floor than chatting in the café?

Right. Or stuck in their office writing a paper.

The Media Lab is called a media arts and science group. How do the arts fit in?

Pulling together the arts with the science is critical. There is very little art on Wall Street. There's very little art in most tech companies. It's those tech companies that are able to synthesize art and technology, like some of the successful companies around us, such as Apple, that are key.

”

The MIT Media Lab has and continues to be a technology and innovation factory, playing an integral role in the development of our modern digital lifestyle. But beyond the innovations produced, there are the advances in the process and method in which they were produced. By embracing the specialities of professionals with different backgrounds and recognizing the importance of art and science working together, breakthroughs in science and technology were achieved that might otherwise have taken longer or never materialized. Additionally, seeing how important the layout of the lab is in fostering these dialogues between disciplines is, can be instrumental in informing the design of the prototype colLABorative.

Brand, Stewart. The Media Lab: Inventing the Future at MIT. New York: Viking, 1987. Print.

Mone, Gregory. "The Startup Man: A Conversation With Joi Ito." The Atlantic. Atlantic Monthly Group, 13 Sept. 2011. Web. 14 Mar. 2012.

Xerox PARC

Xerox Palo Alto Research Center (PARC) was founded in 1971 as an offshoot of the Xerox corporation. PARC was responsible for many of the computer and technological innovations we now take for granted. The computer mouse, graphical user interface (GUI) and the concept of WYSIWYG (what you see is what you get) were all conceived and incubated at PARC. While the institution itself did not reap the benefits from these innovations, as they were copied by the likes of Paul Allen from Microsoft and Steve Jobs from Apple.

“Xerox sought a different source of innovation when it built the Palo Alto Research Center (PARC), in the hills of what was to become Silicon Valley. The idea Behind PARC was simple: if you put creative people in a hothouse setting, innovation will naturally emerge. You might not be able to demand innovation, but you can certainly nurture and cultivate it - thought I might add here that harvesting ideas turned out to be at least as difficult as cultivating them.”

“If you set up your research center (as PARC was set up) to be not only **multidisciplinary but also interdisciplinary**, you get innovations that could never have occurred in the highly focused environments of startups or in the segregated environments of university departments.”

- John Seely Brown, Harris, p.xi-xii)

“The PAIR program invites artists who use new media into PARC and pairs them with researchers who often use the same media, though often in different contexts. The output of these pairings is both interesting art and new scientific innovations. The artists revitalize the atmosphere by bringing in new ideas, new ways of thinking, new modes of seeing and new contexts for doing.”

- John Seely Brown, Harris, p.xii)

In addition to copious technological innovations, Xerox PARC instituted the Artist-in-residence (PAIR) program.

True to the acronym, the PAIR program is a “matchmaker” for artists and researchers.

Artists were paired with researchers whose work closely aligned with their artistic work.

These pairings were and are arranged by PAIRCORE, the PAIR Internal Advisory Panel (Harris p.23).

Hartman, Christopher. “A Brief, Early History of Xerox PARC and the Development of the PersonalÂ computer.” High Tech History. 2 June 2011. Web. 15 Mar. 2012.

Harris, Craig, ed. Art and Innovation: The Xerox PARC Artist-in-residence Program. Cambridge, MA: MIT, 1999. Print.

“many people trained in the sciences are now deeply involved in aspects of their fields that intersect with art, communication, and creativity. Although education programs in many of the traditional science practices remain isolated in discipline-specific departments, the number of interdisciplinary education programs has increased substantially, and many previously informal collaborations have become formalized and more integrated into the education system.”

- Harris p.5

NextFab Studio

Nextfab Studio calls itself “Philadelphia’s Gym for innovators” and indeed the studio feels like an innovation gym. But instead of exercising, members at NextFab build and create prototypes and innovations.

During a visit to NextFab Studio, Itsuki Ogihara, Community Development Specialist, was interviewed. She is responsible for community development, marketing, events and public outreach. NextFab is a space packed with human energy. The staff of NextFab were all working on different projects, all of them interesting. Groups of people were hanging in common areas, around the coffee maker, chatting about their projects. While the community areas of NextFab are where the innovators connect with each other, the shop areas are where most of the action happens. Rooms are filled with tools and machines to fabricate anything imaginable. There is a focus on

rapid prototyping and CNC (Computer Numerical Control) technologies, making it easier and faster to create prototypes and develop ideas. And this is the main draw to the space for freelance and corporate innovators. NextFab has a staggering array of fabricating tools and technologies:

- Laser cutters for cutting and etching flat materials
- 5-axis CNC mills, using a spinning bit on a robotic arm to carve shapes out of solid materials
- CNC router table for carving shapes into flat materials
- CNC plasma cutter for cutting metals up to 1” thick
- Several 3D printers, special machines which literally print objects, layer by layer out of plastic.

NextFab essentially serves two different audiences, individual members and corporate clients. And it is access to these tools that draws most of them to the studio. Individual members pay a monthly fee for access to the incredible technology and facilities. Members have unlimited access to the shop area to develop and prototype their personal projects as well as access to the classes and workshops which NextFab runs. These classes can range anywhere from “Machine Shop Safety Training” to “Digital Embroidery” and “Introduction to 3D Printing”.

The corporate clients generally pay on a per project basis, while Individual members tend to be knowledgeable about the technology to the point where they want to do the fabrication themselves, corporations generally make use of NextFab’s staff to develop and fabricate their designs. According to Ogihara, the level to which the staff must engineer a proposed design

“NextFab Studio's most lucrative contract work is for local companies developing prototype medical equipment.”

- Takiff, *Stoking the Creative Fires*

depends on the clients. Some may come with a full set of dimensioned drawings and plans where others come with a much looser idea.

These two customer segments define NextFab’s business model as a multi sided platform as defined in “Business Model Generation”. Such business models create value for both customer segments but only if the other is present. Without the financial resources of corporate clients, NextFab would likely be unable to provide the resources that draw individual members to use the space. Without the individual members, NextFab would lose the sense of openness and community, becoming

more similar to a contract fabrication outfit. The combination of these two customer segments provides inspiration for the business model for the prototype collABorative being proposed. Beyond the simple two sided business model however, NextFab is involved in beneficial partnerships with universities and institutions in the Science Center community. The Science Center (www.sciencecenter.org), located near the Drexel University and University of Pennsylvania campuses in Philadelphia PA, is a large, urban industrial park catering to non-profit science and research organizations. NextFab itself has benefited from being a tenant of the Science Center.

While NextFab does not maintain formal institution level partnerships with local universities, they do have relationships with individual professors and students within the universities, even offering a student membership rate. Several professors have brought classes to the space as well.

One institution, predating NextFab but now with connections to the studio is the BreadBoard program (www.breadboardphilly.com). Breadboard “facilitates cross-disciplinary art exhibits, community outreach initiatives and special programs offering public access to a new generation of fabrication technology and workspace in an effort to empower individuals and convene communities around creative applications of technology.”

Breadboard also had one artist in residence within the NextFab studio, exploring the intersections of artistic work and technology. The results of these explorations may be exhibited in the BreadBoard exhibition space, the Esther Klein Gallery.

In talking with Itsuki Ogiwara, it was important to find out specifically what aspects of the space are functioning well and perhaps more importantly, what she would like to see changed. By examining areas where they can improve, can inform



Evan Malone, Founder of NextFab speaking at TEDx Philly

the plans for the prototype collABorative. She said the basic function of NextFab is functions very well in terms of the providing of services to members and clients. She did note that there have been several instances in which they had to turn down work because they did not have enough physical space to work on the project. In part to address this issue, NextFab has decided to expand with a new facility 5 times the size of the current one.

The other area Ogihara is interested in improving is building the community of members within NextFab. She noted that “some people come here only for the equipment”. She wants to encourage members to come for the community. She referenced the Independents Hall (Indy Hall) concept in Old City Philadelphia. Indy Hall is a “co-working” concept where freelance and independent workers can come to a common space to work on their own projects. Co-workers at Indy Hall benefit from the community, talking and working

with other people who come to the space. It is this development community which Ogihara wants to foster within NextFab. As noted earlier, many of the individual members come to NextFab studio with an interest in the types of technology and techniques that are available there. These members represent an enormous base of technical and creative experience. Since many of the members just come to use the equipment, they are not adding their experience back into the space.

This is another objective of the planned expansion of NextFab. They will be adding more and larger classrooms, larger community areas and big conference rooms which can be rented. All of these will add to more freedom in terms of time and use of space. Ogihara is looking to create a space where people are encouraged to hang out and spend time beyond working on their own projects.

These concepts are key in developing the plan for the prototype collABorative. When everyone comes to the space to both benefit from and contributes to the collective experience, everyone benefits and better projects may result.

“spending more time = more collaboration”- Ogihara

Beyond the theory that collaboration breeds success, one of the underlying concepts at NextFab is that as a country we need to get back to building things. Ms. Ogihara talked about the disconnect between consumers and producers, how many consumers don’t know or care about how and where their products come from. And therein lies the gap between the success of Chinese manufacturing and America. And this disconnect is being extended into higher education.

This is something that Ms. Ogihara said she noticed before coming to NextFab, while working with architecture firms. Students coming out of school can talk philosophically about architecture but they don't know how to build anything. Before you know how to build something, you cannot design it. And this is one of the benefits of the NextFab model, members and corporate clients may come to the space with an idea of how to build something, but in many cases their designs need to change or evolve, and in the process they learn new ways of building.

“Theory is being promoted over practice” - Ogihara

During a visit to NextFab, the staff were talking both about projects they were working on for clients as well as their own personal projects and passions. Ms. Ogihara was asked about ways to display or promote these personal projects by the staff. She said that while there are no concrete plans to

implement an exhibit space, it is one thing they have been talking about in order to promote the work they do, especially in light of the success of the BreadBoard program and gallery.

Beyond serving corporate clients and individual members, NextFab also runs workshops and outreach programs. These programs can range from meetups, hosting other groups to even having school field trips. One woman is even going to have her birthday party there, complete with DIY activities and a cake with icing “printed” on it with their CNC cake bot. Ms. Ogihara says that something special happens when both children and adults come into NextFab, both groups are amazed. Children love all the toys and things that can be made in the space. Adults, some of whom have never encountered the incredible technologies in the studio such as laser cutters and 3D printers are astounded by them.

There are many aspects of NextFab's creative and business model which are being applied to the plan for the prototype collABorative. Working with two separate groups of innovators benefits both groups. Fostering connections with university professors and students can bring learning by doing to the next generation of innovators. NextFab has the unique ability to inspire everyone who goes there, and it is this inspiration to design and build which will be incorporated into the prototype collABorative.

Stabert, Lee. “Group Think: Models of Collaborative Consumption Catch on in Philly.” Flying Kite. 15 Nov. 2011. Web. 21 Mar. 2012.

Takiff, Johnathan. “Stoking the Creative Fires: NextFab & Its Kind Give the Communal-workshop a ...” Philadelphia Inquirer. The Philadelphia Daily News, 29 Feb. 2012. Web. 21 Mar. 2012.

“See the space,
be inspired” - Ogihara

Indy Hall

During the conversation with NextFab's Community Development Specialist, Itsuki Ogihara, she made mention of a space which is inspiring NextFab's movement towards building a stronger and more active community. This space is called Independents Hall (Indy Hall) and is in the forefront of a new collaborative model called "co-working". Co-working spaces cater mostly to independent and freelance workers who would normally work from home or peppered throughout any number of coffee shops. The concept is that by creating a space for independent workers to work on their individual projects in a shared

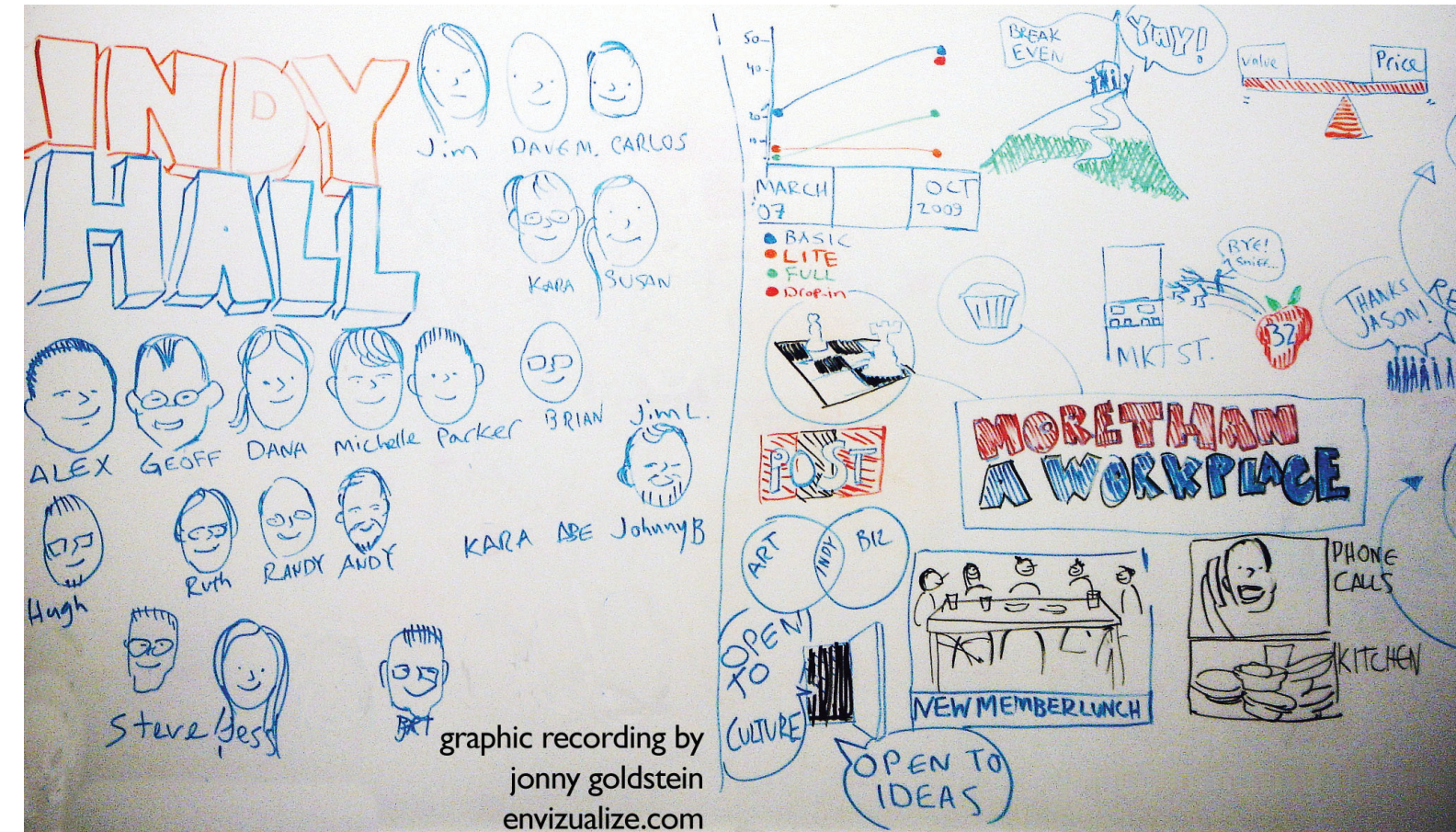
space, everybody can benefit from increased social interaction, camaraderie and the daily structure that is missing when one works from home.

Indy Hall is the brainchild of Alex Hillman and Geoff DiMasi. The idea came about after Hillman realized that he was seeing the same people over and over again in meetups and talks throughout Philadelphia.

He eventually organized these independent workers to meet any number of changing locations throughout the city to work together on individual projects. Out of these meetups, Hillman and DiMassi decided to found a dedicated space for independents, this space became Indy Hall. The Hall is open to anyone on a day to day basis, but visitors are encouraged to purchase a membership. Memberships can range from

“Bilotta said to Hillman, “You’re working alone, I’m working alone—what the [expletive deleted] are we doing?””

- Fagone, *The Indy Hall Experiment*



“They are hyper-social geeks who Show & Tell and Lunch & Learn and work alongside each other for 10 hours at a time and then go out to bars together and drink till dawn. And the solution to any problem at the Hall is to become even more social.”

- Fagone, *The Indy Hall Experiment*

\$25 for a single day all the way to \$275 a month for unlimited 24/7 access with a dedicated work space. Indy Hall provides all the facilities an independent or freelance worker could want: Wi-Fi, kitchen with coffee maker, fridge stocked with microbrews, a lounge with a flatscreen and an Xbox 360, ample workspace and conference rooms for meetings.



Alex Hillman, founder of Indy Hall

The interesting take away for the prototype colLABorative is the way in which a community can converge around a shared need. If we believe that a need exists for museums to prototype and test exhibit solutions and engage with other professionals, the coalescence of this community can inform the type of atmosphere that is intended in the prototype colLABorative.

Stabert, Lee. “Group Think: Models of Collaborative Consumption Catch on in Philly.” *Flying Kite*. 15 Nov. 2011. Web. 21 Mar. 2012.

Fost, Dan. “They’re Working on Their Own, Just Side by Side.” *The New York Times* 20 Feb. 2008. Web.

Fagone, Jason. “The Indy Hall Experiment.” *Phillymag.com*. *Philadelphia Magazine*, Nov. 2011. Web. 21 Mar. 2012.

“Indy Hallers believe that business is too ruthless, too mechanical, too secretive, so they strive to make business friendly, casual and open. They are inverse corporate raiders, with all of the same drive and desire but none of the core beliefs. They share information publicly, even sensitive information about their finances.”

- Fagone, *The Indy Hall Experiment*

IDEO, Brainstorming and Prototyping

Lately, there has been a lot written about the failure of brainstorming as a technique. With titles like “GROUPTHINK The brainstorming myth” and “The Brainstorming Process Is B.S. But Can We Rework It?” some are declaring that brainstorming is a failed experiment, that it inherently stifles innovation and creativity. How is it then that brainstorming became so heralded in the first place? Have companies been wrong all along? Moreover, how can a company like IDEO, arguably one of the most heralded design firms in history be so successful and declare that “Brainstorming is practically a religion”? What do they know that others do not?

David Kelley founded IDEO in 1978 and it has become one of the world's most prolific design and innovation firms. Perhaps, the biggest reason IDEO is so successful while using the “traditional” brainstorming model is

precisely because they see it is so integral to everything they do. Rather than an ancillary process, or one phase of many which is to be performed then completed, brainstorming is at the very heart of the culture of IDEO.

“Many businesspeople treat brainstorming as a check box, a threshold variable, like “Can you ride a bicycle?” or “Do you know how to tie your shoes?” They overlook the possibility that brainstorming can be a skill, an art, more like playing the piano than tying your shoes.”

- Kelley and Littman, p.55

“Ideo takes its rules for brainstorming so seriously that they're printed on a large banner that runs across the top of our classroom's whiteboards. They are:

Defer judgment (otherwise you'll interrupt the flow of ideas);

build on the ideas of others (it's far more productive than merely hogging the glory for your own insights);

stay focused on the topic (no tangents);

one person at a time (so you don't drown out that quiet, brilliant mumbler in the corner of the room);

go for quantity (when Ideo staffers brainstorm, they shoot for 150 ideas in 30 to 45 minutes);

encourage wild ideas (to paraphrase Einstein, “If at first an idea doesn't sound absurd, then there's no hope for it”);

and be visual (sketch ideas to help people understand them).”

- Brown, *A Day at Innovation U*

“The problem with brainstorming is that everyone thinks they already do it.”

- Kelley and Littman p.55

As Kelley and Littman observe, brainstorming is a skill, not a line item to be checked off. Indeed some of the outspoken critics of brainstorming seem to think it is a simple task:

“If you want a rash of new ideas, you get a group of people in a room, have them shout things out, and make sure not to criticize, because that sort of self-censoring is sure to kill the flow of new thoughts.”

- Kuang, *The Brainstorming Process Is B.S. But Can We Rework It?*

But this is very much an over simplification and mischaracterization of what brainstorming is all about. Furthermore, it assumes that brainstorming is the only creative collaborative process as opposed to only one step in the process, and many see brainstorming as only valuable at the beginning as opposed to applicable throughout the development process.

In some cases, the assertion that brainstorming is ineffective is based on research saying that brainstorming produces fewer numbers of ideas. These assertions are confusing the goal and the method of brainstorming. The goal of brainstorming is to produce quality ideas, solving a problem in the best way. The method for

producing these ideas is coming up with a large number of ideas, then refining them to find the best. So to assume that because a brainstorming process may produce fractionally fewer ideas than concepting alone is missing the point.

The process of brainstorming was started by Alex Osborn when he penned *Your Creative Power* in 1948. Osborn was a partner in the advertising agency B.B.D.O., lauded for its innovation (Lehrer). Much of the criticism of the process of brainstorming centers around one of the original “rules” of brainstorming, which is to avoid criticism.

“The book outlined the essential rules of a successful brainstorming session. The most important of these, Osborn said - the thing that distinguishes brainstorming from other types of group activity - was the absence of criticism and negative feedback. If people were worried that their ideas might be ridiculed by the group, the process would fail. “Creativity is so delicate a flower that praise tends to make it bloom while discouragement often nips it in the bud,” he wrote.”

- Lehrer, *Groupthink*

“Prototyping, brainstorming, and observations. These are the fundamentals, the reading, writing and arithmetic of innovation.”

- Kelley and Littman p.121

Lehrer notes a study showing that the presence of criticism in the brainstorming process actually increases productivity. Criticizing, eliminating and refining ideas generated during an initial brainstorming session is the logical next step in a development process.

That next logical step for IDEO is prototyping. Prototyping for IDEO is nearly as integral to their development process as brainstorming, and it really involves refining their ideas to create a viable product. Designers use observations of people using their prototypes to inform the next round of development.

Because of the success IDEO has had in creating breakthrough and innovative products, many of their clients have asked how they do it. What is IDEO's "secret sauce"? In order to help many of their clients increase innovation in all areas of their business, IDEO has begun running a series of workshops, called IDEO U. Employees from some of IDEO's client institutions can come and learn how IDEO does brainstorming and prototyping.

This education workshop functions similarly to the way development sessions at the prototype collABorative are envisioned. Brainstorming and prototyping are integral activities for IDEO and will function at the heart of the prototype collABorative.

IDEO U's workshop participants learn a process and how to apply it to challenges in their own work. The goal of the collABorative is to both create devices that will one day be used in a museum, as well as to teach skills and processes. Participants in development sessions at the prototype collABorative will learn similar skills, while at the same time producing something of value for a local museum.

Kuang, Cliff. "The Brainstorming Process Is B.S. But Can We Rework It?" Co.Design. Fast Company, 31 Jan. 2012. Web. 13 Apr. 2012.

Lehrer, Jonah. "Groupthink." The New Yorker. 30 Jan. 2012. Web. 13 Apr. 2012.

Brown, Ed. "A Day at Innovation U. Can You Learn Creativity? At Design Firm Ideo, They Teach It in Steps: Brainstorming, Rapid Prototyping, and Playing Cannonball Run." CNNMoney / Fortune Magazine. Cable News Network, 12 Apr. 1999. Web. 13 Apr. 2012.

Kelley, Tom, and Jonathan Littman. The Art of Innovation: Lessons in Creativity from IDEO, America's Leading Design Firm. New York: Currency/Doubleday, 2001. Print.

Wikinomics: systems for collaboration

The term “wikinomics” is one which describes a variety of collaborative platforms for sharing. This sharing can take various forms as outlined in the book, *Wikinomics: How Mass Collaboration Changes Everything* by Don Tapscott and Anthony Williams. What follows is a synopsis of the these different forms, which were first categorized and named by Tapscott and Williams. Understanding these various collaborative systems helps to inform new ways of collaborating and how they can apply to museums.

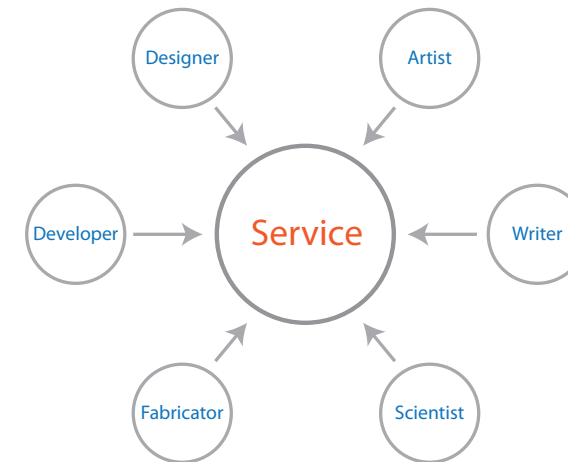
“[wikinomics is] a term I invented to refer to the theory and practice of harnessing mass collaboration.”

- Don Tapscott

Peering/crowdsourcing:

Just as it sounds, peering employs a community of peers for innovation. The best example of Peering is seen in the Linux community. Linux, at its core, is an open source computer operating system. Its creator, Linus Torvalds put all of the code online for anyone to download, run, modify and distribute (even for profit). The community consists of freelance developers, hobbyists and employees of giant technology companies such as IBM. In *Wikinomics*, the authors outline the development and implementation of the Apache (based on Linux) open source web server software. IBM at one point was spending large amounts of research and development money developing a proprietary web server suite which was full of problems. IBM made the bold decision to scrap their proprietary software and join the Apache community. By having their in house developers add their expertise to the Apache

community, IBM could benefit not only from the work of their in-house employees, but those outside of their firm as well. Apache has gone on to become the most popular software platform for web servers in the world.



Another example of peering is the platform which is almost synonymous with the term wikinomics, and that is the online dictionary, Wikipedia. This is the most well known example of a wiki, an online database of documents which can be added to or edited by anyone with access to the internet. An important distinction can be drawn between

the wiki model and the Linux model. While wikipedia is run by a central organization which monitors and edits the submissions made, the Linux community is more loosely organized. There is a difference between self-organized groups of collaborators and groups who organize around centralized entities or services.

Ideagoras:

Ideagoras are “marketplaces for ideas, innovations and uniquely qualified minds”. The prime example of an ideagora is InnoCentive. This marketplace (supported primarily by Proctor and Gamble) is a place where firms can post problems and challenges to which anyone can respond to. The firm can then look at all the responses and select a winner. The person with the winning design gets paid (often a considerable sum) and the firm gets the design. The challenges on InnoCentive range from engineering to chemistry, engaging a group of freelance scientists and designers.

This is a boon for the firm, who gets access to new research and development at a relatively inexpensive cost. But for the designers whose solutions were not chosen means no reward for their work.

Prosumers:

The concept of the prosumer is an evolution of the consumer. Whereas the consumer passively takes in products and content developed by others, the Prosumer takes content in, modifies or evolves it and returns it either to the company or freely to everyone. An example of the prosumer is the remix culture that surrounds digital music. Sometimes referred to as a “Mash-up”, music listeners are taking tracks, modifying and combining them with extremely interesting results. The artist, Danger Mouse rose to fame with *The Grey Album* which combined lyrics from the rapper Jay-Z’s

Black Album with The Beatles LB, commonly called *The White Album*. At first, *The Grey Album* caused nothing but problems for Danger Mouse. Record companies sued and the case was stuck in court for years. More recently, however, he has spun the controversial success of the album into an auspicious production career in the music industry. Another example of the prosumer is the burgeoning DIY (Do It Yourself) culture. This can be seen in the online craft goods marketplace etsy as well as instructables (a website for DIY instructions), and MAKE magazine. The DIY community will take any product, tear it apart and use its components to make new things. Savvy companies are finding ways to harness the creativity in the DIY community to inform their own designs and products.

“Companies that produce design-driven innovations value highly their interactions with this network of interpreters. These companies understand that **they are immersed in a collective research laboratory through which firms, designers, artists, and schools are conducting their own investigations.** These researchers are engaged, explicitly and implicitly, in a continuous dialogue: they exchange insights, interpretations and proposals [...]. They test the robustness of their assumptions and share their visions.”

The New Alexandrians:

The title “The New Alexandrians” comes from the Alexandrian Greeks and the great library of Alexandria. There, all the major scientific works in recorded history were collected at that time. The New Alexandrians are currently pioneering the sharing of scientific knowledge, and nowhere is this more evident than in the Human Genome Project. This project was an incredible undertaking to map the entire human genome, and took the collaboration of firms around the globe. If one company tried to do the project themselves, the cost and time investment would be incalculable. Only by combining their efforts and sharing the results were these companies able to finish the project.

Crowdsourcing:

noun

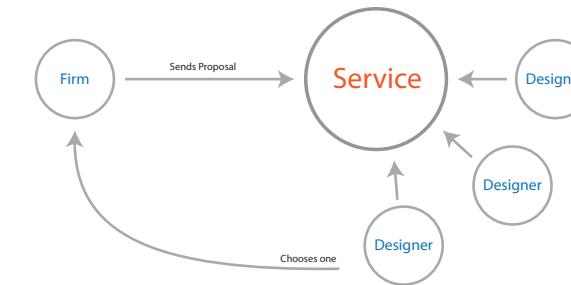
[kraúd-sór-sin]

1. the practice of obtaining needed services, ideas, or content by soliciting contributions from a large group of people and especially from the online community rather than from traditional employees or suppliers

-Mirraim-Webster Collegiate Dictionary

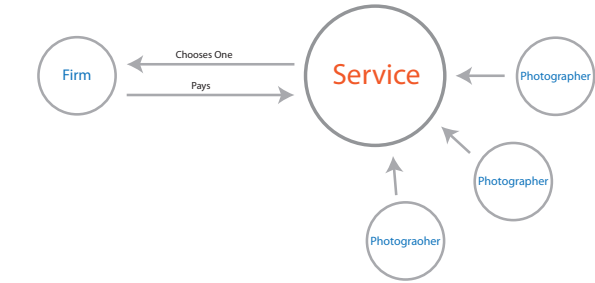
Crowdsourcing is a term that was coined by Jeff Howe in June of 2006 in an article for Wired magazine entitled, “The Rise of Crowdsourcing”. The concept of a company or firm sourcing talent from a large group of people fits underneath the umbrella of Wikinomics. Indeed the “ideagora” or idea marketplace is a prime example of crowdsourcing. The concept itself is so powerful however that it deserves critical analysis. In researching these concept, three primary models for crowdsourcing have been identified.

The first is based on the aforementioned InnoCentive. In this model, the firm sends a proposal to a service (like InnoCentive) allowing for whoever wishes to answer it. Freelance scientists and designers respond to the proposal through the service. The firm is then free to browse the possible solutions and pick the best one. The person whose solutions are selected is rewarded for their work and everyone else gets nothing. This process is similar to a traditional Request For Proposal (RFP) but differs in one important way.



When sending out an RFP, firms generally send them to qualified firms who have a reputation or an ability to fulfill it. When using a crowdsourcing service network however, the proposal is available for anyone to respond to, professional or not. This allows

for a wider range of diverse responses than normally would be found in a traditional RFP.



The second model is based on iStockphoto, an online stock photo service. The model for iStockphoto works almost completely backwards from the InnoCentive model. Amateur photographers submit their work to the service which maintains the repository of

“ [Crowdsourcing] poses a tantalizing question: What if the solutions to our greatest problems weren't waiting to be conceived, but already existed somewhere, just waiting to be found, in the warp and weave of this vibrant human network? ”

- Jeff Howe, *The Rise of Crowdsourcing*

images. When a firm or designer requires an image, they can search this database for an image. When they purchase it, the service sends the money to the photographer, keeping a small profit for itself. This shook up the traditional stock photography market, where professional photographers would sell photos to a service which then owned the right to license it to others. With the istockphoto model, each amateur contributor to the repository is, in essence their own business. The service provides the forum for connecting the photographers with firms looking for stock photography.

The third model for crowdsourcing is the previously mentioned Linux and apache software model. It is important to note how this model differs from the previous two models. The previous two have an intermediary between the content creators and the end firm utilizing the end product. In the peering model however, there is no barrier between the content creators and the end product.

Looking at the emerging world of wikinomics poses an interesting question: How can wikinomics be further applied to the museum field?

The concepts which are most applicable for the prototype colLABorative are peering, prosumers and crowdsourcing. Each of the concepts influence the plan (outlined on p.86) in different ways. Peering and crowdsourcing describe new methods for production, engaging a large base of experiences. This large base of experiences can come from anyone inside or outside of the institution. Prosumers are engaged consumers, actively participating in the development of the product they consume. Applying this concept in museums would allow visitors to shape the design and development of current and future exhibits

through evaluation and testing.

Additionally, peering describes the manner in which results from the development are disseminated back to the public. In order for the prototype colLABorative to influence the museum field as a whole, the results created should be available to all those who can benefit from them.

Howe, Jeff. "Wired 14.06: The Rise of Crowdsourcing." Wired.com. June 2006. Web. 12 Sept. 2011.

Tapscott, Don, and Anthony D. Williams. Wikinomics: How Mass Collaboration Changes Everything. New York, NY [u.a.: Portfolio/Penguin, 2010. Print.

Verganti, Roberto. Design Driven Innovation: Changing the Rules of Competition by Radically Innovating What Things Mean. Harvard Business Press: Boston, 2009. Print.

"Crowdsourcing." Merriam-Webster. Merriam-Webster. Web. 22 Apr. 2012.

The concept of artscience is manifest in many forms. The most visible of which are the current manifestations of artscience labs whose heritage goes back to concepts and ideas developed at The Bauhaus. These concepts then evolved in new spaces such as the MIT Media Lab and Xerox PARC among others. The larger idea of art/science goes beyond the walls of these institutions to more unconventional spaces.

Artscience is a movement which is supported by artists, scientists, writers, and designers.

In 2011, Bob Root-Bernstein, Todd Siler, Adam Brown and Kenneth Snelson wrote an article titled “ArtScience: Integrative Collaboration to Create a Sustainable Future” in the journal *Leonardo*. This article contained an artscience manifesto consisting of 17 points defining the mission and promise of artscience.

The artscience manifesto:



1. Everything can be understood through art but that understanding is incomplete.
2. Everything can be understood through science but that understanding is incomplete.
3. ArtScience enables us to achieve a more complete and universal understanding of things.
4. ArtScience involves understanding the human experience of nature through the synthesis of artistic and scientific modes of exploration and expression.
5. **ArtScience melds subjective, sensory, emotional and personal understanding with objective, analytical, rational, public understanding.**
6. ArtScience is not embodied in its products so much as it is expressed through the convergence of artistic and scientific processes and skills.
7. ArtScience is not Art + Science or Art-and-Science or Art/Science, in which the components retain their disciplinary distinctions and compartmentalization.
8. ArtScience transcends and integrates all disciplines or forms of knowledge.
9. One who practices ArtScience is both an artist and a scientist simultaneously and one who

produces things that are both artistic and scientific simultaneously.

10. Every major artistic advance, technological breakthrough, scientific discovery and medical innovation since the beginning of civilization has resulted from the process of ArtScience.
11. Every major inventor and innovator in history was an ArtScience practitioner.
12. We must teach art, science, technology, engineering and mathematics as integrated disciplines, not separately.
13. We must create curricula based in the history, philosophy and practice of ArtScience, using best practices in experiential learning.
14. The vision of ArtScience is the re-humanization of all knowledge.
15. The mission of ArtScience is the re-integration of all knowledge.
16. The goal of ArtScience is to cultivate a New Renaissance.
17. **The objective of ArtScience is to inspire open-mindedness, curiosity, creativity, imagination, critical thinking and problem solving through innovation and collaboration!**



“ArtScience will move art out of galleries and museums, science from its laboratories and journals, into **newly invented spaces** and places modeled after MIT’s Media Lab, La Laboratoire in Paris, SymbioticA in Perth and Harvard University’s Initiative for Innovative Computing (IIC), which already do scientific exploration, engineering, design and artistic display in a single space. **Other novel venues will be invented. In that inventiveness lies the excitement of ArtScience.**”

- Root-Bernstein, Siler, Brown and Snelson

artscience labs

The current manifestations of artscience labs owe much of their heritage to the advancements made by The Bauhaus, the MIT Media Lab and Xerox PARC. In many ways, artscience labs like Le Laboratoire and the MIT Media Lab represent different sides of the same coin.

Le Laboratoire in Paris and Science Gallery in Dublin represent gallery or exhibition focused institutions. These spaces connect artists and scientists in a way which promotes the public dissemination of the work. Collaborations tend to be undertaken with the goal of displaying the results within the gallery.

In *The Lab: Creativity and Culture* by David Edwards, he describes a broad outline for his vision for a new artscience lab which became Le Laboratoire. Edwards describes a series of cases from Le

“Le Laboratoire, located in Paris’s first arrondissement, invites the public to experience the creative process that drives innovation and value in culture as in industry, society, and education as a fusion of art and of science producing tangible – if transient – art and design outcomes. These outcomes or “works-in-progress” result from experiments conceived of and led by leading international artists in collaboration with leading international scientists”

- Edwards

Laboratoire where unique experiences were created and exhibited to visitors. These experiences are generally the product of the collaboration between a scientist and an artist. Photographer James Nachtwey

worked with Anne Goldberg, a medical scientist on a photographic project about AIDS and tuberculosis patients. Ryoji Ikeda, a Japanese musician collaborated with Benedict Gross, a mathematician to create printed works based in music and mathematical formulas.

In addition to these collaborations, David Edwards runs what he calls an “Idea Translation Lab”, which are student workshops where the students are given problems or ideas and spin them forward into projects. As the broadest entry-point to the idea funnel, the idea translation lab helps students “learn to learn” in real world settings while pursuing dreams and frontiers of knowledge. Student projects begin as “seed ideas” proposed by artists, designers, scientists, and entrepreneurs. The projects then evolve from there through student initiative and creativity into collaborative ventures in art or design, and often some form of lasting implementation in society. (“The Lab” pp.49)

Institutions such as the MIT Media Lab and Xerox PARC also foster collaborations between artists and scientists, but the focus of these collaborations tends to be less on exhibition and more on research and technological development.

This distinction makes sense in that the results are in line with the traditionally held roles of each type of institution. There are however important exceptions to these typical constructs, most notably the creation of “Le Whif” a device for inhaling food flavors such as chocolate. “Le Whif” debuted as an oddity displayed in the gallery at Le Laboratoire. It soon became clear that demand for the product would require it going into production. It can now be purchased from the lab store in Paris.

Edwards, David A. *The Lab: Creativity and Culture*. Cambridge, MA: Harvard UP, 2010. Print.

“lab·o·ra·to·ry

[lab-ruh-tawr-ee, -tohr-ee, lab-er-uh-;
Brit. luh-bor-uh-tuh-ree, -uh-tree]
noun

1. a building, part of a building, or other place equipped to conduct scientific experiments, tests, investigations, etc., or to manufacture chemicals, medicines, or the like.

2. any place, situation, set of conditions, or the like, conducive to experimentation, investigation, observation, etc.; anything suggestive of a scientific laboratory.”

Research Summation

In conducting research into these institutions and concepts, connections between these methods and the institutions that pioneered them and employ them were found.

The Bauhaus first introduced the concepts of artscience and the importance of building. The benefit building things can provide for the designer and the design pervades the maker community and is the main importance of protoyping. After it was dissolved, other design schools adopted the model of education The Bauhaus developed to teach art and design. The Exploratorium pioneered a new model of interaction for museum visitors. Experiences were prototyped, built and tested on the museum floor. And in the spirit of open-source design, The Exploratorium shared their discoveries and designs with the rest of the museum field. Taking inspiration from the concepts and institutions before, the exhibition design

process at The Franklin Institute represents another example of the benefits and importance of prototyping and evaluation in the museum setting. Looking at the MIT Media Lab and Xerox PARC are examples of artscience in action and shows us to power of interdisciplinary collaboration. These labs foster partnerships with professionals who wouldn't normally work together. What results is often innovative and imaginative solutions to challenges. NextFab Studio and IndyHall take the concepts of interdisciplinary collaboration and prototyping, and apply them to new spaces. Their breakthrough was not focusing on specific groups but are open to anyone to participate. IDEO, the industrial design firm practice brainstorming and collaborative development as almost a religion. Taking inspiration from their process and methodology would provide valuable for developing the prototype collABorative.

The analyses of the different concepts concerning collaboration, research and development contain best case scenarios for how to implement these methods. The institutions analyzed earlier show that there are opportunities for future institutions or spaces to take these concepts and methods and combine them to suit the needs. While some of the concepts employed by these institutions may at first seem disparate, the ways in which these institutions combined them and borrowed from each other inspired the application section of this thesis.

Evaluation

Concept Evaluation

In order to gauge interest in the prototype colLABorative within the museum communities, A front-end evaluation was conducted.

The survey instrument was administered on surveymonkey.com, a website for conducting and collecting responses to surveys. The survey was sent to the “museum-L” e-mail listserv, the Association of Science and Technology Centers (ASTC) e-mail listserv, as well as on several museum groups on the professional social networking site, linkedin.

Survey instruments can be found in the appendix, and all data is available on the CD in the back of this book.

Surveys were prefaced with the same opening statement to give the survey taker context. This opening statement is as follows:

This survey is a research portion of my graduate thesis.

My thesis project is researching the possible implementation of a collaborative design and exhibition space where university students and faculty, museum professionals and the public research, brainstorm, develop and prototype solutions to problems proposed by participating museums.

I am seeking input to gauge interest in and help shape this thesis project. I greatly value your thoughts and opinions.

Your response is of course anonymous. However, if you would like to contact me or have any questions about my thesis project, I can be reached at:

Dstreelman@uarts.edu

Thank you for your participation!

- Dan Streelman

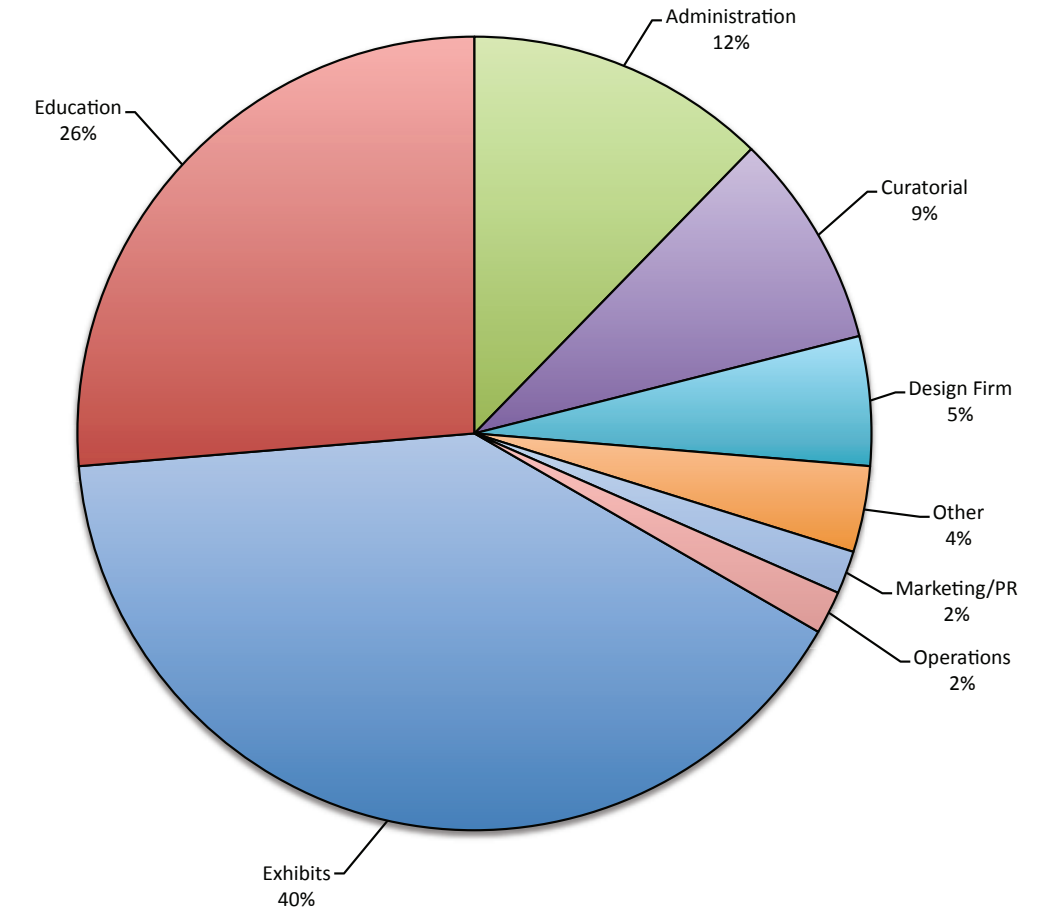
Data Analysis

In order to determine the need for and interest in the prototype collABorative within the museum community, a front-end survey was implemented. Using the online survey tool, surveymonkey, this instrument was sent to approximately 5,000 museum professionals subscribed to the Museum-L and ASTC email listservs. After 2 weeks of being open, 66 responses have been collected.

Demographics

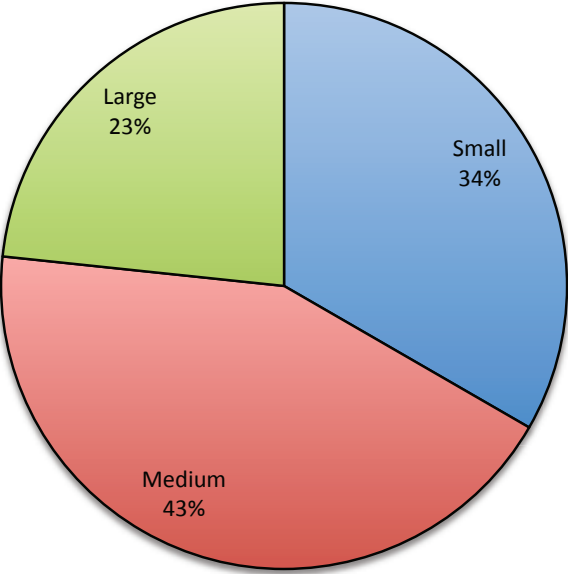
While the surveys were anonymous, some demographics were collected. This information was helpful in seeing the types of professionals responding to the survey as well as providing interesting insights into their thoughts about the prototype collABorative.

Museum Department or Role



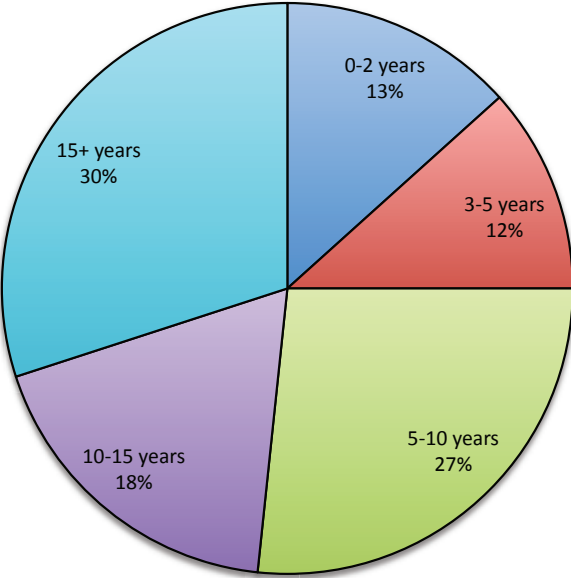
While some respondents work for either an independent design firm or ancillary departments within museums, 87% of respondents were from exhibits, education, administration and curatorial departments, those with the most direct influence in the direction and development of exhibitions and programs.

Institution Size



Respondents were asked what size they would consider their institution to be. The majority (43%) considered their institution to be medium sized. Important to note is that more people from medium institutions responded (43%) than those from large institutions, (23%) with small institutions in between (34%). This is most likely due to the fact that there are more medium and small institutions than large ones.

Experience in the Museum Field

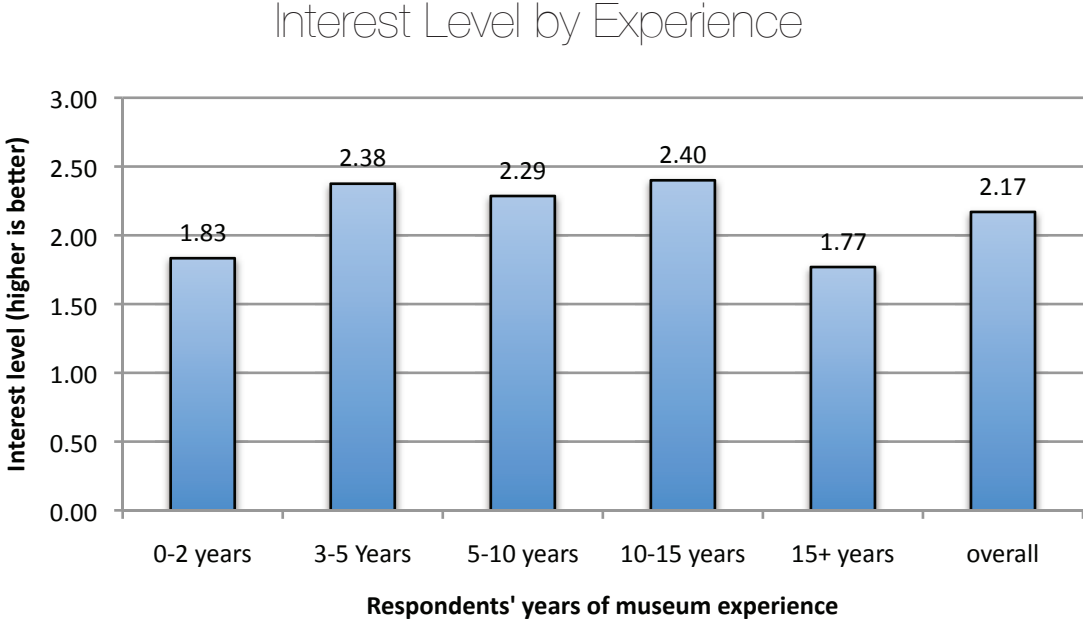


Respondents were asked how many years of experience they had in the museum field. Results were used to cross reference with some of the more substantive question to follow.

Question:
Please rate your interest in participating in a collaborative design space for brainstorming, mocking-up, prototyping and testing solutions for museum challenges

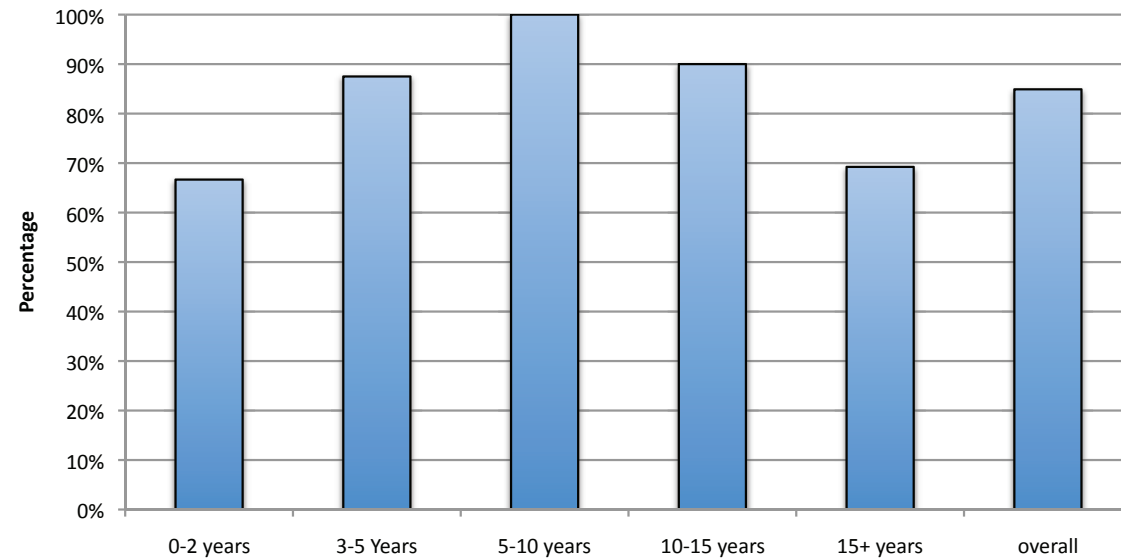
The responses for this question are a range with four options:

- No interest
- A little interest
- Moderately interested
- Very interested



This chart looks at the average interest level of respondents broken down by their number years of experience in the museum field. This shows that, on average, professionals in the middle of their careers (3 to 15 years of experience) have a higher average interest level than those with 2 or fewer, or more than 15 years of museum experience.

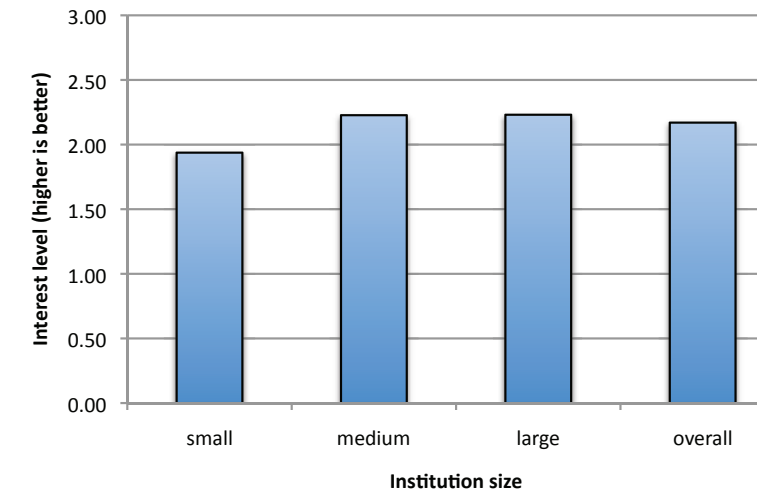
Percentage of Respondents Moderately or Very Interested by Experience



This chart looks at the average interest level of respondents broken down by their experience in the museum field. When combining “Moderately interested” and “Very interested” responses, this graph shows even more clearly the higher average interest level among those with 3-15 years of museum experience.

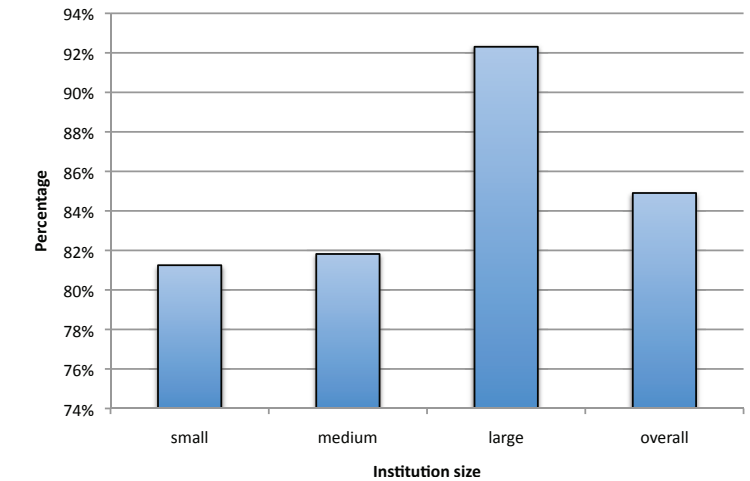
Both of the preceding graphs show a clear pattern of higher interest level among respondents with 3-15 years of experience, as well as much lower interest levels among those with less than 2 or more than 15 years of museum experience. While it is not exactly clear as to why this may be, one possible reason might be that both of these groups are slightly more resistant to radical change. Those with fewer years of experience may still be figuring out how museums operate, and those with more experience could be more set in their ways.

Interest Level by Institution Size



This graph expresses the same interest level question but breaks it down by institution size. While the values are similar, this does show that on average, interest level increases among those from larger and larger institutions.

Percentage of Respondents Moderately or Very Interested by Institution Size

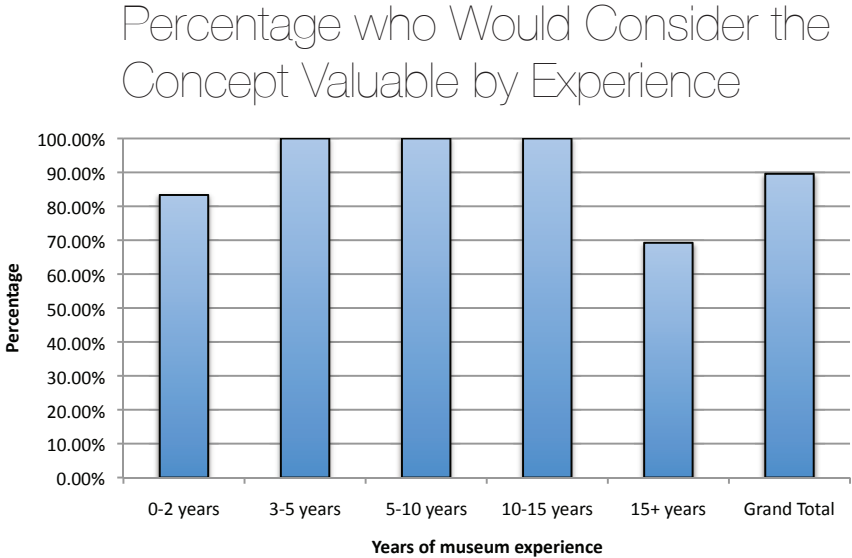


When combining “Moderately interested” and “Very interested” responses, this graph shows a very clear increase in interest level among those from larger institutions.

Both of the preceding graphs show a slight increase in interest level among larger institutions as opposed to smaller ones.

Question:
Would a collaborative design and exhibition space where university students and faculty, museum professionals and the public research, brainstorm, develop and prototype solutions to problems proposed by participating museums be valuable to you, or your institution?

This is a simple yes or no question with the option to explain why it would or would not be valuable.



This graph shows the percentage of respondents who think the space would be of value to them or their institution, expressed by their years of museum experience. Those with 3-15 years consider the space to be more valuable than those with fewer than 2 or more than 15 years of experience.

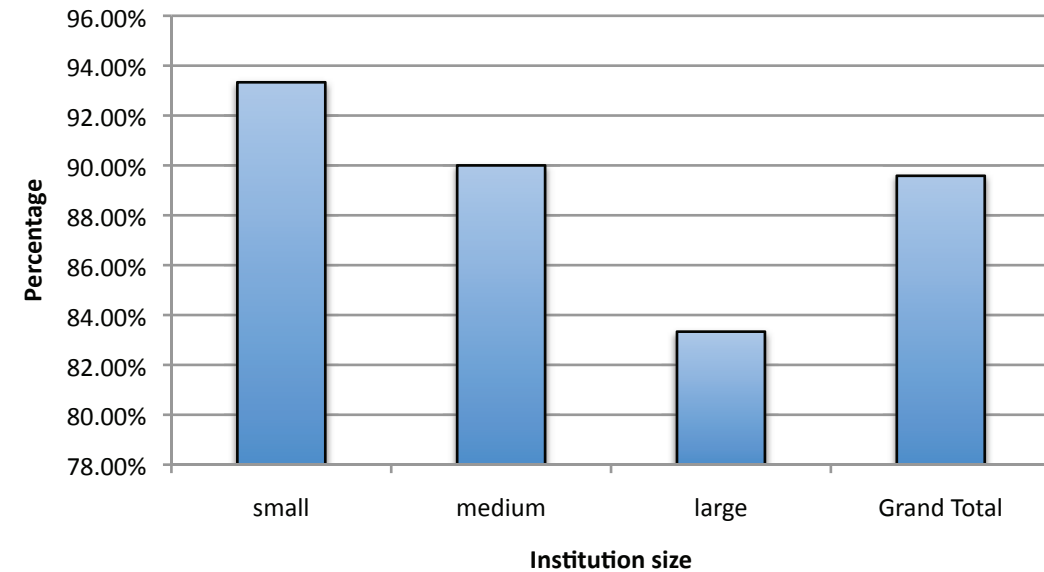
Some of the free responses to the question of why or why not help to clarify exactly why respondents thought it would be valuable:

“We don't have enough space to prototype, so such a space would simply allow us to try it!”
- Survey #57, Museum Survey

“I learn about a lot of exhibit problems by traveling to museums around our state. I have some solution ideas but little or no fabrication capabilities. An outside organization that would work with our problem and solution ideas could be a big help.”
- Survey #41, Museum Survey

“We don't currently have the facilities or staff to adequately pre-test ideas and get feedback before launching so this type of space could be quite useful.”
- Survey #52, Museum Survey

Percentage who Would Consider the Concept Valuable by Institution Size



When the same question is expressed by institution size however, we see that smaller institutions consider the space to be more valuable than larger ones. While at first it would seem to contradict the previous interest level data, it is important to note the difference between interest level and value. Someone from a larger institution may be personally very interested in the concept but realize that because their institution may have more resources, it is in less need of an outside space for brainstorming, prototyping and testing. Similarly, while someone from a small institution may not be as interested in the specific concept, they see that because of limited resources, their institution could benefit from the services the space could offer.

“Prototyping and evaluation are two integral steps in the exhibit / program development process, and unfortunately there is no standardized method for capturing the mood of an audience. A space where institutions and research facilities come together to collaborate and study common issues and theories, would be invaluable to the entire museum community.”

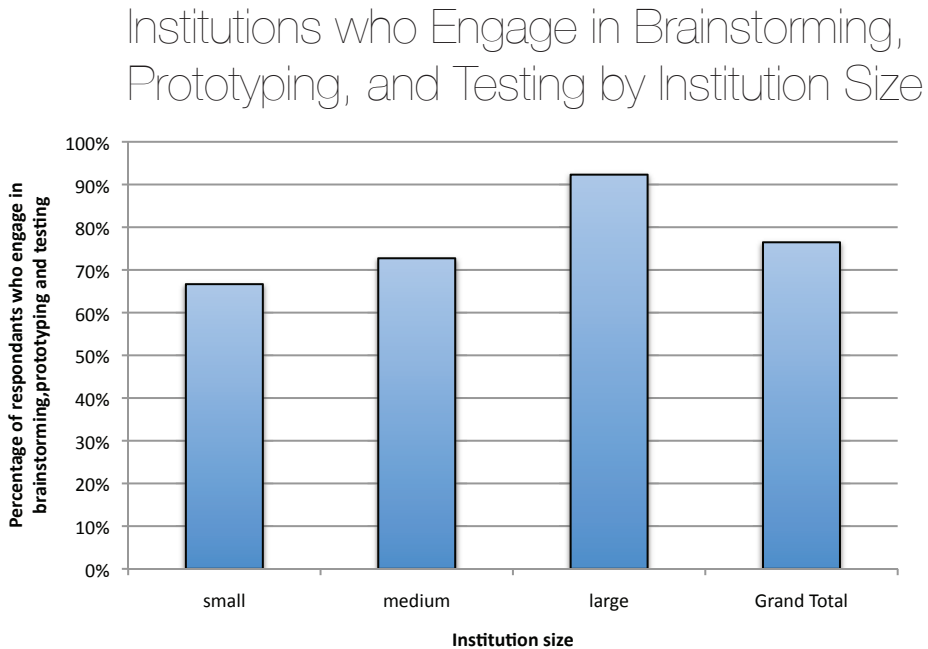
- Survey #34, Museum Survey

“I work at a start-up museum and am the only educator on staff. I lack people to collaborate with/prototype in the early stages of a product.”

- Survey #30, Museum Survey

Question:
Does your institution engage in a formal or informal brainstorming, development, prototyping and testing process?

This is also a simple yes or no question with the option to explain why the respondent's institution does not engage in these practices or to describe their process.



This graph shows the percentage of those who engage in brainstorming, prototyping and testing expressed by institution size. This shows that as institution size gets larger so does the percentage of those institutions who engage in these practices. This data supports the previous questions as well as the written responses. Larger institutions have the resources, financial and human to engage in formal brainstorming, prototyping and testing while smaller institutions generally have fewer of these resources.

Some of the written responses reinforce this idea:

“Our institution operates in a rather old- fashioned, hierarchical manner; some of us on staff would like to implement more collaboration and prototyping into oh exhibition development, but many of the entrenched authority figures don't support the idea. Also, it is sometimes hard to explain why prototyping is important in an art museum, because our exhibitions aren't considered “participatory”.”

- Survey #55, Museum Survey

“Process is left to the curator and a few people who have deadlines and pressure from every angle. Exhibits are doable and average.”

- Survey #14, Museum Survey

“we are trying to implement these design processes into our practice as educators and museum professionals, but it is not easy in an institution that has a lot of bureaucracy, fear of failure, and inefficient systems.”

- Survey #8, Museum Survey

“Not that I know of. Most ideas come from the top down or the curator.”

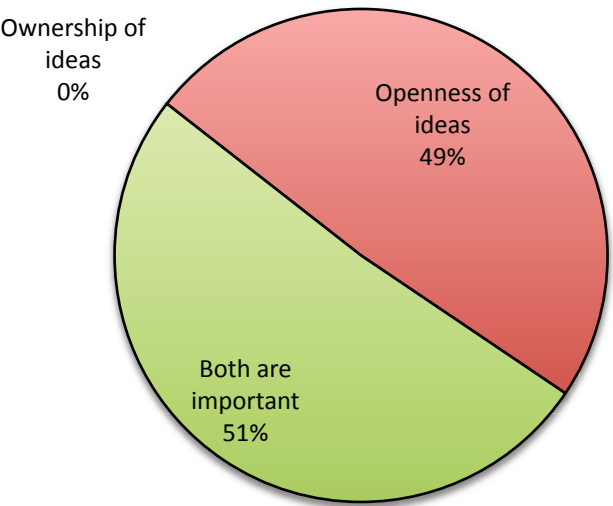
- Survey #6, Museum Survey

Which is more important, Ownership of ideas or Openness of ideas?

Because some of the concepts that are being incorporated into the prototype collABorative are wikinomics and open-source, the importance of open ideas is important to understand. The responses to this question were:

- Ownership of ideas
- Openness of ideas
- Both are important

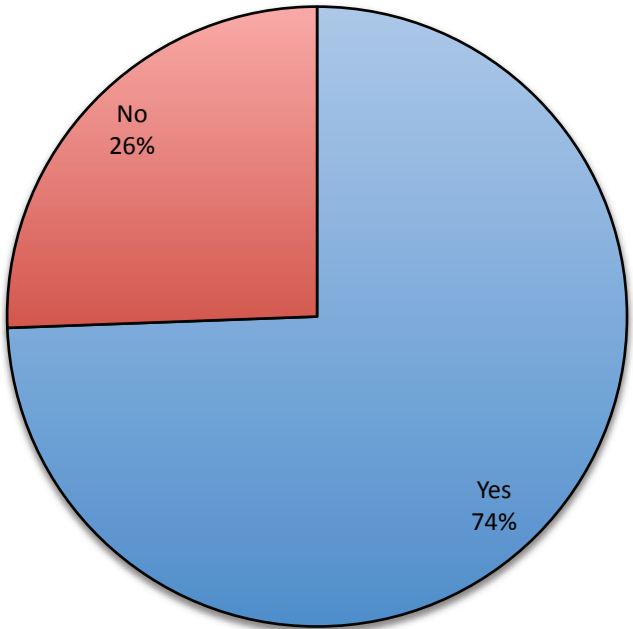
Which is More Important



The results of this question were both surprising and helpful. Nobody responded that ownership of ideas was the most important. The responses were evenly split between openness of ideas being important and both being important. What this says is that while intellectual property (I.P.) should be protected as much as possible, the spirit of openness is primary. As long as the I.P. rules and expectations are clear and fair for everyone involved, issues around ownership of ideas should not be a problem.

Has your institution ever partnered or collaborated with a university?

The first part of this question was a simple yes or no. The second part asked if the collaboration was a valuable experience.



From this chart the fact that museum and university partnerships are rather common is clear. While this is not particularly enlightening, some of the comments as to the value of these collaborations show some of the benefits and issues with museum-university collaborations.

“Some collaborations have been incredibly valuable and a positive learning experience for both sides, while some have been all-around frustrating for everyone.”

“We do a lot with local universities. It can be challenging, but we generally gain a lot of valuable expertise.”

“Yes, but not in this format. We've partnered for program delivery and found it a great leadership opportunity and chance to connect with potential new employees/ community connections”

- Survey #44, Museum Survey

“Generally, yes. We're still finding our way with some of the partnerships, but the expertise of university professionals is very valuable in our work in the science center. These relationships create a pipeline to new research and trends in the field.”

- Survey #35, Museum Survey

“Yes, but there are serious challenges in these collaborations because of the different models of education that are often present in museums vs universities”

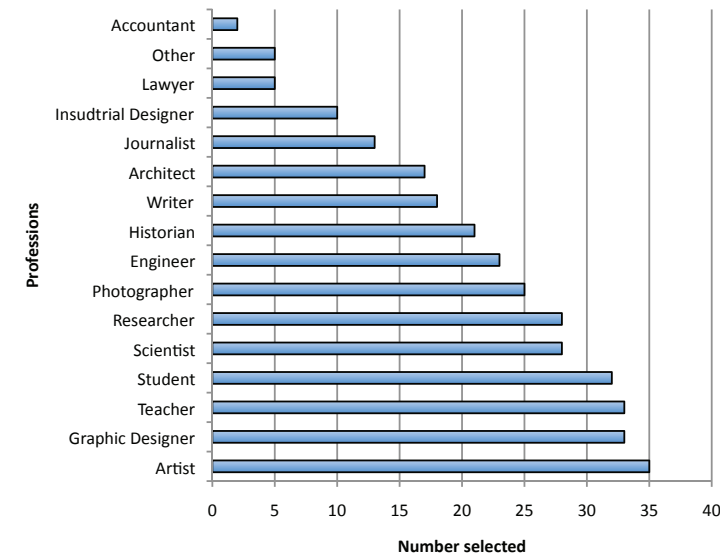
- Survey #27, Museum Survey

“Yes and no. There was a lot of handholding and training that had to take place. In the end, the students got more out of it than the museum did.”

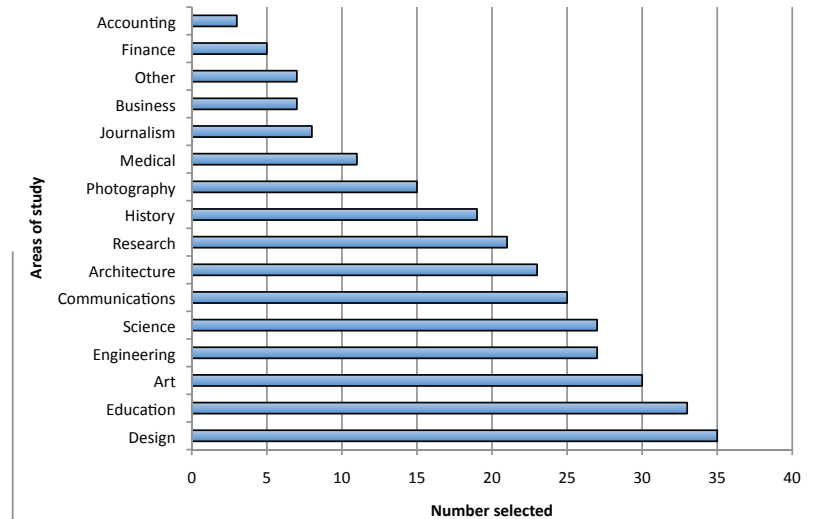
- Survey #13, Museum Survey

These next two questions are trying to ascertain which disciplines or professions do museums most commonly collaborate with.

Have you ever partnered with professionals in the following disciplines?



Students from which of the following disciplines would be most valuable?



Application

The application of the researched concepts to the museum setting pose a series of interesting questions:

What If...

...Museums could tap into a group of people with diverse backgrounds to help develop, prototype, and test solutions for exhibition elements, public programs and other offerings?

...Other museums could benefit from the solutions developed rather than spending time and resources re-inventing the wheel?

...University students, members of the general public, and professionals in different disciplines could engage with each other, collaboratively working on projects and learning from each others experiences?

...There was a design lab where visitors could see an ever changing series of experiences and participate in their development?

The Philadelphia museum prototype collABorative

Introduction

The application of the research, interviews and examples of new and forward thinking serves as a basis for the Philadelphia museum prototype collABorative. **This lab serves local museums, universities and individuals interested in developing exhibition elements, interactive displays and programs for public audiences.**

This lab aims to provide a platform for exchanging of ideas and fosters dialogue between members of the public, institutions, professionals and amateurs in different disciplines.

“Prototyping and evaluation are two integral steps in the exhibit / program development process, and unfortunately there is no standardized method for capturing the mood of an audience. A space where institutions and research facilities come together to collaborate and study common issues and theories, would be invaluable to the entire museum community.”

- Survey #34, Museum Survey

This proposal locates this lab in Philadelphia as an example because of the opportunity for a large number of museums and universities to participate. The model which will be outlined however may apply to other cities or areas interested in creating a collaborative design space. This proposal should be looked at as one example for creating such a lab. The hope is that this lab if proven successful could serve as a model for other labs around the world.

“We don't currently have the facilities or staff to adequately pre-test ideas and get feedback before launching so this type of space could be quite useful”

- Survey #52, Museum Survey

There are several advantages for museums in a particular city to collaborate on creating a prototype space. While it can benefit directly smaller institutions who do not have the resources to prototype themselves, larger institutions who are involved will reap the benefits of the solutions they arrive at. There are also opportunities for marketing and public relations outreach from the museums within the prototype colLABorative. Museums would be able to reach audiences they don't currently get coming in to their institution. they would be able to use the space to raise awareness about special exhibitions and events. And the space would be an exceptional venue for smaller collaborations between the participating museums such as programs, parties, fairs etc.

There are three main goals of the prototype colLABorative, these are:

The development, building and evaluating of functional prototypes which will be valuable to the partnering museums.

Providing valuable skills and experience for the workshop participants as well as program facilitators which they can bring back to their institutions.

Promoting the benefits of collaborative design and prototyping and providing resources for those interested in implementing those processes.

The proposed lab serves three separate audiences in different ways. Museums seeking new and interesting solutions to problems or challenges can make use of the brainstorming and prototyping and evaluation process, benefiting from new and meaningful ideas and concepts

they would not normally have access to. Universities whose students take part in the brainstorming and prototyping process gain valuable experience, encountering real world problems and developing effective and practical solutions. Representatives of the colLABorative will reach out to professors in local universities. By fostering these relationships the hope is that visits to the colLABorative can be integrated into the professors' planned curricula. Members of the general public can visit and participate in the exhibition space, testing prototypes or contributing ideas. Those who possess the applicable skills may also serve as facilitators within the space.

At its core, this collaborative prototype lab serves as a brainstorming and rapid prototyping space. Museums would be able to present a problem they would like potential solutions for. These problems can be as far ranging as an idea for a new interactive exhibit, a new marketing strategy, or an issue with an existing educational

program. This problem is then taken and presented to groups made up of university students and/or corporate employees for several brainstorming and development sessions. These sessions are managed by a small group of up to 3 facilitators. The results of the sessions are taken by the facilitators and refined for testing in the prototype space.

The facilitators who manage these sessions are part of a residency program which lasts for up to 3 months at a time. The facilitators could be anyone from a current museum professional, university graduate student or a member of the general public with skills and interest in the lab. It would be advantageous for there to be a variety of skill sets among the group of facilitators. The skill sets that would be important for a facilitator involved in the program are varied but could include: art, science, management, business, physical design, graphic design, shop/building skills, making/tinkering, content development, marketing,

research, evaluation, and writing. By keeping the residency start and end dates staggered, every month there will be someone leaving and someone joining the team. This will have the advantage of always having 2 facilitators with at least one month of experience to remain while bringing in one new facilitator. This roll over effect will mean that the prototypes being produced by the space will be dynamic and ever evolving.

By collaborating with individuals not traditionally involved in the museum exhibition process, museums benefit from an increased base of knowledge and experience. When their employees participate in workshop sessions and serve as facilitators, they bring back skills and experiences, building the museum's capacity for the same types of activities.

University students and individuals who participate in brainstorming sessions will benefit from the experience, applying the skills they learned to their studies or profession.

prototype colLABorative

The Philadelphia museum prototype colLABorative as a physical space exists as an independent entity. As an independent entity, it exists apart from participating museums and universities and its location should be carefully considered. Because testing of prototypes is being conducted in this space, it is possible some museums would be concerned that the audience being engaged would be different than the institution's primary audience. On the other hand, the space would offer museums the ability to test with other audiences they do not currently target but they would like to engage with and attract to their institution. They also would be able to provide a more well rounded and well thought experience for all visitors.

By being located in a separate location than partnering museums or universities, the colLABorative can engage with a more

“It would be valuable in that it is always important to get multiple perspectives. However, it is only valuable if the people attending have some idea of the organization's mission, values and pedagogy.”
- Survey #42

“It would give us access to new areas of expertise where we don't currently have connections, or help us build connections to new audiences we'd like to target.”
- Survey #62

universal set of audiences as opposed to the specialized ones which may frequent a specific institution. Additionally, it provides for a marketing and public relations outlet for those institutions. By showing off unfinished and evolving prototypes on a certain exhibit, museums will be able to draw attention to the fact that they are evolving themselves. Universities will also be able to highlight their participation, showing off some real world projects that their students participated in.

Some aspects to consider would be placing it in an area within the city where there are art galleries and boutiques. Additionally, were it to be located in a tourist area or an area with nightlife, there would be opportunity for many drop-in visitors. An example of a location fulfilling these criteria is Philadelphia's Old City and Independence Hall area. Because of the numerous historic sites and museums, during the daytime, the prototype collABorative would have access to tourists, school groups and other similar visitors. At night however, this

area transforms. Because of the numerous trendy bars and art galleries, the area attracts college students, hipsters and young professionals. There is a clear advantage in testing prototypes with the broadest possible group of visitors.

Stakeholders

This is a list of the main stakeholders in the lab who both provide input and gain benefits from supporting the lab. Some of these stakeholders are active participants in the space and others are passive supporters and benefactors. Each stakeholder role will be described later in this document.

- Museums (as institutions)
- Museum professionals
- Universities (as institutions)
- Students
- Faculty
- Amateurs (tinkerers, hobbyists, scientists, engineers, accountants)

The physical space of the prototype collABorative consist of three main spaces. These are the workshop, the lab and the prototype space.

The Prototype Space

The exhibit space is the main way in which visitors, members of the general public engage with the prototype lab. It is always changing, reflecting the projects currently being developed in the other areas of the lab. The exhibit space is open to the public during normal business hours as well as some evenings to take advantage of the nightlife in Philadelphia.

At any one time, prototypes from several different projects will be displayed and tested within the exhibit space at the same time. These prototype exhibits are constantly changing, creating an environment that is constantly transforming itself. The goal is to create an environment which reverses

the typical museum environment of only showing finished an polished exhibits. The environment will intentionally feel unfinished and dynamic, allowing the visitor to feel free to participate more fully in the evaluation and development of the specific prototypes.

The methods of evaluation will vary depending on the specific prototype being tested. A physical interactive exhibit may follow an evaluation scheme inspired by the Franklin Institute's model of structured observation and interview, while digital interactives may rely on the collection of data by the interactive station itself. The evaluation of programs may center on the thoughts and impressions of those running the specific program, in addition to a survey of the participants. Because the exhibit space is set up as a participatory environment, visitors should feel free to express their opinions about the experiences at any time. These opinions may take many forms, from the ubiquitous post-it note solution to the possibility of a high-tech digital whiteboards.

The use of SMARTboards or interactive whiteboards in the space will help to extend the brainstorming and development out from the lab to the general exhibit area. SMARTboards are interactive whiteboards, a large digital surface onto which a computer display is projected. Problems that are currently being brainstormed and developed within the design space can be posted to the whiteboards throughout the exhibit space. Visitors are encouraged to provide feedback to current solutions as well as provide their own ideas. They can write, draw and animate their solutions on the SMARTboard and submit them. The ideas that have been submitted then can be displayed in other areas of the exhibition space to inspire other visitors. These submissions can also be collected and reviewed to make refinements on or create new prototypes.

These whiteboards provide a simple way of digitally documenting all comments and suggestions as well as the process and results of brainstorming sessions. The exhibition space would become

a destination for people seeking new interactive experiences. As the experiences within the exhibition space will constantly be evolving, visitors will be encouraged to return often.

The Lab

The lab is where the workshops and development sessions occur. This space is specially designed for groups of people to go through rapid ideation, building of models and prototypes, and iteration.

The barrier between the lab and the prototype space should be flexible and not permanent. This will allow for the size of the exhibit space to expand or contract depending on its needs. Conversely, the lab space can expand to accommodate larger workshop groups.

The open space of the lab contains several groups of tables. These tables are for the use of the various groups in the workshop. Each table has a roll of white kraft paper at one end. The entire surface of the table can be covered with this paper, allowing for taking notes, sketching and diagramming.

The walls of the lab have projection screens for presentations, magnetic whiteboards for concept mapping and magnetically pinning up paper sketches and digital whiteboards for directly documenting ideation.

Additionally, there are a series of resources to aid the development process, these include computer workstations, markers, materials for mock ups such as cardboard, foam core, tape, glue, and cutting knives.

The main design goal of the lab is versatility. The space is adaptable enough for a presentation to the entire workshop group or to designate areas for sub groups within the workshop. Participants will be brainstorming, sketching and making concept diagrams, then moving on the building small and full scale models out of cardboard, tape, and foam core.

The Workshop

The workshop is an area of the space which visitors and workshop participants will have somewhat limited access to. This is mainly because of logistical safety concerns.

Taking the example from The Exploratorium, the workshop while separated from the rest of the space, should remain visible to both visitors and workshop participants. Accessibility to certain areas is to be determined by the characteristics of the tools and technologies therein. Equipment that is potentially dangerous and produces significant amounts of dust such as saws, routers mills and lathes would be contained in a separate room but still visible through large windows. Graphics and signage production equipment should also be contained in a room because of the importance keeping those pieces of equipment free of dust. The rest of the workshop should remain open to the rest of

the space, with only a small physical barrier separating the shop from the exhibit space and the lab. This open space constitutes the bulk of the workshop space. This is where assembly of prototypes will occur, and provide space for the use of hand tools, drills etc. This is also a place to showcase the advanced technology being utilized in the space. Rapid prototyping equipment such as a laser cutter and 3D printer should be on display for the public. While standard tools are familiar to most people, these rapid prototyping technologies are new and amazing to many visitors. Taking a cue from NextFab, these technologies should be showcased to the visitor.

Above all, the facilitators in the workshop should be available to all visitors for answering questions about their process.

The Process

When a group comes to the lab, they first have a short session covering how to brainstorm. A series of simple rules are posted on the wall in huge letters. These rules were inspired by the rules employed by the design firm IDEO:

“**There is no wrong in brainstorming**

Say every idea no matter how crazy it sounds, it may lead to a great idea

When in doubt, draw it!!

Sketches and diagrams can help to communicate ideas better

Have fun!!

Ideas are harder to come by when you're mad”

The three facilitators are responsible for the day to day operations of the space. They run the brainstorming and ideation sessions with the interdisciplinary development groups.

The length of the workshops and development sessions depends on the project needs and the make-up of the development group. The average session length should be about a day and a half to two days long. But extended sessions would be possible, as well as workshops that meet once a week for a month.

The process starts out with the problem or challenge. This comes from one of the museums who participates in the co-op. Each problem will be worked on in the order that they are submitted, however the facilitators carefully weigh which design problem to match with which workshop group. Also, facilitators will schedule the session when a representative from the museum is able to attend.

Next, the brainstormers participate in a few creativity warm up exercises. These may include:

A rapid sketching exercise

sketch 5 concepts to a simple problem in 5 minutes

Word associations

Creating a cloud of associated words based on a seed word or idea

Rapid Prototyping

quickly create a small model with some everyday materials such as matchsticks, paper clips, rubber bands, thumbtacks etc.

These exercises are intended to get the participants warmed up and to prepare them for the more extensive problems to come.

Once the participants are warmed up, the representative from the specific museum presents the design problem they will be working on. This presentation should convey as much information as possible in order for the teams to develop the best possible solutions. The information should include but is not limited to:

Background information about the institution, it's mission, goals and audience

A detailed description of the design problem, the target audience and goals

Any additional resources, research and information needed to accomplish the task

A final deliverable or goal for development teams to aspire to

With this information, the interdisciplinary development teams should be able to begin brainstorming solutions.

At this point, the workshop participants are split into smaller teams. Because each workshop session is made up of participants from different institutions, these smaller teams should be made up of equal numbers from each institutions. These smaller teams, containing 8-14 are large enough to benefit from the members' diverse experience, and small enough as to not become cumbersome during brainstorming and development.

Each team is given a few hours to come up with several possible solutions to the problem. These solutions will then be presented to the entire group. Each group presents their solutions and receives feedback from the entire workshop as well as the facilitators. This feedback is used to refine and select one solution per team.

This one solution is then taken to the next stage. Each team takes their solution and builds a mock-up out of common model making materials. In this stage, participants must think about human factors, and the way in which the end user will ultimately interact with the device they have designed.

The teams take turns testing their prototypes with the other team players playing the role of visitors. They use a combination of observation and survey questions to determine where their design succeeds and where it fails. They take this information to create their final proposal for a solution to the challenge originally proposed. This proposal would consist of a single written page about their approach to the challenge. It would also include the actual prototype they produced as well as any photographs of the development and design process.

The Facilitators

The entire process of brainstorming, prototyping and testing is driven by the facilitators in the space. On a day to day basis, they are running the sessions, building prototypes in the workshop, and engaging with visitors in the exhibit space. They are the visible “face” of the institution, interacting with visitor and workshop participants alike.

At any one time, three facilitators are working for the prototype collABorative. Each one is part of a three month long residence program. Each of the three residencies are for a different stakeholder group. The first is for a museum professional whose institution has joined the collaborative. The second is for a junior, senior or graduate university student studying in a field related to design, education or museums. And the last residency is for any member of the general public, but is geared for individuals in the maker community. These residencies

are set up this way for a targeted diversity of experience, combining the knowledge of the workings of museums with the enthusiasm and fresh perspective of a student and someone with the knowledge of making things.

All three residencies last for three months and are staggered so that every month, one of the three residencies is rolling over. Each position is filled by a total of four people throughout the year, resulting in a total of twelve facilitators rotating through the space every year. The main reason for this is to keep the personality or spirit of the space as fresh as possible. If facilitators were able to spend extended lengths of time running the space, their influence over time may result in similar prototypes being repeatedly produced.

Facilitator Schedule

	Jan	Feb	Mar	Apr	May	etc.
Museum	Month 1	Month 2	Month 3	Month 1	Month 2	
University	Month 3	Month 1	Month 2	Month 3	Month 1	
Maker	Month 2	Month 3	Month 1	Month 2	Month 3	

Blue squares indicate when a new facilitator is starting in the space.

Management

While most of the day-to-day operations of the prototype collABorative are handled by the three facilitators, the need for a management group who are permanent fixtures in the institution is clear.

The management will be essential in selecting prospective facilitators, sorting through their application forms and coordinating the facilitator schedule. They, along with the two current facilitators will train the incoming facilitator on a monthly basis. They will also maintain the continuing relationships and partnerships with universities and museums, handling public relations and marketing, and maintaining the physical needs of the space.

The Lab Designer/Director

The director of the lab functions as the head of the entire prototype collABorative. This director coordinates the functions of the facilitators with the representatives of the partnering museums.

The designer works with the facilitators running the workshop and acts as a design resource for both the facilitators and the workshop participants. The designer is also charged with documenting the workshop process, taking photographs and maintaining the digital archive of material that is created during workshop sessions.

The designer is also in charge of the prototype space. While facilitators perform many of the tasks such as setting up devices for testing, the designer coordinates them.

The Shop Technician

The next manager is the shop technician. The shop technician is mainly in charge of the workshop section of the space because of the advanced technology and the experience required to operate these machines. The shop tech is responsible for the technical maintenance of all the workshop equipment, ordering and maintaining building materials as well as training new facilitators on working with the tools available. Additionally, the shop tech serves as a technical resource for the facilitators as they build the prototypes for testing in the exhibit space. Like the lab designer, the shop tech is also responsible for documenting the process of building prototypes.

Evaluators

Evaluators will run studies of each device tested. These evaluators will be brought in by contract on a project by project basis to oversee the evaluation of one set of solutions for a given museum.

Each evaluator will design their own survey and observation instruments according to the needs and goals of the museum who originally proposed the challenge. The initial results of the evaluation will be used for evolving the designs for a second round of testing. After this second round, the evaluator will prepare a report for the partnering museum as well as for documentation on the quarterly report from the collABorative.

“Probably no form of publicity has spread the museum’s fame more widely than the Cookbook or won it more friends.”

- Hein 68

Documentation and Dissemination

As one of the main inspirations for the prototype colLABorative is the spirit of openness and collaboration in the open source software community. All of the processes and results of the workshops and prototype testing that occur in the space will be made available for anyone who wants them. This is why one of the main tasks of the directors and facilitators is to document everything that happens during development sessions, in the workshop and during testing with visitors. Each project proposed by a partnering museum and undertaken by the colLABorative is documented from beginning to end. The documentation is aided by the use of technology within the space. The digital SMARTboards can automatically archive all information written and drawn on them. This includes the workshop sessions as well as contributions from visitors within the exhibit space.

As the length of some individual projects may be longer than an individual facilitator’s residency, the director is responsible for overseeing each project as a whole. The facilitators however, as the ones who are running the workshops, building the prototypes and conducting the evaluations, will be writing first hand accounts and summaries of their work.

This information will be compiled and distributed both on-line and in a quarterly journal sent out to partners in the collaborative. The online distribution will take the form of a database of projects with an overview of the project, the process and the solutions. This database is available to anyone who wishes to access it, however it does not include much of the detailed information such as actual design schematics or full evaluation results. Taking a cue from *The Exploratorium Cookbooks*, the full information is available to museums and institutions who are partners in the colLABorative, as well as to anyone who purchases the quarterly journal.

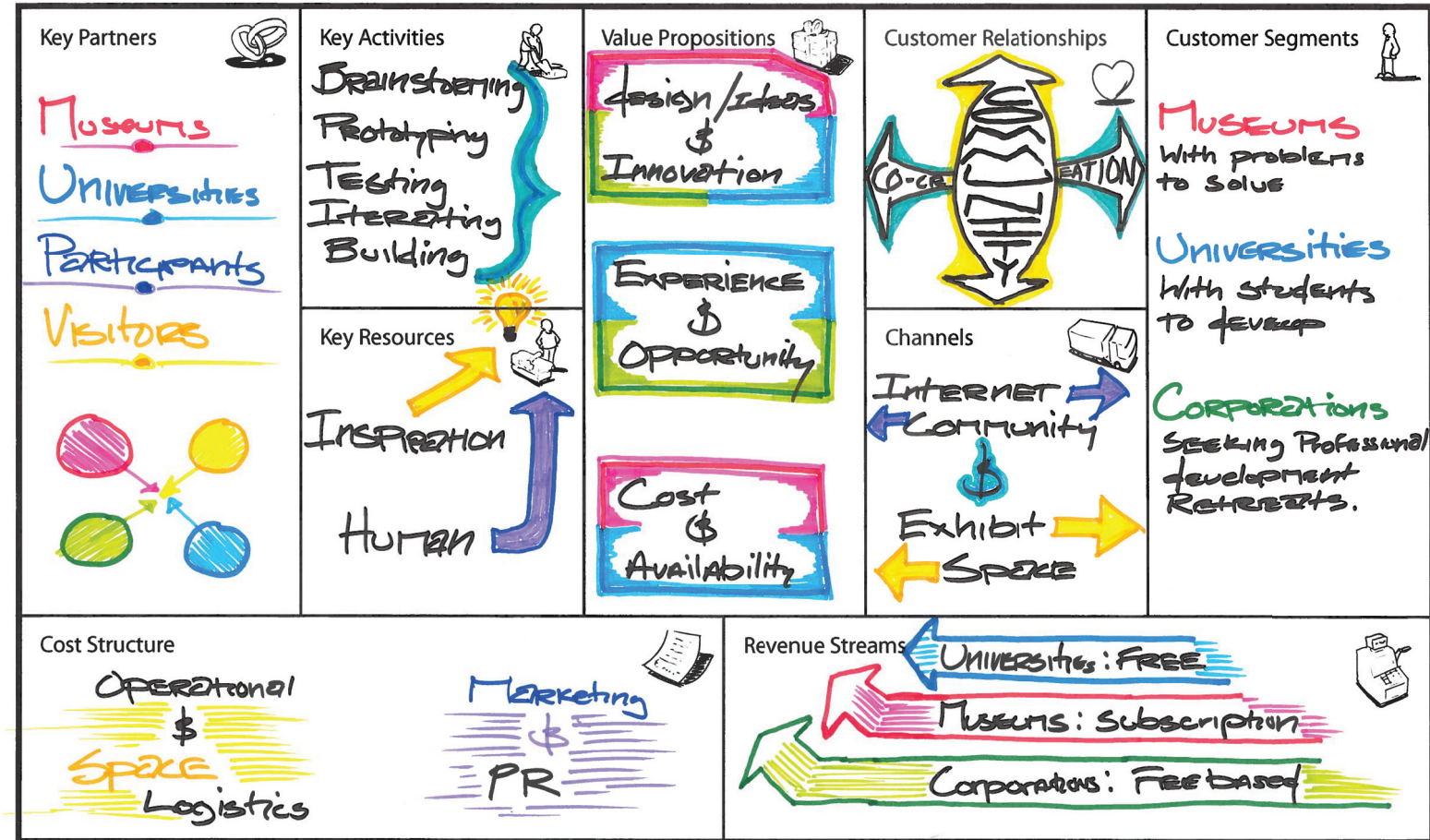
The Business Model Canvas

Designed for:

Designed by:

On:

Iteration:



www.businessmodelgeneration.com

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Business Model

In order to fully understand the logistics behind the prototype collABorative as an institution, a business model canvass (from *Business Model Generation*) was utilized. This tool helped to visualize the various enterprise sectors, areas which the business plan must address. As this business model canvass was a tool for developing the various business model areas, these areas have evolved and are addressed as follows.

Customer Segments:

Who do we serve?

The first area that needed to be defined was the customer segments. Customer segments are groups for who the lab creates value, whose needs the lab fulfills. In the parlance of museums, this would be the audience, who are we serving and why? It quickly became apparent that in order to fully answer the questions posed in the “what if?” scenarios, a so called multi-sided platform would be required. The two three main customer segments are museums, universities and their students. Museums are looking for new, meaningful experiences for their visitors. Universities main concerns are aiding in the development of their students, and to further their standing in research and design circles.

Value Propositions:

Creating value for partners

The next area is the value propositions; what does the lab offer to its customer segments to address their needs? The lab creates value for its customers in a variety of ways, often overlapping in customer segments. The production of design concepts, ideas, and innovations applies to the needs of museums for new visitor experiences as well as to the individuals from universities who also participate in the process. These experiences and opportunities benefit anyone who participates in the space. Beyond benefiting the individuals, the institutions they represent gain by their constituents bettering themselves. The cost and availability of the lab service is of paramount value to both universities and museums. Ideally, the lab will be located in an area with large populations of universities and museums close by.

Channels:

Marketing

The next area is analyzing the channels through which the lab reaches its customers. The two main channels for interaction between the customers and the lab are the prototype space itself and an online community. The creation of an active and relevant online community will be an important step in fostering a lasting relationship with its customers. The online community is the main access point for the museums to keep updated about the progress and results of the lab. The other channel to the lab's customers is the exhibit space itself. By exhibiting the results and

intermediate steps in the design process, the prototype space will inform and entice potential customers to participate fully in the workshops. The prototype space can also serve as a venue for a lecture series or for other institutions to use for their workshops and sessions. The online presence and the physical space will feed off each other. Developing a robust online presence is a specialized activity involving fostering relationships with other sites to reach those most likely to participate. These sites may include museums or other maker communities.

Customer Relationships:

Building community

Customer relationships is the next area for analysis. The main relationships between the collABorative and its participants will be through the director and the facilitators. One of the relationships that will be fostered by the lab will be the community. discussed briefly before, the importance of the community for both channels and relationships cannot be overstated. By actively engaging their customers in the community, the lab fosters a feeling of ownership in the process and results. Additionally, the concept of co-creation is an important aspect of the lab space.

“As a multi-sided platform Google has a very distinct revenue model. It makes money from one Customer Segment, advertisers, while subsidizing free offers to two other segments: Web surfers and content owners. This is logical because the more ads it displays to Web surfers, the more it earns from advertisers. Increased advertising earnings, in turn, motivates even more content owners to become AdSense partners”

- Business Model Generation p.81

Revenue Streams: Sustainability

Revenue streams are obviously important to the development of any business plan. The cost of the service varies according to the customer segment. This is one of the hallmarks of the multi-sided platform. For universities to bring their students to the space for workshops is totally free. As Chris Anderson notes, “truth is that zero is one market and any other price is another. In many cases, that’s the difference between a great market and none at all.” By making the service free to universities and their students, the hope is that the barrier to entry is non-existent. In a multi-sided platform, the value to other customer segments is dependent on the existence of the one which is free.

Museums, as the main benefactors and stakeholders in the results and continuing success of the lab, they will be the main participants in the cooperative. As such, they will be asked to contribute what they

can on an annual basis. This financial commitment to the colLABorative will entitle each museum to all of the results and documentation of process which occurs in the lab. They will also be able to present their specific design problems to be developed and incubated within the lab. Additionally, museum professionals from these institutions may be tapped to participate in the lab in the form of 3 month long residencies as facilitators on the ideation sessions.

It is clear however that relying on pay what you can donations from participating institutions is not a suitable model for long term stability. To that end, it will be important to vigorously pursue public funding such as grants, or private funding in the form of corporate sponsorships. Additionally, partnering with other associations such as The American Association of Museums, and the Association of Science and Technology Centers may provide additional avenues to find funding.

“One example is Metro, the free daily newspaper that originated in Stockholm and can now be found in many large cities worldwide. It launched in 1995 and immediately attracted a large readership because it was distributed free of charge to urban commuters in train and bus stations throughout Stockholm. This allowed it to attract advertisers and rapidly become profitable.”

- Business Model Generation p.79

“The model only works, though, if many people use Google’s search engine. The more people Google reaches, the more ads it can display and the greater the value created for advertisers.”

- Business Model Generation p.80

Key Activities:

What do we do?

The next area for enterprise plan analysis are key activities. The key activities for the lab are those that go into the design process that is being offered. These activities are brainstorming, prototyping, testing, iterating and building.

“Operators of multi-sided platforms must ask themselves several key questions: Can we attract sufficient numbers of customers for each side of the platform? Which side is more price sensitive? Can that side be enticed by a subsidized offer? Will the other side of the platform generate sufficient revenues to cover the subsidies?”

- Business Model Generation p.79

Key Resources:

What can we tap into?

Again, the key resources as advantages of the lab will vary depending on each customer segment. Resources which would be of concern to museums are the power of groups of people to generate new and valuable ideas. Additionally, smaller museums would be able to take advantage of the physical workshop resources that they may otherwise not have access to. These workshop resources include various rapid prototyping machines such as 3D printers, CNC routers, mills, and laser cutters. The key resource for universities and their students is the experience. The lab has a resource in the form of real-world problems in search of solutions. University students will have unique opportunities to apply themselves to practical problems.

Key Partnerships:

Who can we work with?

The key partners in the lab are also its customers. Because two of the customer segments are nonprofit institutions or groups of institutions, their partnership and institutional support will be extremely important. In this case the “supply” that particular university partners will provide is human, bringing its students to participate in the lab. One additional partner in the lab are the visitors to the exhibit space itself. By providing platforms for their participation within the space, visitors become developers of ideas.

Cost Structure:

Fixed or variable?

The final area for analysis under the business model canvas is the cost structure. Most of the costs associated with the lab will be fixed. Day to day costs such as those the logistics of operating the space should be fixed. The same goes for most of the materials required for prototyping and building. Some materials and technology for specific prototypes may require more money. As the scale of the lab should remain consistent, as should its costs.

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Challenges

While the preceding plan for the prototype colLABorative addresses many areas which are essential for running the space, there will no doubt be many challenges in starting and operating the space.

The first and most essential challenge to overcome are the very high start-up costs. In order to secure a lease for a space, hire staff, design and build it to suit the colLABorative's needs, promote and market the space, install all the necessary equipment, technology, and tools, is an enormous challenge. If the prototype colLABorative is going to get off the ground, it is going to take a large financial contribution from a combination of private donors, public grants and commitments from institutions interested in participating in the space. Additionally, it is going to take a team of individuals driven and committed to the success of the space.

The second challenge is getting museums and institutions to buy-in and commit to supporting the space. The first step is convincing them of the benefits of collaborative development and prototyping. Much of the research conducted for this thesis could serve to show these benefits. And once they decide that they could benefit from this process, showing that supporting the prototype colLABorative is the easiest and most effective way to start. Additionally, the collaborative can benefit the participating museums by marketing and promoting projects that are currently in development, broadening their visitor base.

The key will be highlighting the advantages to institutions, that include simply creating better exhibits, having access to and attracting a new audience, and having access for their employees to develop new skills. This challenge also extends to

Further Research

The research portion of this thesis represents an overview of the concepts that were the impetus for planning the prototype colLABorative. This conceptual overview looked at several historical and contemporary institutions which inspired the prototype colLABorative. This broad overview looked at these institutions for their big ideas and was less concerned with operational details.

One important area for further research would be a new and more targeted survey and evaluation of the concept. The evaluation that was performed during this thesis process was broad and introductory. Specifically the question about whether or not the respondent's institution engages in a brainstorming, prototyping and testing process could be split up into three different questions. This would provide a deeper level of understanding of the current practices of

museums. Additionally, because the plan for the prototype colLABorative is more defined, the next survey could be based more concretely on the decisions made to create this plan.

A deep investigation into the nuts and bolts of how modern and contemporary collaborative design spaces function including a practical investigation of funding resources would benefit both the prototype colLABorative getting off the ground, as well as other potential collaborative concepts. Looking at specific grants from both the National Endowment for the Arts and the National Science Foundation to get an idea of the types of public funding are available. It would also be beneficial to pursue private funding in the form of corporate sponsorships or formal partnerships.

The next steps in realizing the plan for the prototype colLABorative include this deep investigation into funding sources as well as creating a detailed business plan. This

detailed business plan will be extremely important when actually pursuing grants and private sources of funding.

One corporate group which may be very interested in participating in the colLABorative would be exhibit fabricators. Because they partner with museums and design firms to realize the exhibitions they develop. A prototype colLABorative could be an important resource of successful prototypes and designs to draw upon. At the same time, the fabricator could bring valuable building resources to the lab.

Conclusion

The examples that have been examined through the research process have shown the potential of Wikinomics, open-source and artscience. These institutional examples represent a look at a wide range of concepts, but the sheer number of those either using or investigating these concepts shows their strength and timeliness. The institutions making use of these concepts are archetypes to which others can look, in implementing brainstorming, prototyping and testing in a collaborative setting.

Interdisciplinary and multidisciplinary collaboration have been shown to be valuable and successful in various areas including scientific research and development, the technology industry, design, creative, and artistic. The synthesis of these ideas within the museum

community could prove to be extremely valuable for all those involved.

Drawing on the research, interviews, and the evaluation performed, the prototype colLABorative provides a needed service and fosters relationships between museums, universities and corporations. The promise of the prototype colLABorative may be realized in full, but also in part by the work of others, applying the concepts and spirit presented, in their own work or institution.

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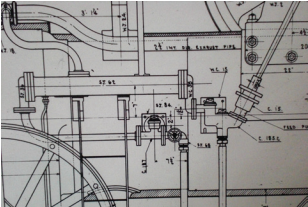
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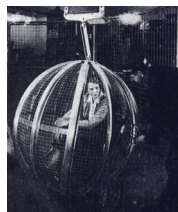
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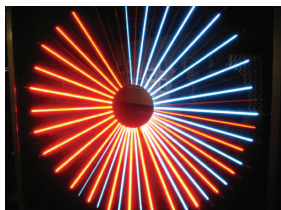
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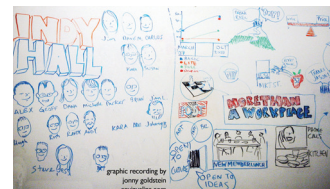
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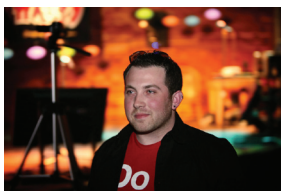
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Museum Survey

1. Museum department or role

☐ Development

☐ Exhibits

☐ Marketing/PR

☐ Administration

☐ Education

☐ Facilities

Other (please specify)

2. How long have you been in the museum field?

☐ 0-2 years

☐ 3-5 years

☐ 5-10 years

☐ 10-15 years

☐ 15+ years

3. You would consider your institution:

☐ small

☐ medium

☐ large

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Museum Survey

*4. Please rate your interest in participating in a collaborative design space for brainstorming, mocking-up, prototyping and testing solutions for museum challenges

Interest level

Not interested

A little interest

Moderately interested

Very interested

☐

☐

☐

☐

5. Would a collaborative design and exhibition space where university students and faculty, museum professionals and the public research, brainstorm, develop and prototype solutions to problems proposed by participating museums be valuable to you, or your institution?

☐ Yes

☐ No

How would it be valuable?

6. Does your institution engage in a formal or informal brainstorming, development, prototyping and testing process?

☐ Yes

☐ No

If yes, please describe your process, if no, what is the main reason you dont?

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Museum Survey

*7. Which is more important?

- ☐ Ownership of ideas
- ☐ Openness of ideas
- ☐ Both are important

8. Has your institution ever partnered or collaborated with a university?

- ☐ Yes
- ☐ No

If yes, did you find it valuable?

9. Have you ever collaborated with professionals in the any of the following disciplines?

- ☐ Artist
- ☐ Graphic Designer
- ☐ Industrial Designer
- ☐ Architect
- ☐ Teacher
- ☐ Student
- ☐ Scientist
- ☐ Engineer
- ☐ Historian
- ☐ Writer
- ☐ Journalist
- ☐ Photographer
- ☐ Researcher
- ☐ Lawyer
- ☐ Accountant

Other (please specify)

Museum Survey

10. Assuming a collaborative design space is created, students from which of the following areas would be most valuable in brainstorming, prototyping or developing museum exhibits?

- ☐ Art
- ☐ Architecture
- ☐ Design
- ☐ Engineering
- ☐ History
- ☐ Photography
- ☐ Science
- ☐ Research
- ☐ Medical
- ☐ Communications
- ☐ Journalism
- ☐ Finance
- ☐ Business
- ☐ Accounting
- ☐ Education

Other (please specify)

11. Are there any specific projects you have in mind which could benefit from brainstorming and ideation in the prototype lab and be applied to a museum setting? If yes, please describe.

